



GENERAL TECHNICAL CATALOG



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DAS LAGER

GENERAL TECHNICAL CATALOGUE

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Measuring units of the international system SI

Length

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

Weight

1 kg = 2,205 lb
1 lb = 0,454 N

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)



Bearing types and their characteristics

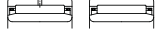
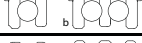
 EXCELLENT  GOOD  UNSUITABLE  FAIR  POOR  Single Direction  Double Direction		Purely radial load	Purely axial load	Combined load	Moment load
Bearing Type					
Deep Groove Ball Bearings					
Angular Contact Ball Bearings, Single Row					
Matched Single Row, Double Row					
Four-Point Contact					
Self-Aligning Ball Bearings					
Cylindrical Roller Bearings, with cage					
Full Complement, Single Row					
Full Complement, Double Row					
Needle Roller Bearings, with steel rings					
Assemblies/Drawn Cups					
Taper Roller Bearings, Single Row					
Matched Single Row					
Spherical Roller Bearings					
Torodial Bearings					
Full Complement					
Thrust Ball Bearings					
with sphered housing washer					
Cylindrical Roller Thrust Bearings					
Spherical Roller Thrust Bearings					

Table 1.1

High Speed	Tolerance class (High Running Accuracy)	High Stiffness	Quiet Running	Low friction	Compensation of Misalignment	Compensation for error of alignment (initial)	Located Bearing Arrangement	Non-located Bearing Arrangement	Axial Displacement Possible in Bearing

Selection of bearing type

Every bearing type has some different specific features, that make it suitable for certain specific applications. For this reason many bearing types and models have been developed, in order to satisfy many different necessities for rolling bearings. As there are so many factors to be considered when choosing the right bearing type, it's impossible to provide a general rule.

We will now provide the most important criteria that need to be considered in order to select the right bearing type.

Selection of bearing type, considering the load magnitude and direction

Radial load

In case of light and moderate pure radial loads, deep groove ball bearings are the most adequate types of bearings. In case of heavy radial loads, or where large-diameter shafts are used, double row cylindrical bearings are the most suitable choice. In case of limited space and heavy loads, needle roller bearings are recommended.

Axial load

In case of pure axial loads, when loads are acting in only one direction, the use of single direction thrust ball bearings is recommended. When loads are acting in both directions, then double direction thrust ball bearings are to be used. The choice of angular contact thrust ball bearings and single or double row angular contact ball bearings is to be done in case of light or moderate pure axial loads at moderate speeds.

Deep groove ball bearings are adequate in case of light axial loads at high speeds. In these bearings, under the axial load a contact angle different from 0° is generated, making

them operate as angular contact ball bearings. Therefore, in order to achieve a superior capacity of load carrying, a larger clearance (C3, C4, etc...) should be chosen.

In case of moderate axial loads at high speeds, the most adequate choice is to use angular contact ball bearings in tandem arrangement, in order to make them take over loads acting in both directions.

Another option is to use four-point contact ball bearings of the QJ type.

Combined load

In case of combined radial and axial loads acting simultaneously, bearings with a contact angle different from 0° are to be used. In such case, the axial load carrying capacity is proportional to the contact angle.

Also self-aligning ball bearings, spherical roller bearings or cylindrical roller bearings of the NJ, NUP and NJ+HJ type can be used in order to carry combined loads of certain values. But a special attention should be given to some limit values of the ratio F_a/F_r , that are shown in the bearing tables and should never be exceeded. Cylindrical roller bearings can carry axial loads by means of the sliding friction on ribs.

Bearings accommodating only one direction axial loads should always be mounted in pairs, in order to carry axial loads in both directions.

Selection of bearing type considering the alignment between shaft and housing

When the operating load makes the shaft bend, or the bearings' adjoint parts have shape or position deviations, angular misalignments can occur.

In similar cases, the use of self-aligning ball bearings, cylindrical roller bearings or spherical

roller thrust bearings is recommended.

Errors of alignment can be compensated by certain bearing bent angles; maximum angles for each type are indicated in the introductory texts of the table sections.

When the aim is to compensate misalignments, then great importance must be given to radial and axial clearance, because the possibility of self-aligning is directly proportional to the clearance.

If the misalignment exceeds the maximum values indicated in the introductory texts of the bearing tables, the result is a decrease in the bearing rating life.

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

The use of normal bearings is recommended only up to a temperature of maximum 120°C. In case of higher temperatures, the use of bearings with special heat treatments is recommended, in accordance with the specifications indicated on page 23.

The use of sealed bearings, 2RS type, is recommended only up to temperatures of 80°C, because when this temperature is exceeded there is a considerable reduction in the efficacy of lubricants.

Selection of bearing internal clearance

When operating, bearings should almost always be provided with a small radial clearance, definable as "the possible value of displacement in radial direction of one bearing ring in relation to the other without deformation of the parts".

While in use, the internal clearance of bearings is different from the one at delivery, because the latter is reduced when bearings are mounted with a certain tight fit.

While operating, a change in the internal clearance of bearings occurs also because of the different temperatures between the outer and inner ring. Bearings are generally delivered with a normal radial or axial clearance according to the values indicated for each roller bearing group.

The decrease in radial clearance caused by

operating temperature and tight fit is generally estimated to be 60-80% of the tightening value, according to the bearing series and size.

After a decrease in the clearance in bearings, the maintenance of a large enough operational clearance is recommended, in order to avoid the destruction of the lubricant film.

The operational clearance of deep groove ball bearings should be close to zero. Often there may be a light preload, because of the point-contact between the rolling elements and raceways.

The operational clearance of small-sized cylindrical roller bearings should be between 5-10 µm, while the operational clearance of larger-sized bearings should be around 10-30 µm.

On request, bearings can also be manufactured with radial and axial clearance smaller (C1 and C2) or larger (C3, C4, C5) than normal, in order to assure the most favorable operating conditions.

It's also possible to manufacture cylindrical and needle roller bearings with interchangeable rings (suffix NA).

In case of bearings with non interchangeable parts, it is not allowed to change rings from one bearing to the other, and the radial clearance is smaller than bearings with interchangeable parts.

In bearings with interchangeable parts, rings may be changed without altering the values of radial clearance.

Bearing types and technical characteristics

DAS LAGER can manufacture different types and sizes of bearings, in order to meet the customers' needs and assure an adequate reliability in different cases of application.

Table 1.1 shows quantitative results of each group of bearings, exposing their main technical characteristics.

Each bearing should be selected according to the technical characteristics required by the specific application.

A range of graphic symbols has been developed in order to represent the main technical characteristics of bearings, thus making simpler the selection of an adequate bearing for each different purpose. Using this catalogue as a reference, the adequate type and size of bearing can be selected according to its specific manufacturing and technical characteristics.

Selection of bearing size

When selecting the size of a bearing, what must be considered is the load to be endured, as well as the operational rating life and the prescribed operating safety.

Basic load ratings

In order to calculate bearing dimensions when rotating under load, what is used is the basic dynamic load rating C_r , which expresses the bearing admissible load assuring a basic rating life up to 1000 000 revolutions.

The basic dynamic load ratings of DAS LAGER bearings have been calculated according to international standard ISO 281. The values are given in bearing tables.

The rating life is determined by considering the basic dynamic load rating and calculating the service time until the fatigue of the material appears.

In case of low speeds, low oscillating movements or stationary conditions, the basic static load rating C_{or} is considered.

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

- 4600 MPa for self-aligning ball bearings,
- 4200 MPa for all other ball bearings,
- 4000 MPa for all roller bearings.

This amount of stress determines a permanent deformation of the rolling element and raceway which is about 0,0001 of the rolling element diameter. The loads are purely radial for axial bearings and purely 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, that 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.

When considering only the fatigue on the bearing operating surfaces, the following conditions have to be observed:

1. The forces and speeds considered in the calculation of the bearing should correspond to the real operating conditions.
2. During the entire operating period, adequate lubrication should be assured.
3. If the bearing carries a light load, its failure is due to the wear.
4. Often the failure of bearings happens to be caused by reasons different than fatigue, such as: selection of an improper bearing type in a bearing joint, improper operation or lubrication, presence of 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 the same conditions, is the life associated to a reliability of 90%.

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

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

L_{10} can be calculated using the equation:

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

L_{10} - basic rating life, millions of revolutions,

- C - basic bearing load, kN,
P - equivalent dynamic bearing load, kN,
p - exponent of the life equation with the following values:
p=3 - for ball bearings
p = 10/3 - for roller bearings

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

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

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

In case of thrust ball bearings, the following equations can be used:

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

$$P_a = XF_{ar} + YF_r, \text{ kN,} \quad \text{- for combined load}$$

where:

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

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

For some groups of bearing, the details necessary to determine the equivalent load have been provided in the texts preceding the bearing tables. Values for the coefficients X and Y can be found in tables.

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

$$L_{10h} = \frac{1000000}{60n} (C/P)^p \quad \text{or} \quad L_{10h} = \frac{16666}{n} (C/P)^p$$

where:

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

Values of the basic rating life L10 (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 L10h (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, the calculations should be based in accordance with the rating life corresponding to the purpose of operation.

Important factors to be considered are the machine type, service life and the requirements

concerning operational safety.

Approximate values of the service life for different classes of machines and equipments for general purposes are provided in table 2.4.

The basic rating life L10h of the bearings can be determined as a function of service life, using the life calculation chart on page 17.

The basic rating life for 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:

$$L_{10} = \frac{1000}{\pi D} L_{10s}, \quad \text{respectively:} \quad L_{10s} = \frac{\pi D}{1000} L_{10}$$

where:

L_{10} - basic rating life, millions of revolutions

L_{10s} - service life distance, millions of kilometers

D - wheel diameter, m

For light loaded cars and rail vehicles, approximate values for the service life distance (kilometers covered) are provided in table 2.5.

Load ratio C/P for various life values L_{10}
(milions 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	5,77	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

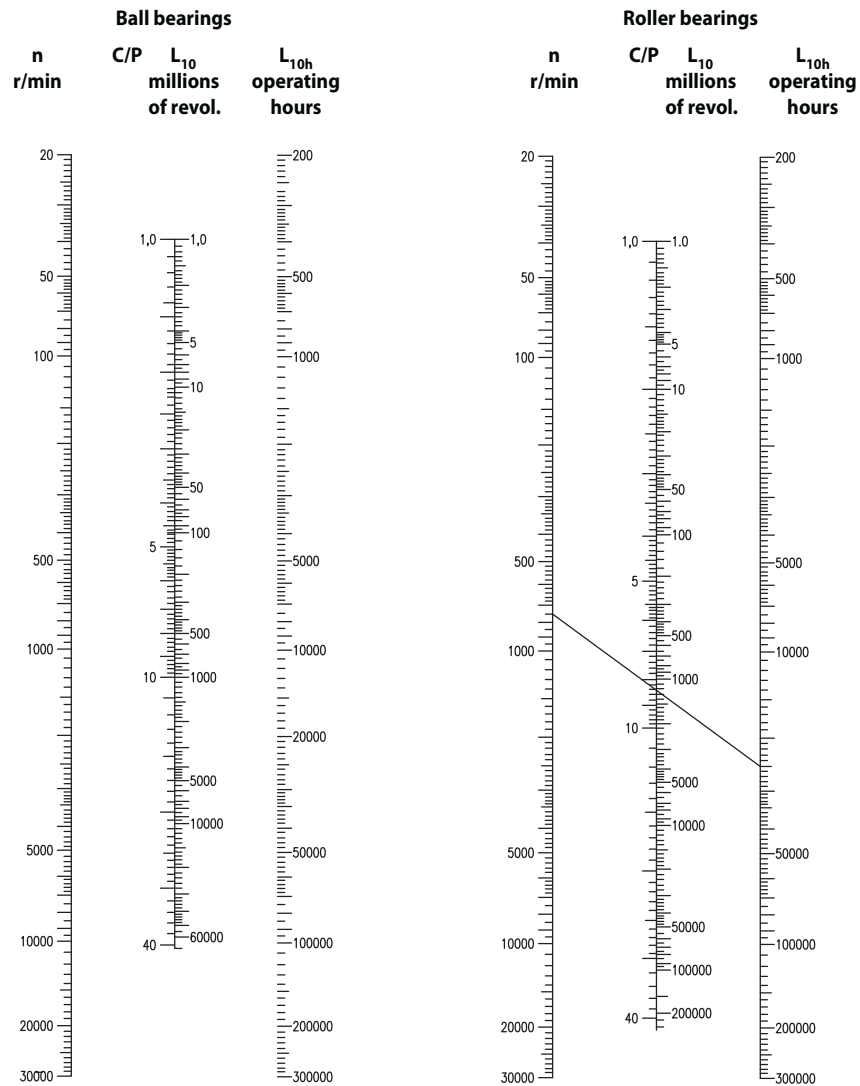
**Roller bearings - load ratio C/P for various basic rating lives L_{10h} (operating hours)
at various speeds n (r/min)**

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	1,85	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
- motorailers	3-4
- Diesel and electric locs	3-4

L_{10sc} - bearing rating life, millions of cycles
 δ - 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

Often, during operation, there can be a fluctuation in operation speed and/or magnitude of load. In such cases, it's necessary to calculate a mean dynamic load.

Complete oscillation = 4δ from point 0 to point 4

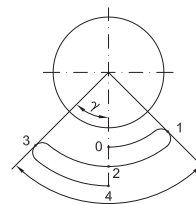


Fig. 1

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:

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

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

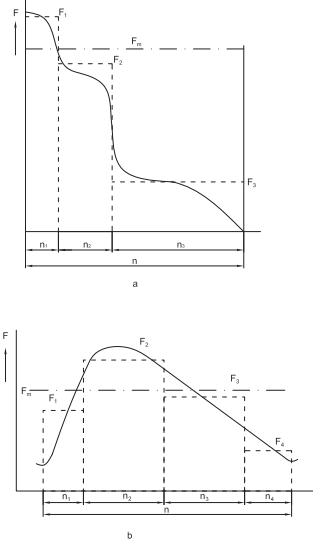


Fig. 2

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:

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

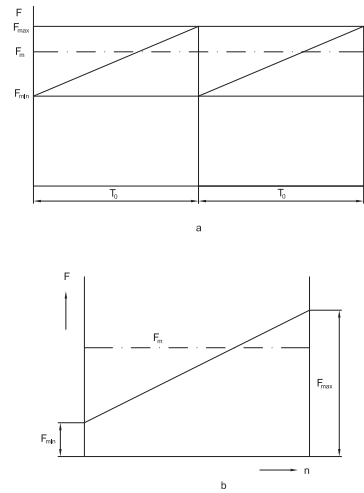


Fig. 3

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:

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

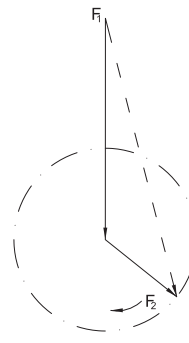


Fig. 4

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:

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

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

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

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

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

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

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

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

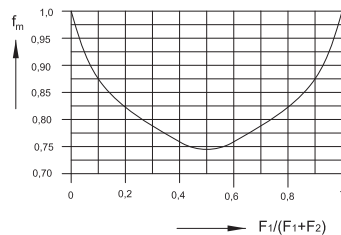


Fig. 5

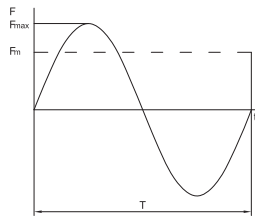


Fig. 6

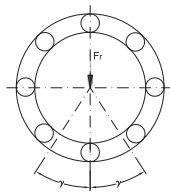


Fig. 7

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:

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

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 DAS LAGER bearings, $a_2=1$ is recommended.

Life adjustment factor a_{23} for operating conditions

In order to achieve the longest life of a bearing, the best possible condition is hydrodynamic lubrication, that is when there is no direct contact between rolling elements and raceway due to the lubricant film. World leading bearing manufacturing companies have accomplished many researches in this field, showing that there is a relationship between life adjustment factor a_2 for material and life adjustment factor a_3 for operating conditions. These factors can thus be preferably unified, obtaining factor a_{23} . In such case, the 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}									
	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 $v_1 = 8 \text{ mm}^2/\text{s}$, the viscosity at +40°C is $20 \text{ mm}^2/\text{s}$ (cSt).

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

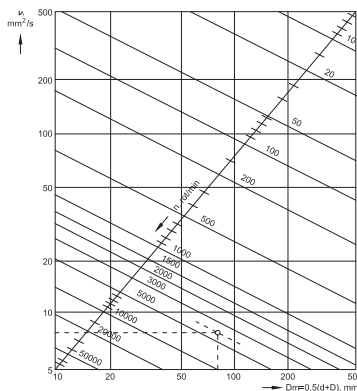


Fig. 8

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.

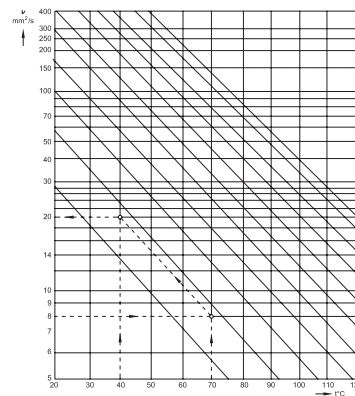


Fig. 9

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	1
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.

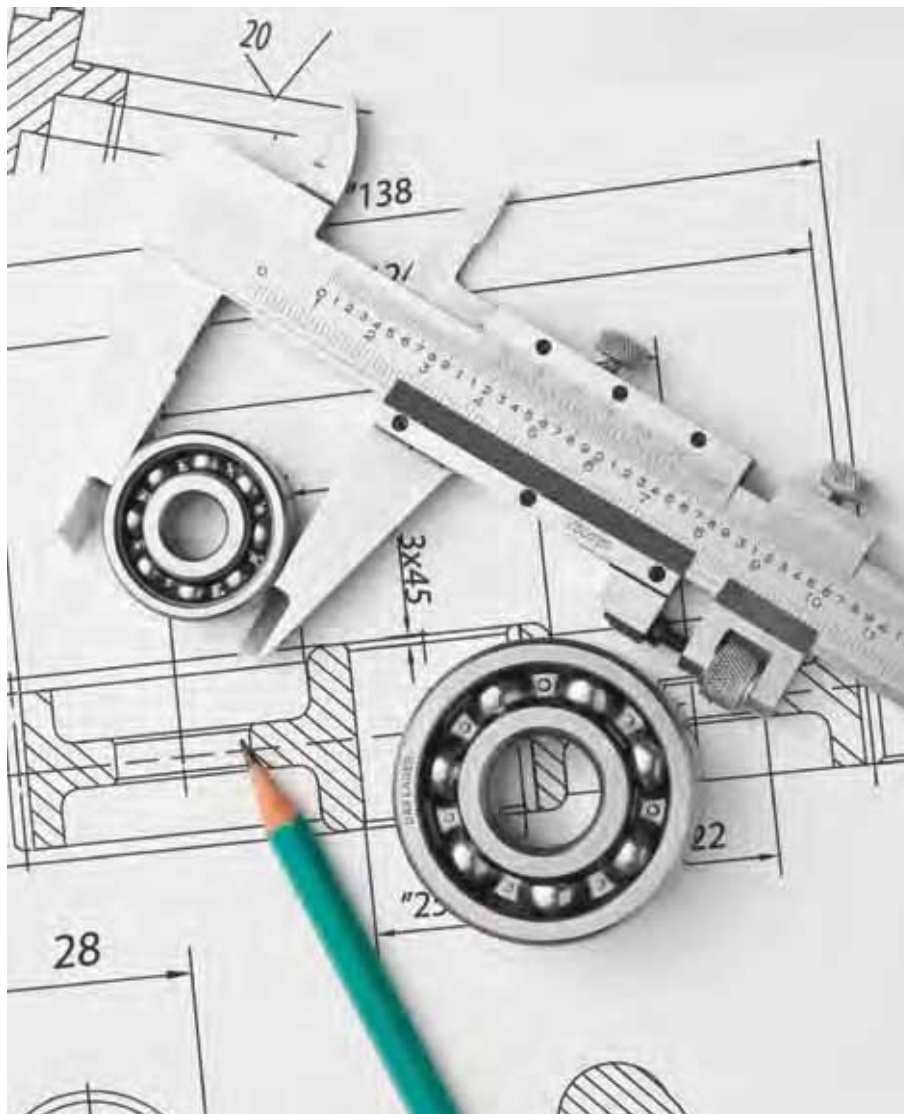
Basic static load for a group of bearings

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.



Bearing tolerances

ISO 492, ISO 199, ISO 582 and ISO 1132 are the international standards defining bearing tolerances.

In general conditions, bearings are manufactured according to the tolerance class P0, but upon request, in case of special applications such as very accurate shaft guidance or very high speeds, they can be manufactured to the tolerance classes P6, P6X, P5, P4 e P2.

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

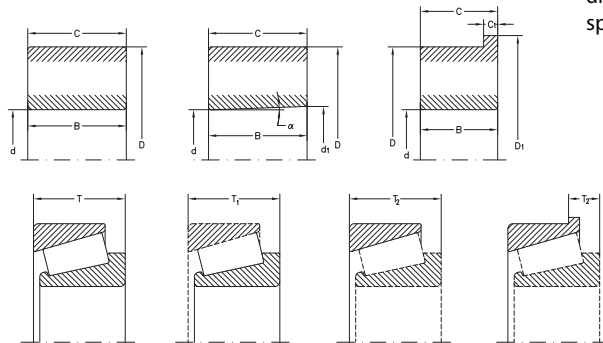
- the overall dimensions of:
 - deep groove ball bearings, angular contact ball bearings, self-aligning ball bearings, spherical roller bearings, cylindrical roller bearings, needle roller bearings, tapered roller bearings,
 - tapered roller bearing with metric (mm) and inch dimensions,
 - tapered bore 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 direction thrust bearings
d_s	- deviation of single bore diameter
d_{psmax}	- maximum bore diameter, in a single radial plane

d_{psmin}	- minimum bore diameter, in a single radial plane
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 $\Delta_{dmp} = d_{mp} - d$
d_{1mp}	- mean diameter at the large theoretical end of the tapered bore in a single plane
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 direction 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	T_{1s}	- single width of the inner ring and tapered roller assembly
D_s	- single outside diameter	Δ_{T1s}	- deviation of the single width of inner ring and tapered roller assembly $\Delta T_{1s} = T_{1s} - T_1$
D_{psmax}	- maximum outside diameter in a single radial plane	T_2	- nominal width of the outer ring assembly
D_{psmin}	- minimum outside diameter in a single radial plane	T_{2s}	- single width of the outer ring assembly
ΔD_s	- deviation of the single outside diameter $\Delta D_s = D_s - D$	Δ_{T2s}	- deviation of the single width of outer ring assembly $\Delta T_{2s} = T_{2s} - T_2$
D_{mp}	- mean outside diameter, in a single plane $= (D_{psmax} + D_{psmin})/2$	K_{ia}	- radial runout of assembled bearing inner ring
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_{ea}	- radial runout of assembled bearing outer ring
V_{DP}	- outside diameter variation in a single radial plane; or housing washer diameter variation in a single radial plane for dual direction thrust bearings $V_{DP} = D_{psmax} - D_{psmin}$	S_d	- side face runout with reference to bore of the inner ring
V_{Dmp}	- mean outside diameter variation	S_D	- variation in inclination of outside cylindrical surface to outer ring side face
B	- nominal width of the inner ring	S_{ia}	- side face runout of assembled inner ring with reference to raceway
B_s	- single width of the inner ring	S_{ea}	- side face runout of assembled outer ring with reference to raceway
Δ_{Bs}	- inner ring single width deviation $\Delta B_s = B_s - B$	S_i	- thickness variation measured from middle of raceway to back seating face of shaft washer
V_{Bs}	- inner ring single width variation	S_e	- thickness variation measured from middle of raceway to back face of housing washer
C	- nominal width of the outer ring	Δ_{Hs}	- deviation of mounting height of single direction thrust ball and roller bearings
C_s	- single width of the outer ring	Δ_{H1s}	- deviation of mounting height of thrust ball bearings with sphered housing washer
Δ_{Cs}	- deviation of the outer ring single width $\Delta C_s = C_s - C$	Δ_{H2s}	- deviation of mounting height of dual direction thrust ball and roller bearings
V_{Cs}	- single width variation of the outer ring $V_{Cs} = C_{smax} - C_{smin}$	Δ_{H3s}	- deviation of mounting height of dual direction thrust ball bearings with sphered housing washer
T	- nominal width of tapered roller bearings		
T_s	- single width of tapered roller bearings		
Δ_{Ts}	- deviation of the single width of tapered roller bearings $\Delta T_s = T_s - T$		
T_1	- nominal 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
		7,8,9	0,1	2,3,4									
over	up to	high	low	max.	max.	max.	max.	max.	high	low	max.	max.	
0,6 ¹⁾	2,5	0	-8	10	8	6	6	10	0	-40	-	12	
2,5	10	0	-8	10	8	6	6	10	0	-120	-250	15	
10	18	0	-8	10	8	6	6	10	0	-120	-250	20	
18	30	0	-10	13	10	8	8	13	0	-120	-250	20	
30	50	0	-12	15	12	9	9	15	0	-120	-250	20	
50	80	0	-15	19	19	11	11	20	0	-150	-380	25	
80	120	0	-20	25	25	15	15	25	0	-200	-380	25	
120	180	0	-25	31	31	19	19	30	0	-250	-500	30	
180	250	0	-30	38	38	23	23	40	0	-300	-500	30	
250	315	0	-35	44	44	26	26	50	0	-350	-500	35	
315	400	0	-40	50	50	30	30	60	0	-400	-630	40	

1) This value included.

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

Outer ring													Table 3.2
Deviations μm													
D mm		Δ_{Dmp}		$V_{\text{Dp}}^{2)}$				$V_{\text{Dmp}}^{3)}$	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.	
2,5 ¹⁾	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				

1) This value included.

2) For bearings of diameter series 7,8,9,0 and 1 values are not indicated

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

Tolerance class P6

Inner ring													Table 3.3
Deviations μm													
d mm	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	max.	max.	
0,6 ¹⁾	2,5	0	−7	9	7	5	5	5	0	−40	−	12	
2,5	10	0	−7	9	7	5	5	6	0	−120	−250	15	
10	18	0	−7	9	7	5	5	7	0	−120	−250	20	
18	30	0	−8	10	8	6	6	8	0	−120	−250	20	
30	50	0	−10	13	10	8	8	10	0	−120	−250	20	
50	80	0	−12	15	15	9	9	10	0	−150	−380	25	
80	120	0	−15	19	19	11	11	13	0	−200	−380	25	
120	180	0	−18	23	23	14	14	18	0	−250	−500	30	
180	250	0	−22	28	28	17	17	20	0	−300	−500	30	
250	315	0	−25	31	31	19	19	25	0	−350	−500	35	
315	400	0	−30	38	38	23	23	30	0	−400	−630	40	

1) This value included.

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

Outer ring													Table 3.4
Deviations μm													
D mm		Δ_{Dmp}		$V_{\text{Dp}}^{3)}$				$V_{\text{Dmp}}^{2) 3)}$	K_{ea}	Δ_{Cs}		V_{Cs}	
				Open bearings				Shielded bearings					
				Diameter series									
				7,8,9	0,1	2,3,4	0,1,2,3,4						
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.	
2,5 ¹⁾	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				

1) This value included.

2) For bearings of diameter series 7,8 and 9 values are not indicated

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

Tolerance class P5

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

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}	$V_{\text{Dp}}^{(2)}$		V_{Dmp}	K_{ea}	S_{D}	$S_{\text{ea}}^{(3)}$	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.	
2,5 ¹⁾	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	

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.	
0,6¹⁾	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		$\Delta_{\text{Dmp}}, \Delta_{\text{Ds}}^{2)}$	$V_{\text{Dp}}^{3)}$	Diameter series		V_{Dmp}	K_{ea}	S_{D}	$S_{\text{ea}}^{4)}$	Δ_{Cs}		V_{Cs}	
				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.

3) Apply only to ball bearings.

Tolerance class P2

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

1) This value included.

2) Applies only to ball bearings.

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

1) This value included.

2) Do not apply to bearings with rib on the inner ring.

3) Apply only to ball bearings.

Tolerance class SP

Inner ring															
Deviations μm															
d mm	Cylindrical bore					Tapered bore									
	Δ_{dmp}	Δ_{ds}	V_{dp}	Δ_{ds}	V_{dp}	Δ_{d1mp}	Δ_{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
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_{dmp}	Δ_{ds}	V_{dp}	Δ_{ds}	V_{dp}	Δ_{d1mp}	Δ_{dmp}	Δ_{Bs}	V_{Bs}	K_{ia}	S_{d}	S_{ia}	S_{d}	S_{ia}	
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}
over	up to	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		Δ_{dmp}		V_{dp}	V_{dmp}	K_{ia}
mm						
over	up to	high	low	max.	max.	max.
10 ¹⁾	18	0	-12	12	9	15
18	30	0	-12	12	9	18
30	50	0	-12	12	9	20
50	80	0	-15	15	11	25
80	120	0	-20	20	15	30
120	180	0	-25	25	19	35
180	250	0	-30	30	23	50
250	315	0	-35	35	26	60
315	400	0	-40	40	30	70

1) This value included.

Outer ring						
Deviations μm						
Table 3.16						
D		Δ_{Dmp}		V_{Dp}	V_{Dmp}	K_{ea}
mm						
over	up to	high	low	max.	max.	max.
18 ¹⁾	30	0	-12	12	9	18
30	50	0	-14	14	11	20
50	80	0	-16	16	12	25
80	120	0	-18	18	14	35
120	150	0	-20	20	15	40
150	180	0	-25	25	19	45
180	250	0	-30	30	23	50
250	315	0	-35	35	26	60
315	400	0	-40	40	30	70
400	500	0	-45	45	34	80

1) This value included.

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

Tolerance class P0

Inner and outer ring									
Deviations μm									
Table 3.17									
d		$\Delta_{\text{Bs}}, \Delta_{\text{Cs}}$		Δ_{Ts}		Δ_{T1s}		Δ_{T2s}	
mm									
over	up to	high	low	high	low	high	low	high	low
10 ¹⁾	18	0	-120	+200	0	+100	0	+100	0
18	30	0	-120	+200	0	+100	0	+100	0
30	50	0	-120	+200	0	+100	0	+100	0
50	80	0	-150	+200	0	+100	0	+100	0
80	120	0	-200	+200	-200	+100	-100	+100	-100
120	180	0	-250	+350	-250	+150	-150	+200	-100
180	250	0	-300	+350	-250	+150	-150	+200	-100
250	315	0	-350	+350	-250	+150	-150	+200	-100
315	400	0	-400	+400	-400	+200	-200	+200	-200

1) This value included.

Tolerance class P6X Inner and outer ring

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

Deviations μm												Table 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
Deviations μm 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
Deviations μm										
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	
18 ¹⁾	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												
Deviations μm												
d mm		$\Delta_{dmp}, \Delta_{ds}$		V_{dp}	V_{dmp}	K_{ia}	S_d	S_{ia}	Δ_{Bs}	Δ_{Ts}		
over	up to	high	low	max.	max.	max.	max.	high	low	high	low	
10 ¹⁾	18	0	-5	4	4	3	3	3	0	-200	+200	-200
18	30	0	-6	5	4	3	4	4	0	-200	+200	-200
30	50	0	-8	6	5	4	4	4	0	-240	+200	-200
50	80	0	-9	7	5	4	5	4	0	-300	+200	-200
80	120	0	-10	8	5	5	5	5	0	-400	+200	-200
120	180	0	-13	10	7	6	6	7	0	-500	+350	-250
180	250	0	-15	11	8	7	7	8	0	-600	+350	-250

Table 3.21

1) This value included.

Outer ring										
Deviations μm										
D mm		$\Delta_{Dmp}, \Delta_{Ds}$		V_{Dp}	V_{Dmp}	K_{ea}	S_D	S_{ea}	Δ_{Cs}	
over	up to	high	low	max.	max.	max.	max.	high	low	
18 ¹⁾	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		

Table 3.22

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)

Assembled bearing - Δ_{Ts}											
Deviations μm											
d											
mm											
Tolerances classes											
4 2 3 0 00											
over	up to	high	low	high	low	high	low	high	low	high	low
-	101,6	+203	-	+203	0	+203	-203	+203	-203	+203	-203
101,6	266,7	+356	-254	+203	0	+203	-203	+203	-203	+203	-203
266,7	304,8	+356	-254	+203	0	+203	-203	+203	-203	-	-

Table 3.26

Inner roller ring - standard outer ring assembly - Δ_{T1s}											
Deviations μm											
d											
mm											
Tolerances classes											
4 2 3 0 00											
over	up to	high	low	high	low	high	low	high	low	high	low
-	101,6	+102	0	+102	0	+102	-102	+102	-102	+102	-102
101,6	304,8	+152	-152	+102	0	+102	-102	+102	-102	+102	-102

Table 3.27

Outer ring with gauge inner ring assembly - Δ_{T2s}											
Deviations μm											
d											
mm											
Tolerances classes											
4 2 3 0 00											
over	up to	high	low	high	low	high	low	high	low	high	low
-	101,6	+102	0	+102	0	+102	-102	+102	-102	+102	-102
101,6	304,8	+203	-102	+102	0	+102	-102	+102	-102	+102	-102

Table 3.28

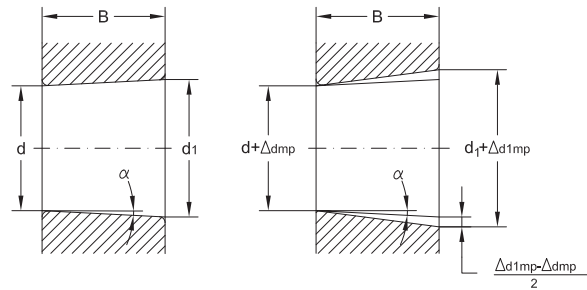
Tapered bore bearings

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							
Table 3.31							
Deviations μm		P0;P6;P5		P4;P2			
d, d_2 mm		Δ_{dmp} Δ_{d2mp}		V_{dp} V_{d2p}	Δ_{dmp} Δ_{d2mp}	V_{dp} V_{d2p}	
over	up to	high	low	max.	high	low	max.
-	18	0	-8	6	0	-7	5
18	30	0	-10	8	0	-8	6
30	50	0	-12	9	0	-10	8
50	80	0	-15	11	0	-12	9
80	120	0	-20	15	0	-15	11
120	180	0	-25	19	0	-18	14
180	250	0	-30	23	0	-22	17
250	315	0	-35	26	0	-25	19
315	400	0	-40	30	0	-30	23

Housing washer							
Table 3.32							
Deviations μm		P0;P6;P5		P4;P2			
D mm		Δ_{Dmp}		V_{Dp}	Δ_{Dmp}	V_{Dp}	
over	up to	high	low	max.	high	low	max.
10 ¹⁾	18	0	-11	8	0	-7	5
18	30	0	13	10	0	-8	6
30	50	0	16	12	0	-9	7
50	80	0	19	14	0	-11	8
80	120	0	-22	17	0	-13	10
120	180	0	-25	19	0	-15	11
180	250	0	-30	23	0	-20	15
250	315	0	-35	26	0	-25	19
315	400	0	-40	30	0	-28	21
400	500	0	-45	34	0	-33	25

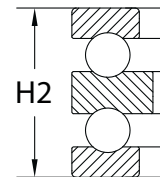
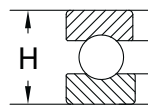
1) This value included.

Variation of shaft washer and housing washer thickness							
Table 3.33							
Deviations μm							
d^*		S_i					S_e
mm		P0	P6	P5	P4	P2	P0;P6;P5;P4;P2
over	up to	max.	max.	max.	max.	max.	max.
-	18	10	5	3	2	1	Identical to S_i for the shaft washer
18	30	10	5	3	2	1,2	
30	50	10	6	3	2	1,5	
50	80	10	7	4	3	2	
80	120	15	8	4	3	2	
120	180	15	9	5	4	3	
180	250	20	10	5	4	3	
250	315	25	13	7	5	4	
315	400	30	15	7	5	4	

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

Assembled thrust ball bearings Bearing height

Table 3.34					
Deviations μm					
d		Δ_{Hs}		Δ_{H2s}	
mm		high	low	high	low
over	up to				
-	18	+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

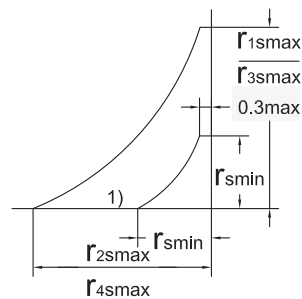
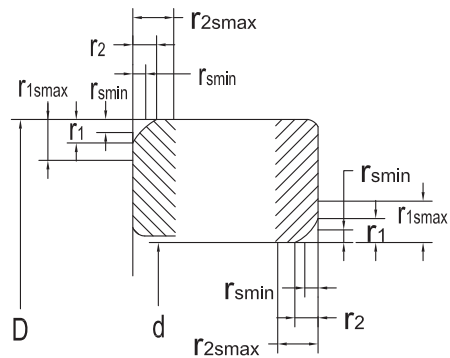
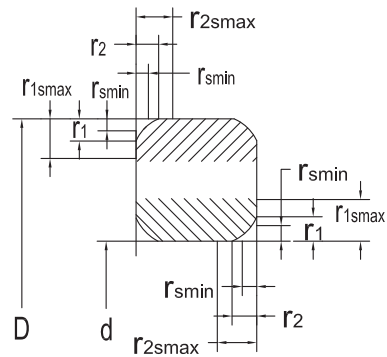


Mounting chamfer dimensions tolerances

Symbols:

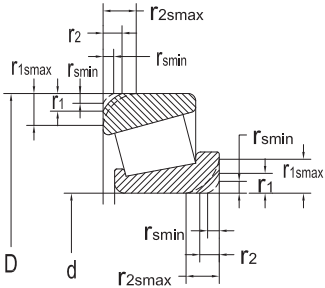
r_1, r_3 - chamfer dimension in radial direction,
 r_2, r_4 - chamfer dimension in axial direction,
 $r_{s \min}$ - general symbol for minimum limit of r_1, r_2, r_3, r_4 ,
 $r_{1s \max}, r_{3s \max}$ - maximum dimension in radial direction,
 $r_{2s \max}, r_{4s \max}$ - maximum dimension in axial direction.

Mounting chamfer dimension limits for radial and thrust bearings					
Values in mm					
Table 3.35					
$r_{s \min}$	d	Radial bearings		Thrust bearings	
		r_{1s}, r_{3s}	r_{2s}, r_{4s}	r_{1s}, r_{2s}	
	over	up to	max.	max.	max.
0,1	-	-	0,2	0,4	0,2
0,15	-	-	0,3	0,6	0,3
0,2	-	-	0,5	0,8	0,5
0,3	-	40	0,6	1	0,8
	40	-	0,8	1	0,8
0,6	-	40	1	2	1,5
	40	-	1,3	2	1,5
1	-	50	1,5	3	2,2
	50	-	1,9	3	2,2
1,1	-	120	2	3,5	2,7
	120	-	2,5	4	2,7
1,5	-	120	2,3	4	3,5
	120	-	3	5	3,5
2	-	80	3	4,5	4
	220	-	3,8	6	4
	80	220	3,5	5	4
2,1	-	100	3,8	6	4,5
	-	280	4	6,5	4,5
	280	-	4,5	7	4,5
2,5	100	280	4,5	6	-
	280	-	5	7	-
3	-	280	5	8	5,5
	280	-	5,5	8	5,5
4	-	-	6,5	9	6,5
5	-	-	8	10	8
6	-	-	10	13	10
7,5	-	-	12,5	17	12,5



1) Only for $d < 30$ mm

Mounting chamfer dimension limits for tapered roller bearings				
Values in mm				
Table 3.36				
$r_{s \min}$	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 3.38								
Minimum values	Inner ring Nominal bore diameter		Maximum values		Outer ring Nominal outer diameter		Maximum	
$r_{s \min}$	d		$r_{1s \max}$	$r_{2s \max}$	D		$r_{3s \max}$	$r_{4s \max}$
	over	up to			over	up to		
See bearing tables	-	50,8	$r_{s \min} + 0,4$	$r_{s \min} + 0,9$	-	101,6	$r_{s \min} + 0,6$	$r_{s \min} + 1,1$
	50,8	101,6	$r_{s \min} + 0,5$	$r_{s \min} + 1,3$	101,6	168,3	$r_{s \min} + 0,6$	$r_{s \min} + 1,2$
	101,6	254	$r_{s \min} + 0,6$	$r_{s \min} + 1,18$	168,3	266,7	$r_{s \min} + 0,8$	$r_{s \min} + 1,4$
					266,7	355,6	$r_{s \min} + 1,7$	$r_{s \min} + 1,7$
1	254	-	1,9	3	355,6	-	1,9	3
1,5	254	-	3,5	4	355,6	-	3,5	4
2,5	254	-	4,5	6	355,6	-	4,5	6
3	254	-	5,5	7,5	355,6	-	5,5	7,5
3,3	254	-	6,5	9	355,6	-	6,5	9
3,5	254	-	6,5	9	355,6	-	6,5	9
6,4	254	-	12,5	17	355,6	-	12,5	17
8,5	254	-	15	19	355,6	-	15	19

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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 needs to support radially the shaft assembly and to locate it axially in both directions.

A non-locating bearing supports the shaft assembly only radially, while allowing axial displacement in relation to the housing, in order to avoid additional axial loading.

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

If 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, it's possible to use two non-locating bearings with limited displacement. Each of them can accommodate axial loads in a single direction, having this 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.

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

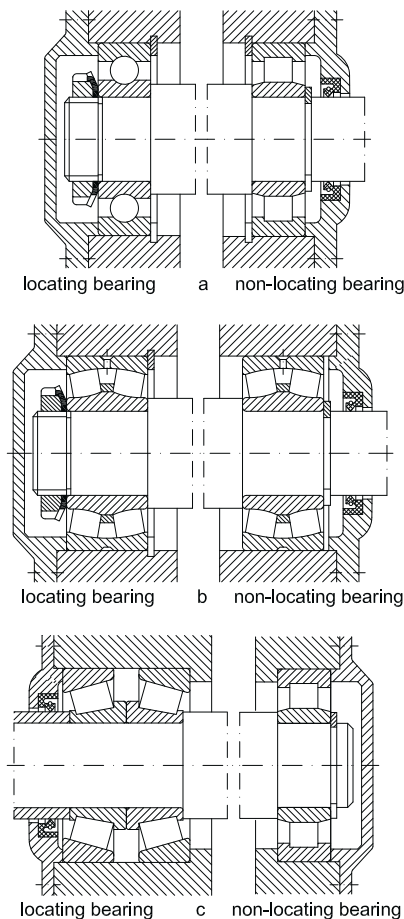


Fig. 4.1

type.

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

When selecting the bearing fit, three main criteria should be considered:

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

The most common location is assured by a tight fit.

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

In case of a tight fit, the inner ring is supported by the entire shaft contact surface, ensuring that the 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.

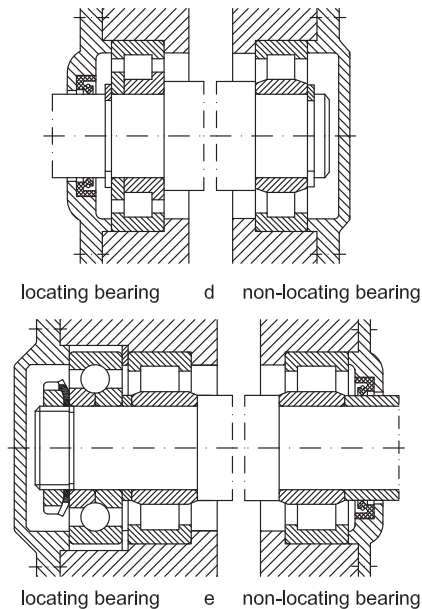
In table 4.1 one can find recommendations to select the tolerance class for shaft as a function of: bearing type, loading and shaft diameter. In table 4.3 there are given recommendations to select the tolerance class for housing.

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 (d) and of the housing diameter (D) 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)



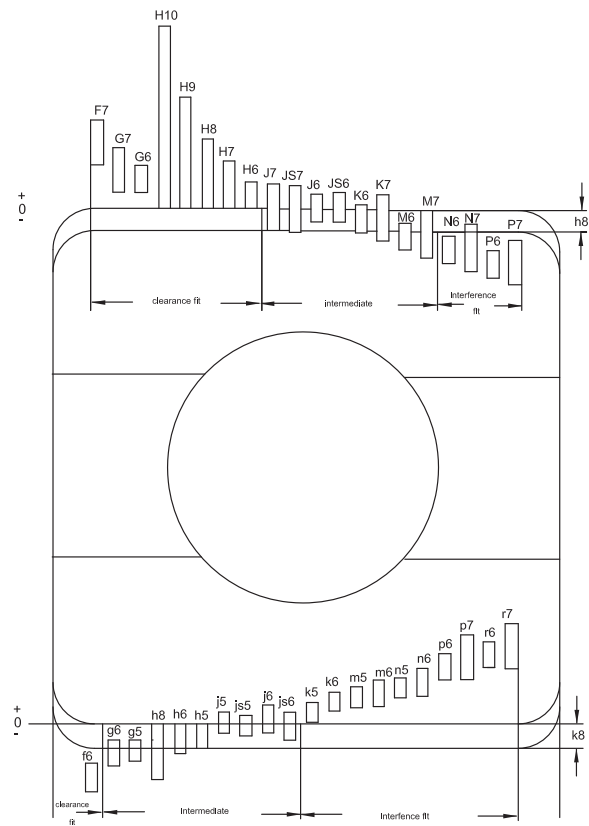
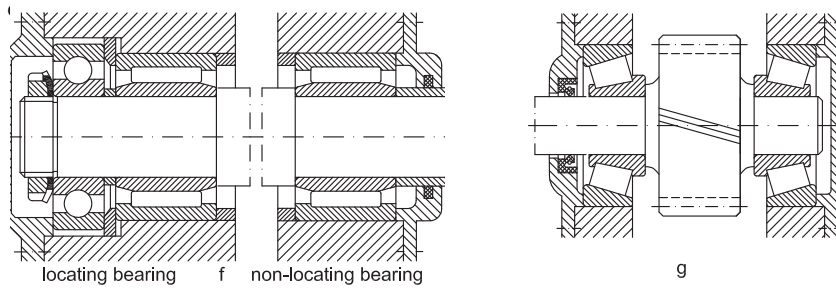


Fig.4.2

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
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 pullyes, sheaves				h6
Rotating inner ring load					
Light and variable loads (P<0,06C)	Conveyers lightly loaded mechanisms, bearings	18...100 >100...140	≤40 >40...100	- -	j6 k6
Normal and heavy loads (P>0,06C)	General mechanical engineering, electric motors, turbines, pups, gearboxes, woodworking machines	≤18 >18...100 >100...140 >140...200 >200...280 - -	- ≤40 >40...100 >100...140 >140...200 >200...400 - -	- ≤40 >40...65 >65...100 >100...140 >140...280 >280...500 >500	j5 k5(k6) m5(m6) m6 n6 p6 r6 r7
Heavy loads and shock loads, arduous working conditions (P>0,12C)	Heavy duty railway vehicles axle bearings, traction motors, rolling mills	- - -	>50...140 >140...200 200	>50...100 >100...200 >200	n6 p6 r6
High running accuracy, light loads (P<0,06C)	Machine tools	≤18 >18...100 >100...200 -	- ≤40 >40...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

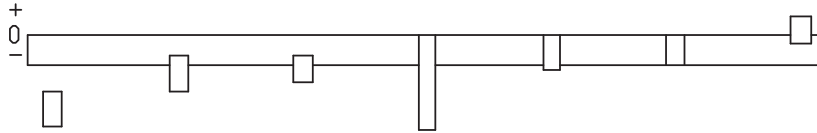


Table 4.2

Shaft Diameter		Bearing Bore diameter tolerance		Deviations of shaft diameter, resultant fits Tolerances													
nominal d		Δ_{dmp}		f6	g6			g5		h8		h6		h5		j5	
				a) Deviations (shaft diameter) b) Tightening/Theoretical clearance c) Tightening/Probable clearance													
over	up to	low	high														
mm		μm															
1	3	-8	0	a) -6 b) +2 c) 0	-12 -10 -12	-2 +6 +4	-8 -8 -6	-2 +6 -5	-6 -6 +6	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	-5 +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 +1 +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	+7 +21 +17	-7 -7 -3
80	120	-20	0	-36 -16 -22	-58 -58 -52	-12 +8 +2	-34 -34 -28	-12 +8 +2	-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			

Bearing application

Shaft fits

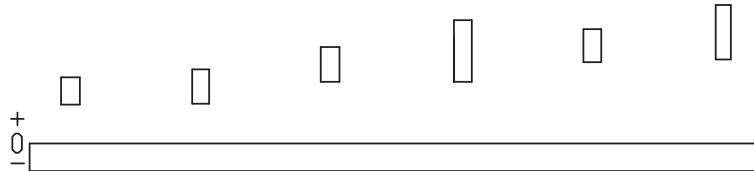


Table 4.2 (continued)

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

Bearing application

Shaft fits

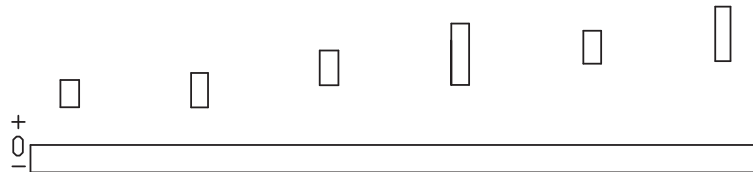


Table 4.2 (continued)

Shaft Diameter		Bearing Bore diameter tolerance		Deviations of shaft diameter, resultant fits Tolerances											
nominal d		Δ_{dmp}													
				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

Table 4.3

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

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

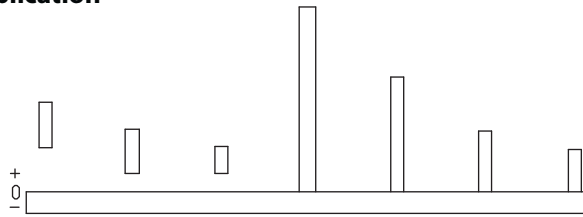


Table 4.4

Housing Diameter		Bearing Outside diameter tolerance		Deviations of housing bore diameter, resultant fits Tolerances													
nominal D		Δ_{Dmp}		F7	G7		G6		H10		H9		H8		H7		
				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

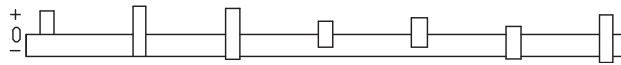


Table 4.4 (continued)

Housing Diameter		Bearing Outside diameter tolerance		Deviations of housing bore diameter, resultant fits Tolerances											
nominal D		Δ_{Dmp}													
</															

Bearing application

Housing fits

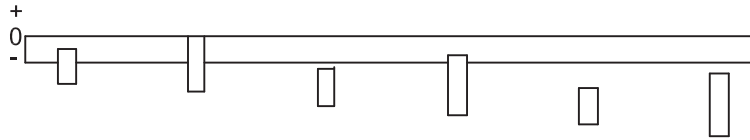


Table 4.4 (continued)

Housing Diameter		Bearing Outside diameter tolerance		Deviations of housing bore diameter, resultant fits Tolerances									
nominal D		Δ_{Dmp}											

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.

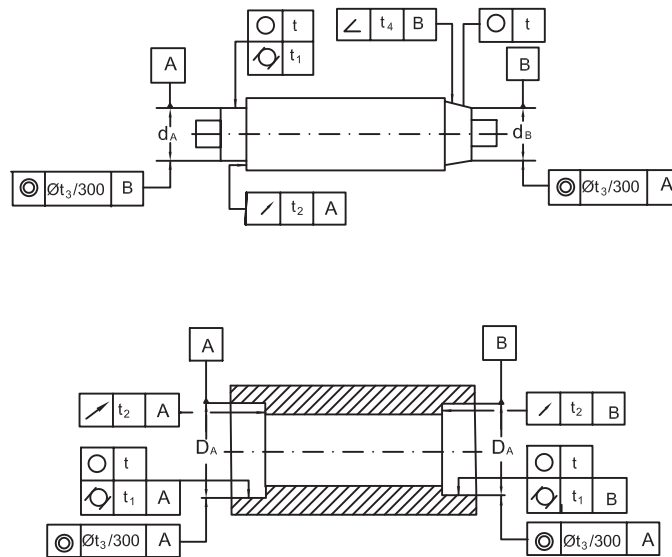


Table 4.5

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	-	-	IT6(IT5)	IT5	IT4	IT4	IT3
	housing	-	-	IT7(IT6)	IT6	IT5	IT4	IT4
Tolerance of roundness and cylindricity	shaft		t ₁	$\frac{IT4}{2} \left(\frac{IT3}{2} \right)$	$\frac{IT3}{2} \left(\frac{IT2}{2} \right)$	$\frac{IT2}{2}$	$\frac{IT1}{2}$	$\frac{IT0}{2}$
	housing		t ₁	$\frac{IT5}{2} \left(\frac{IT4}{2} \right)$	$\frac{IT4}{2} \left(\frac{IT2}{2} \right)$	$\frac{IT3}{2}$	$\frac{IT2}{2}$	$\frac{IT1}{2}$
Tolerance of face runout	shaft		t ₂	IT4 (IT3)	IT3 (IT2)	IT2	IT1	IT0
	housing		t ₂	IT5 (IT4)	IT4 (IT3)	IT3	IT2	IT1
Tolerance of concentricity	shaft		t ₃	IT5	IT4	IT4	IT3	IT3
	housing		t ₃	IT6	IT5	IT5	IT4	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				
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)

Table 4.6

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)														
Nominal dimension														
	over 1	3	6	10	18	30	50	80	120	180	250	315	400	500
	up to 3	6	10	18	30	50	80	120	180	250	315	400	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

Table 4.7

Bearing axial location

Axial location of bearings is necessary in order to assure a proper guiding of assembly in an assembly under operation.

A tight fit is inadequate for the axial location of bearings. Axial location for both rings is generally needed when locating bearings. In Fig.4.4 it's possible to see some relevant solutions of bearing axial location, on shaft or into the housing.

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).

In case of bearings with NR design, with groove and snap ring on the outer ring, can be easily 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 determined by the friction between shaft and sleeve (g).

In order 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, determining experimentally, during the mounting operation, the width of the spacer ring.

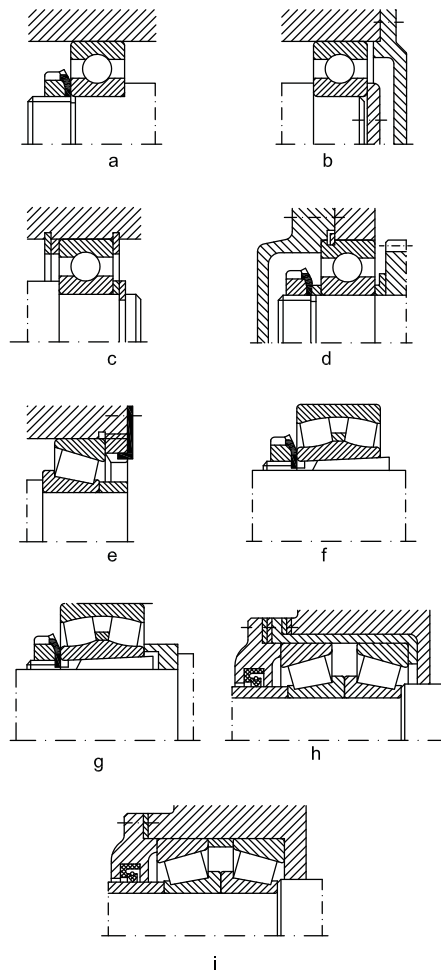


Fig. 4.4

Bearing sealing

Seals are used in most of bearing arrangements, in order to ensure the best conditions for proper operation, that is: retaining the lubricant in the bearing and preventing solid contaminants (like water, dust, hard particles, aggressive substances, etc...) from penetrating into the bearing.

The classification of seals for rolling bearings is done considering some important criteria like: design, operation, type of lubricant, etc...

Concerning issues of design and operation, seals can be defined as: stationary seals between the stationary bearing elements (housing and cover), rotary seals between the rotating bearing elements, or they can also be rubbing or non-rubbing seals, used in special applications (surrounding conditions and loading stress).

Rotary non-rubbing seals are often used because of their simple design. They are specially

used at high speed or temperatures, both for grease and oil, as they have practically no friction and they do not wear.

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

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

Gap seals constitute the simplest constructive solution for a rotary non-rubbing seal that must retain grease in the bearing housing. The efficacy of sealing is linked to the gap length (L) and the clearance between shaft and housing. It's possible to improve it providing one or more

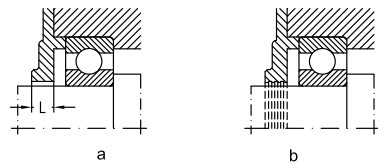


Fig. 4.5

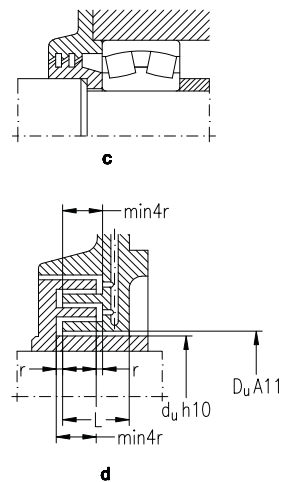
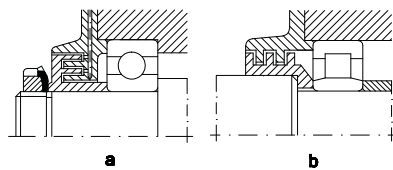


Fig. 4.6

circular grooves on the shaft or in the housing, which are to be filled with grease (b). If oil is used for lubrication, then the grooves on the shaft must be helical (c) and their direction and the direction of the shaft rotary movement must be the same.

It has been experimentally proved that in order to achieve the most favorable clearance the limits of the fit should be A11/h10, the geometrical deviations should be IT6, and the gap surface roughness $R_a = 12,6 \mu\text{m}$.

Labyrinth seals are generally used at high peripheral speeds, within impure surroundings.

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

When selecting the proper rotary rubbing, one should consider the following factors: the material and its elasticity (felt, rubber, plastic, leather, graphite, etc...), the resistance at various

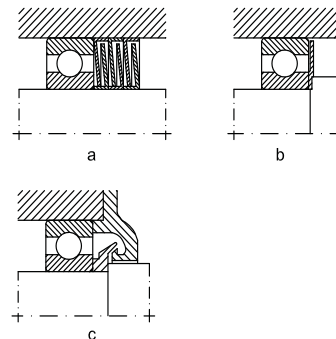


Fig. 4.7

temperatures, the maximum peripheral speed on sealing surface, the sealing direction, etc...

The sealing properties of these systems are higher than those corresponding to non-rubbing seals. Because of their simple design and cheapness, felt ring seals (a) are often used in case of grease lubrication at peripheral speeds higher than 4 m/s and temperatures over $+100^\circ\text{C}$.

In order to improve their sealing properties and reduce the friction, before mounting, felt rings are impregnated with a mixture of mineral oil (66%) and paraffin (34%) at a temperature of $+70-80^\circ\text{C}$.

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

In case of oil lubricated bearings which are operated under peripheral speeds of 5-10 m/s and temperature between -40°C and $+20^\circ\text{C}$, it is preferable to use rubbing seals with an incorporated spring, which in most cases are made of synthetic rubber and have a metallic hardening fixture.

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

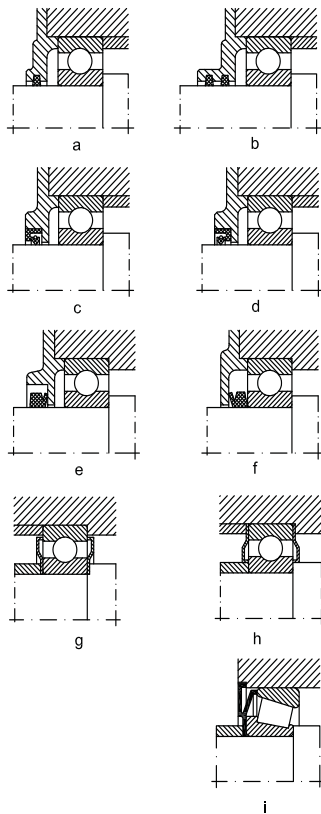


Fig. 4.8

It's also possible to use a double sealing with these rubbing seals.

V-ring seals are used to prevent the penetration of dust or other contaminants into the bearing, providing best results in case of oil or grease 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 can be used at temperatures between -40°C and $+100^{\circ}\text{C}$, with a sealing surface roughness $R_a = 1,5-3\text{ }\mu\text{m}$. At peripheral speeds up to 15 m/s , the V-ring seal operates as a rubbing seal (as the seal lip reaches the sealing surface), while in case of peripheral speeds over 15 m/s the seal lip ends up lifting from the sealing surface, operating as a centrifugal sealing.

The use of V-ring seals is also suggested in case of angular misalignments ($2-3^{\circ}$), as they are made of high quality, elastic rubber, and they are easy to be mounted.

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

Pressed sheet washers provide a simple, space-saving and inexpensive sealing, specially for grease lubricated deep groove ball bearings. The washers are clamped against either the outer or the inner ring, exerting a resilient pressure axially against the rubbing ring. In 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...). Better sealing can thus be obtained if felt ring (a) or V-ring (b) are combined with radial or axial labyrinth non-rubbing seals.

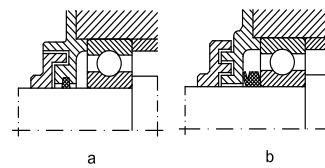


Fig. 4.9

In case of unusual surroundings and loading conditions (e.g. hull of ocean-vessels, rolling mills, main shaft of grinding machines, etc...) special seals are generally used.

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 superior operating results. These roller bearings are delivered ready greased, and no provision for relubrication and maintenance is needed. They are generally used in case of bearings with a small free space available, where other seals cannot be used.

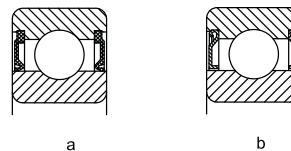


Fig. 4.10

Bearing lubrication

The safe operating and long rating life of bearings are dependant on the type and quality of lubricant, and on the method of lubrication. The lubrication of bearings is necessary for several purposes, like:

- to reduce friction between rolling elements and raceway, rolling elements and cage, cage and guiding ribs of rings during operation;
- to ensure the protection of bearings against corrosion;
- to reduce within certain limits the noise produced during bearings' operation;
- to distribute heat in an uniform way in contact areas, and to remove it outside thanks to lubricant circulation.

Lubricants used for the lubrication of bearings should satisfy these conditions:

- physical and chemical stability;
- absence of foreign mechanical substances (abrasive, metallic substances, etc...);
- minimal coefficient of friction;
- non-corrosivity;
- good lubricating capacity.

The lubricants used for bearing lubrication can belong to two categories:

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

A comparison between fluid and plastic lubricants can be seen in table 5.1.

Although fluid lubricants have generally better characteristics than plastic lubricants, they cannot be used in all case because of sealing problems.

Comparative values for lubricants		
Table 5.1		
Characteristics	Lubricant Fluid	Plastic
speed	any value	low and medium
friction	low (reduced)	high
lubricating capacity	excellent	good
service life	long	short
cooling effect	high	low
replacement	easy	difficult

Selection of lubricants

When selecting lubricants, a special attention is needed, in order to consider all lubricant properties and operating conditions. There is no lubrication system that can be considered universally valid.

So the most important criteria to be considered when selecting a lubricant are the following ones:

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

The effects of these characteristics on the lubricant viscosity are as follows:

- the higher the size of bearing, value of load and temperature, the higher the viscosity
- the effect of bearing speed is determined using the product D_{mn} , as shown in table 5.2.

Corelation between D_{mn} and lubricant type		
Table 5.2		
D_{mn} over	D_{mn} up to	Lubricant type
-	150×10^3	Mineral oil and grease with medium or high viscosity
150×10^3	300×10^3	Mineral oil with medium viscosity and grease
300×10^3	500×10^3	Mineral oil with low viscosity and grease
500×10^3	1200×10^3	Mineral oil with low viscosity and lubricating equipment

Grease lubrication

Grease can be used to lubricate rolling bearing only when the product D_{mn} is inferior or

equivalent to 500×10^3 , offering the following advantages:

- it is more easily retained in the bearing;
- it assures anti-corrosive protection to the bearing thanks to its water-resistant properties;
- it has low expenses for sealing.

One should not exceed in the supply of grease quantity, because otherwise the effect will be a braking in rotation, and an increase in friction and operating temperature, without positive effects on the bearing rating life.

The quantity of grease to be inserted in the bearing seating should be as follows, in accordance with 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 $Dm \cdot n < 10 \times 10^3$.

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

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

where:

$K = 1/900$ - for ball bearings

$K = 1/350$ - for roller bearings

d = bore diameter, mm

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

- bearing type
- bearing size
- operating temperature
- grease properties

Grease service life and relubricating interval can be calculated from:

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

where:

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

k_0 = coefficient depending on the bearing type, table 5.3

n = speed, r/min

d = bore diameter, mm

f_1 = temperature factor, table 5.4

f_2 = factor depending on the operating conditions, table 5.5

Values for coefficient k_0

Table 5.3

Bearing type	Value of k_0 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 $n = 1500 \text{ r/min}$, at a temperature of $+60 \text{ deg C}$, light operating conditions. What is the grease service life and relubrication interval?
Grease service life will be:

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

$k_0 = 25$ from table 5.3
 $d = 40 \text{ mm}$
 $f_1 = 1$, from table 5.4
 $f_2 = 1$, from table 5.5

Relubrication interval:

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

$k_0 = 10$, from table 5.3
 $f_1, f_2 = 1$, from tables 5.4, 5.5.

Values for coefficient K	
Table 5.6	
Relubrication interval	K
weekly	0,0015...0,0020
monthly	0,0020...0,0030
yearly	0,0030...0,0045
after 2...3 years	0,0045...0,0055

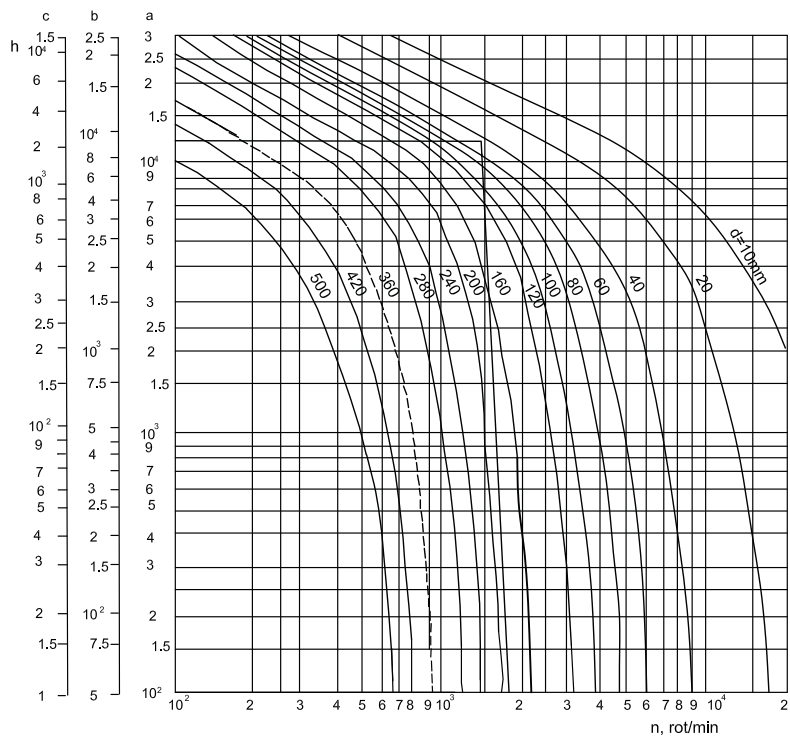


Fig.5.1

Scale a; deep groove ball bearings
Scale b; cylindrical roller bearings
Scale c; spherical roller bearings, thrust ball bearings, cylindrical roller bearings without cage.

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:

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

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:

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

where

L = service life, operating hours

a = exponent depending on the grease quality

(a = 5,8... 6,1)

$m_1, \dots, m_3$ = exponents which take into account the following factors:

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

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

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

D_m = bearing mean diameter, mm

n = bearing speeds, r/min,

P = equivalent radial load, kN,

C = basic dynamic load, kN,

t = bearing operating temperature, °C

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

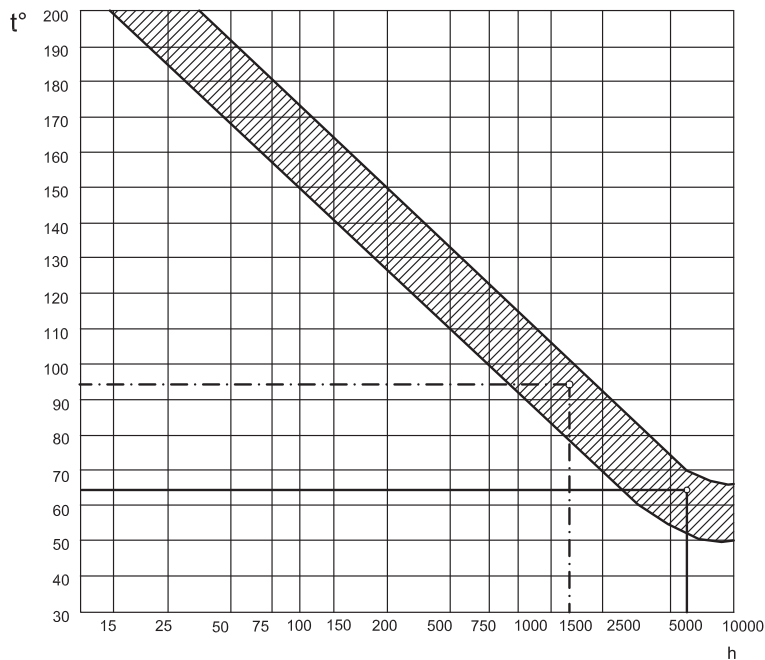


Fig.5.2.

- when bearing operating temperature is lower than +50°C, then $t = +50^\circ\text{C}$
- when speed factor $D_m n < 125000$, then $D_m n = 125000$
- when ratio $P/C < 0,05$, then $P/C = 0,05$

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

Example 1

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

$$C_r = 35,2 \text{ kN, tables on page 100. bearing 6210}$$

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

$$a = 6,1, \text{ for Mobil grease,}$$

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

$$P_r/C_r = 5/35,2 = 0,143$$

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

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

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

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

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°C and 170° operating hours at +95°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 assemblies 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	Without soap, synthetic 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
Synthetic oil + additive for excessive pressure (EP)	Without soap, synthetic thickener	265°C	-54°C...+177°C	Spherical roller thrust bearings, roller thrust bearings etc., bearings operating with high friction, - moderate and high speeds, - low and high temperatures	- Mobilgrease 28, Mobil Austria
Synthetic oil	Without soap, inorganic thickener	260°C	-50°C...+177°C	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 n from table 5.2 is exceeded for grease, namely $D_m \cdot n > 500 \times 10^3$ 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.

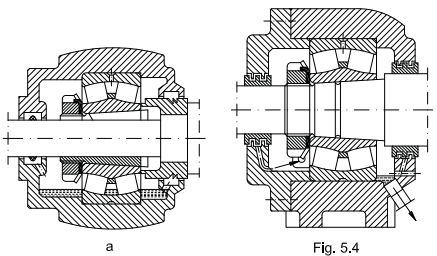
For a proper lubrication of bearings, low quantities of lubricants to reach the rolling elements are needed.

The lubricating systems must provide the 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 $D_m \cdot n$ are given in tables 5.8.

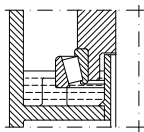
Oil lubricating systems				
Table 5.8				
Lubricating system	Operating conditions	Factor $D_m n$	Oil viscosity at 40°C	Example in fig.
m ² /s				
Oil bath	Bath is filled up to the lowest rolling element for horizontal shaft and 70-80% of bath width for vertical shaft	< 250 x 10 ³	(17.....300) x 10 ⁻⁶	5.3 a), b)
Oil bath with external circulation	Central tank, oil circulates under a pressure of 1,5 MPa. High speeds.	< 600 x 10 ³	(45...175) x 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 x 10 ³	(13,5...80) x 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 x 10 ³	(10...45) x 10 ⁻⁶	5.6

Table 5.8



a

Fig. 5.4



b
Fig. 5.3

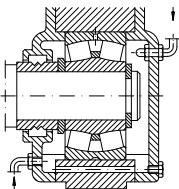


Fig. 5.5

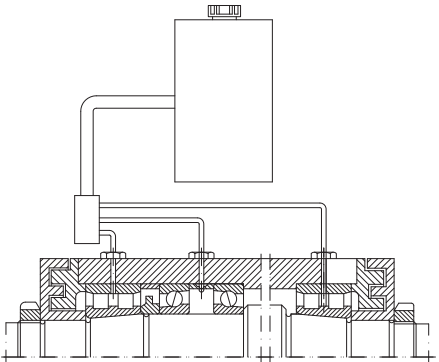


Fig. 5.6

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		
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				
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

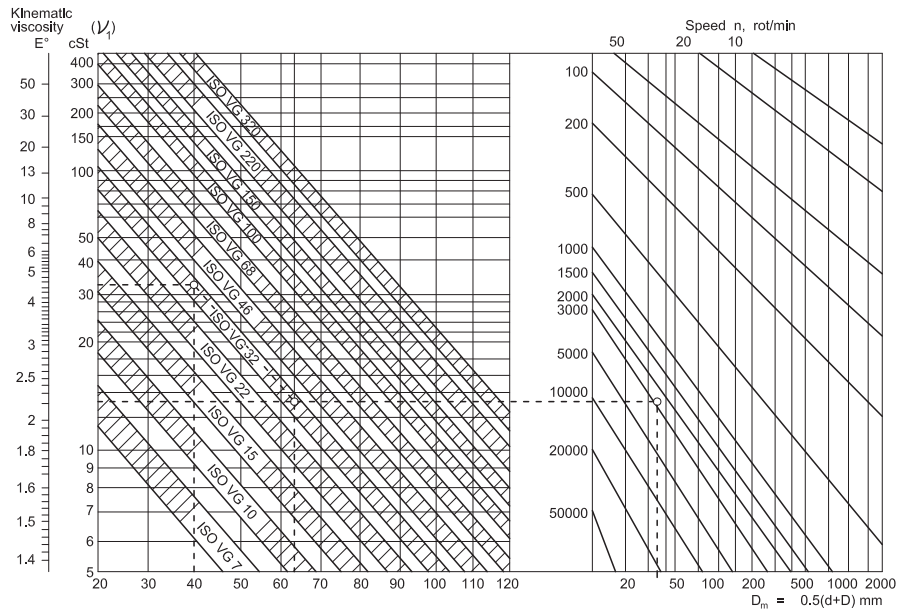


Fig. 5.7

Bearing designation

A precise designation is necessary in order to identify bearing, so that bearings with the same designation can be interchangeable both dimensionally and operationally, no matter if they are produced by different companies in different countries. The designation system of DAS LAGER rolling bearings are in accordance with those

used by world-known bearing companies: SKF, FAG, INA, KOYO etc.

The complete designation of a bearing is composed by a basic designation, possibly followed by one or more supplementary designations (prefixes and suffixes), as shown in fig 6.1.

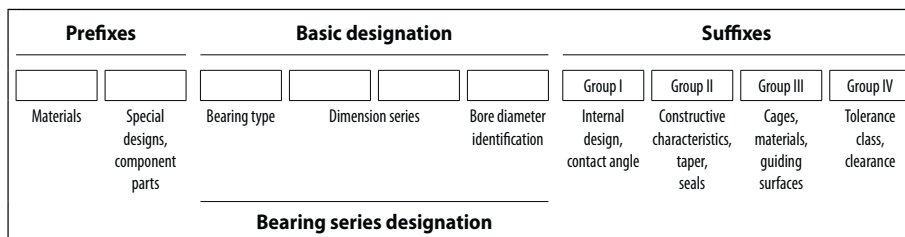


Fig. 6.1.

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

The designation of the bearing type and dimension series, for the main standardized bearing types, are given in fig. 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-based identifications, used to indicate the material, other than steel for bearings or component parts of bearing. The prefix identifying the material is separated from the rest of designation by a horizontal line.

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 03	NU208
	NJ	23 04	NJ2206
	N		N310 N5161M
	NUP		NUP209
	NNU	49	NNU4920
	NN	30	NN3015
	NA	48 49	NA4905 NA121815 NA 85/26
	NA	69	NA6912
	2	30 41 13 40 22 23 31 32	22216 25130
	3	29 22 23 20 03 02 13	32010 32208 34115
	35	0	35130
	5	11 13 12 14	51115 51212

	5	22 23	52205 52308
		24	

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

The good operation of rolling bearings is also influenced by the properness of their mounting and dismounting, considering the type and size of bearing fit, adequate tools for these operations, performance, etc...

As they are precision components, rolling bearings must be handled carefully when storing or mounting, observing the following precautions:

- storing bearings in their original package on special shelves, in a dry room, with temperature of $+18/+20^{\circ}$ and maximum moisture degree of 60%;
- handling bearings carefully when storing or mounting, in order to protect the original package;
- unpacking bearings only when they are to be mounted;
- as the adjoint parts of bearings are very accurate, without burrs, chips or hits, a special care should be taken;
- they shouldn't be washed if the original package hasn't been destroyed.

Mounting of bearings with cylindrical bore

Bearings with cylindrical bore which need to have a tight fit on shaft or in housing, shall 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, avoiding the transmission by rolling bearings, which could be deformed causing a premature damage.

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

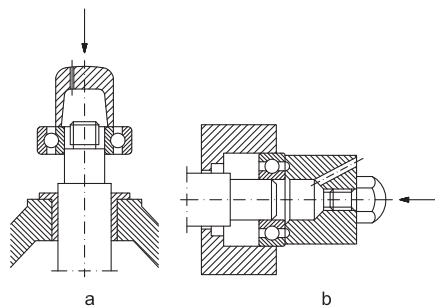


Fig. 7.1

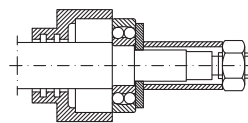


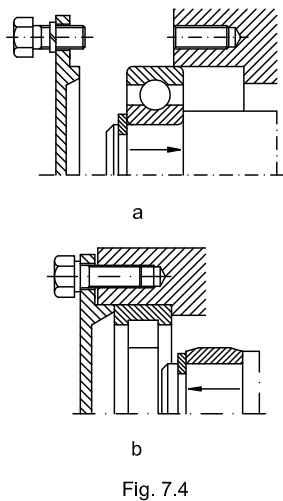
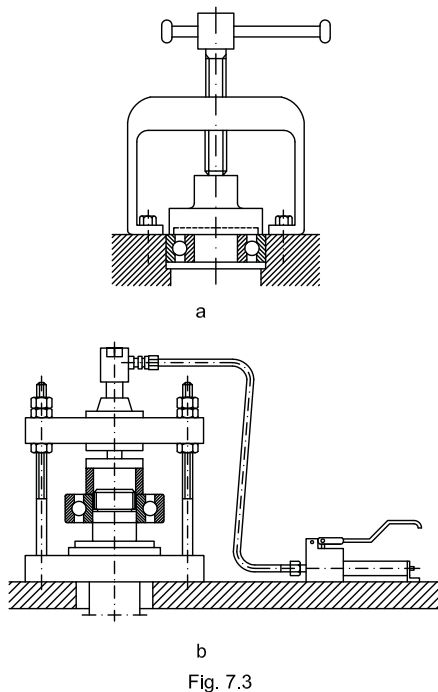
Fig. 7.2

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 ($d > 50$ 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.

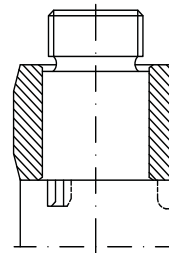


Fig. 7.5

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

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

where:

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

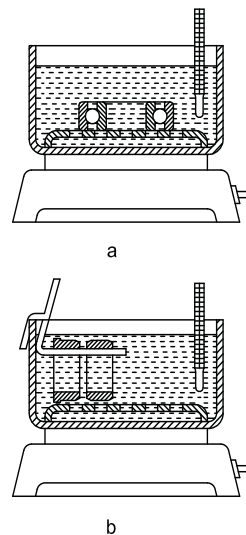


Fig. 7.6

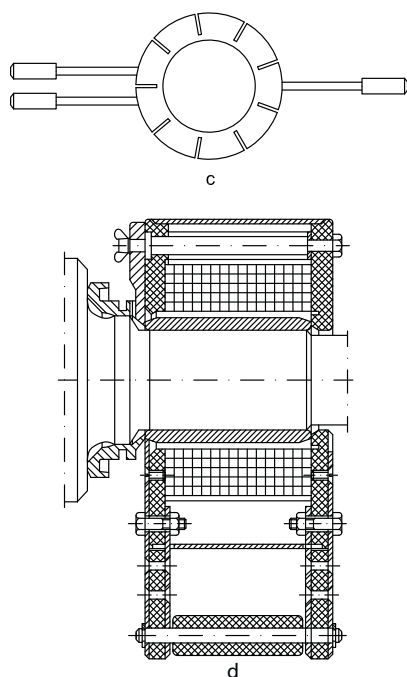


Fig. 7.6 (continued)

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

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

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

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

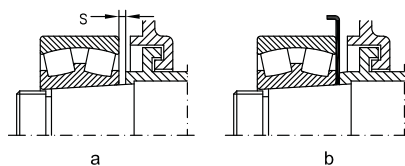


Fig. 7.7

Example

A bearing 22252, $d = 260$ mm, taper: 1:12, distance $s = 10$ mm, distance "a" from table 7.2 = 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 dismounted 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 adapter or withdrawal sleeves, as shown in fig 7,11 a 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									
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

Table 7.1

Values for spherical roller bearings radial clearance, after mounting														
Values in mm														
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

Table 7.2

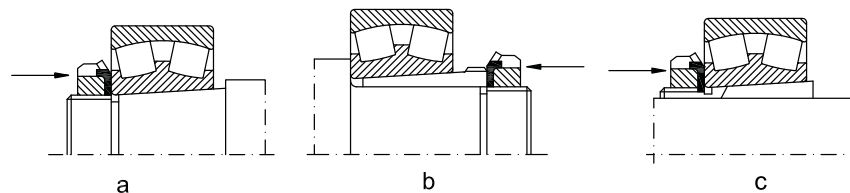


Fig. 7.8

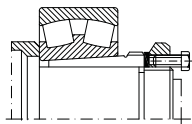


Fig. 7.9

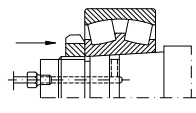


Fig. 7.10

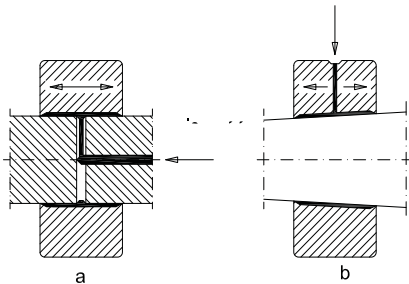


Fig. 7.11

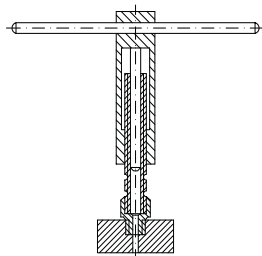


Fig. 7.12

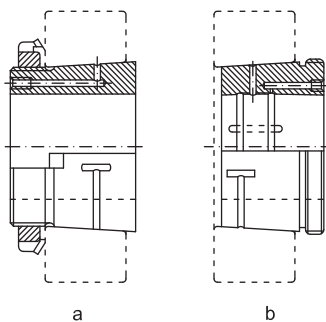


Fig. 7.13

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.

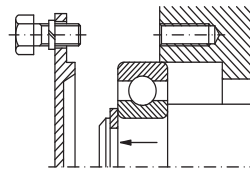


Fig. 7.14

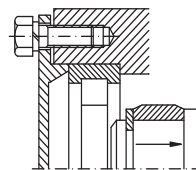
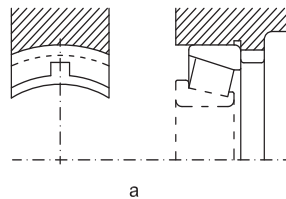
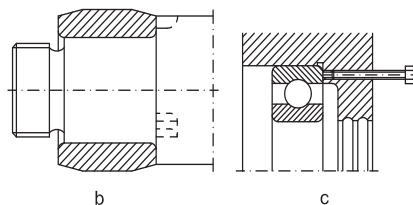


Fig. 7.15

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.



a



b

c

Fig. 7.16

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

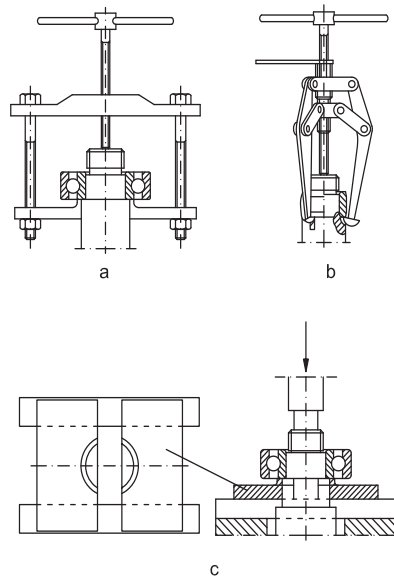


Fig. 7.17

To reduce the frictional force when dismounting 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, dismounting 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.

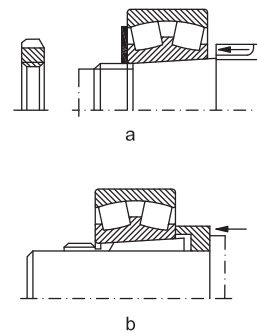


Fig. 7.18

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

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

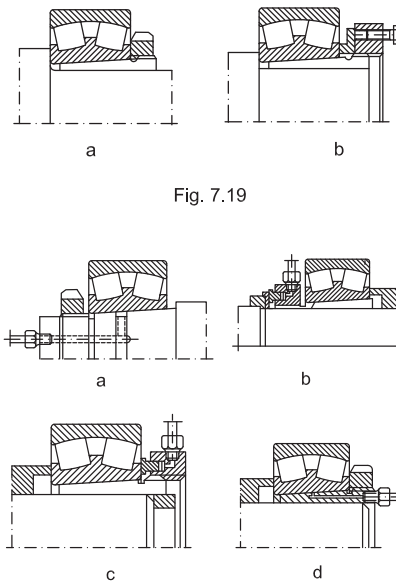


Fig. 7.20



Deep groove ball bearing

Deep groove ball bearings consist of inner ring, outer ring, cage and balls. They are manufactured wide range, both of standard and special design.

Single Row Ball Bearings

Single row deep groove ball bearings are particularly multi purpose. They are simple in design, non-separable. Deep groove ball bearings can take double direction radial and axial loads and also allow good operation at high speeds. If they are produced with precision class, They are suitable for very high speeds. They are requiring little maintenance.

Therefore, single row deep groove ball bearings are the most widely used bearing type.

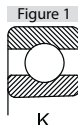
Deep groove ball bearings are classified as follows:

- Miniature ball bearings : to 3.175 mm (including) inner bore diameter
- Extra small ball bearings : from 3.175 mm (over) to 9.525 mm (including) inner bore diameter
- Deep groove ball bearing : from 9.525 mm (over) inner bore diameter.

Single row deep groove ball bearings are manufactured in many constructive versions as shown below.

- Open Basic Design Type
- Shielded Types
- Sealed Types
- Bearings with snap ring groove, with or without snap ring types
- Paired Type

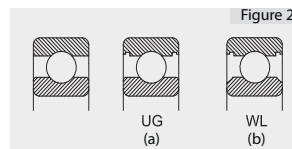
DAS LAGER can produce inch-size bearings and bearings with/or without a tapered bore (See figure1). These variants are not included in this General Catalogue. Information will be provided on request.



Open Basic Design Type

DAS LAGER basic design single row deep groove ball bearing are open. They are simple design without any seal, shield, snap ring groove and snap ring. (See figure 2)

Sometimes for manufacturing reason, open design bearing's rings are also produced 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. (see figure 2-(a)(b))



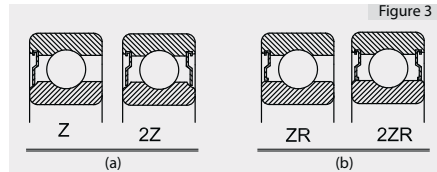
Shielded Type Single Row Deep Groove Ball Bearings

Bearings with shields, designation suffix Z or 2Z. Depending on the bearing series and size are produced in one of two designs (see figure 3). The shields are made of sheet steel and normally have a cylindrical extension in the shield bore to form a long sealing gap with the inner ring shoulder (see figure 3a). Some shields do not have the extension (see figure 3b).

In case of bearings with non-rubbing shields, there is a small interstice between the shield and the rib of the inner ring. Both sides shielded single row deep groove bearings are manufactured in series and delivered filled with lithium base grease and used at temperatures between -30°C and +110°C, in accordance with the specifications. (see Bearing Lubrication section). Bearings can also be greased with special greases. The bearings with shields on both sides are lubricated for life and are maintenance-free. They should not be washed or heated to temperatures above 80 °C.

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, please consult DAS LAGER engineering service



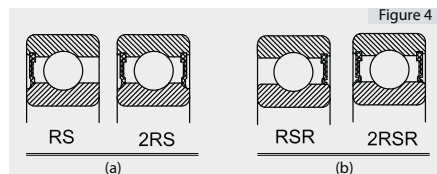
Sealed Type Single Row Deep Groove Ball Bearings

Bearings with shields, designation suffix RS or 2RS. Depending on bearing application are produced in one of two designs (see figure 4). The seal made of synthetic rubber (Nitrile-Butadiene-Rubber, in short NBR) and are suitable for operating temperatures from -30°C to $+120^{\circ}\text{C}$. The gasoline and oil resistant elastic rubber lip that/these are rubs on the groove on the inner ring side (see figure 4a) or directly on the outside surface (see figure 4b). The seals have integrated steel washers to increase their rigidity.

Both sides sealed single row deep groove bearings are manufactured in series are delivered filled with lithium base grease and used at temperatures between -30°C and $+110^{\circ}\text{C}$, in accordance with the specifications (see Bearing lubrication section). Bearings can also be greased with special greases. The bearings with shields or seals on both sides are lubricated for life and are maintenance-free. They should not be washed or heated to temperatures above 80°C .

For special applications, however, seals are also available in other materials (see table 1).

For more information, please consult DAS LAGER engineering service



Seal material		Temperature - range*	
Symbol	Material	Min	Max
NBR	Nitrile Butadiene Rubber	-30°C (-22°F)	$+120^{\circ}\text{C}$ ($+248^{\circ}\text{F}$)
ACM	Acrylic rubber	-20°C (-4°F)	$+150^{\circ}\text{C}$ ($+302^{\circ}\text{F}$)
MVQ	Silicon rubber	-60°C (-76°F)	$+180^{\circ}\text{C}$ ($+356^{\circ}\text{F}$)
FPM	Fluor rubber	-30°C (-22°F)	$+200^{\circ}\text{C}$ ($+392^{\circ}\text{F}$)

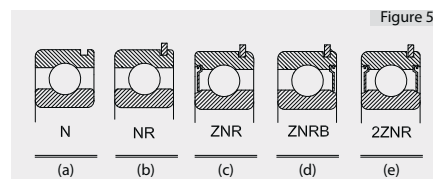
* : Values for guidance only. The temperature range may vary according to the individual material composition.

Single Row Deep Groove Ball Bearing With Snap Ring Groove:

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

DAS LAGER deep groove ball bearings with a snap ring groove are supplied as:

- Open bearings, designation suffix N (see figure 5-a)
- Open bearings with a snap ring designation suffix NR (see figure 5-b)
- Bearings with a Z shield at the opposite side and a snap ring, designation suffix ZNR (see figure 5-c)
- Bearings with a Z shield at the same side and a snap ring, designation suffix ZNRB (see figure 5-d)
- Bearings with Z shields on both sides and a snap ring, designation suffix 2ZNR (see figure 5-e)

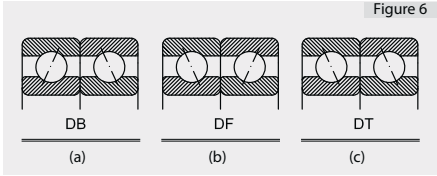


Pair Single Row Deep Groove Ball Bearing

For bearing arrangements where the load carrying capacity of a single bearing is inadequate, or where the shaft has to be axially located in both directions with a given amount of axial clearance, DAS LAGER can supply matched pairs of single row deep groove ball bearings to order.

These bearings can be delivered matched in pairs in three versions, as follows: DB (back-to-back arrangement) (see figure 6-a), DF (face-to-face arrangement) (see figure 6-b) or DT (tandem arrangement) (see figure 6-c). 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 pired bearings to be correctly mounted.(see figure 7)

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 made of stainless steel

Dimensions

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

Misalignment

Single row deep groove ball bearings have only limited ability to accommodate misalignment. The permissible angular misalignment between the inner and outer rings, which will not produce inadmissibly high additional stresses in the bearing, depends on

- The radial internal clearance of the bearing in

- operation,
- The bearing size,
 - The internal design and
 - The forces and moments acting on the bearing

Because of the complex relationship between these factors, no generally applicable specific values can be given. However, depending on the various influences of the factors, the permissible angular misalignment lies between 2 and 10 minutes of arc. It must be considered, however, bearings which run misaligned are subjected to considerable additional forces that will shorten their service life and generate high running noise.

Tolerances

Deep groove ball bearings are generally manufactured to the normal tolerance class P0. DAS LAGER single row deep groove ball bearings are also available with accuracy completely to P6 or P5 tolerance class specifications. The values of tolerances are given in on page 24.

Radial and axial clearance

"Deep groove ball bearings are generally manufactured with normal radial clearance. On 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.

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	

Radial clearance of deep groove ball bearings

Table 1 (Continued)

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											
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		Axial clearance		Preload		
d		(suffix A)		(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

Cage

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

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

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

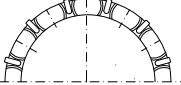
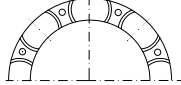
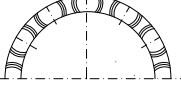
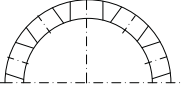
Bearing minimum radial load

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

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

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

$F_{rmin} = 0,01 \cdot C_r$ (C_r = basic dynamic radial load)."

Table 3					
Cage	Design bearing	cage	Application	Max. value $D_m \cdot n$ 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 moment - High speeds	1400×10^3	1100×10^3
Brass machined cage			- General application - Bearings: 61836-618/1000 61936-619/750 16036-16076 6030-60/670 6230-6256 6320-6356	1000×10^3	800×10^3

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:

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

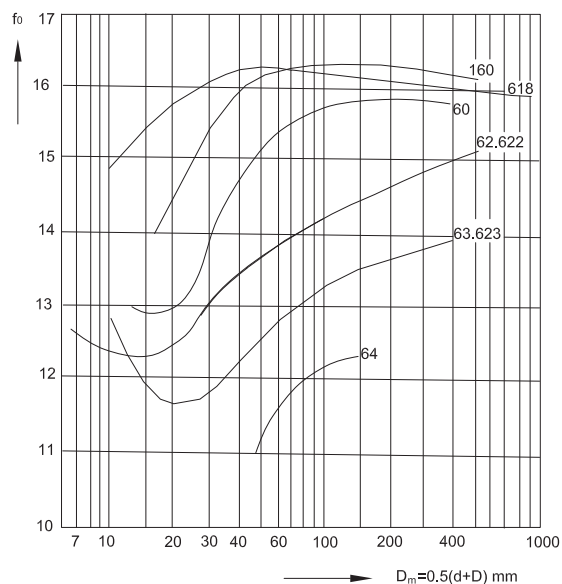
$$P_r = XF_r + YF_a, \text{ when } F_a/F_r > e$$

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

f0Fa/C0r	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

f0Fa/C0r	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:

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

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

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 r_u

Abutment dimension

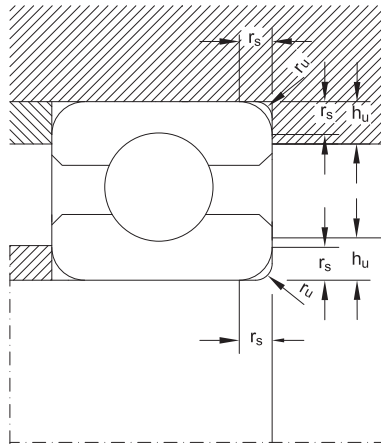
Table 6

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

$r_{s\max}$ 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.

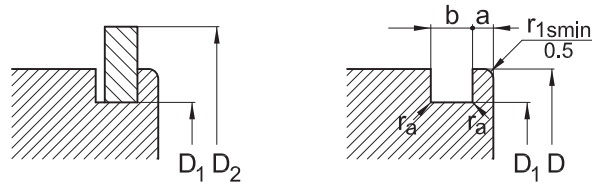


Suffixes

- A : Bearing with extended outer ring
- B : Bearing with extended inner ring
- C0 : Normal Radial Clearance (it's standart not marked on bearing)
- C2 : Radial clearance smaller than normal
- C3 : Radial clearance larger than normal
- FA : Machined cage of steel or cast iron guided on the outer ring
- F2 : Constructive modifications
- K : Bearing with tapered bore
- M : Machined cage of brass guided on the rolling elements
- MA : Machined cage of brass guided in the outer ring
- MB : Machined cage of brass guided on the inner ring
- N : Circular groove for snap ring on the outer ring
- NR : Circular groove on the outer ring and snap ring
- P0 : Normal tolerance class (it is standart not marked on bearing)
- P6 : Tolerance class more accurate than normal
- P62 : Tolerance class P6 and radial clearance C2
- P63 : Tolerance class P6 and radial clearance C3

- P52 : Tolerance class P5 and radial clearance C2
- 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
- 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
- RSV : Bearing with seal on one side, seal made of viton
- 2RSV : Bearing with 2 seal, seal made of viton
- 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
- Q0 : Normal noise level (it's standart not marked on bearing)
- Q6 : Noise level lesser than normal
- QQ6 : Noise level lesser than Q6
- 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

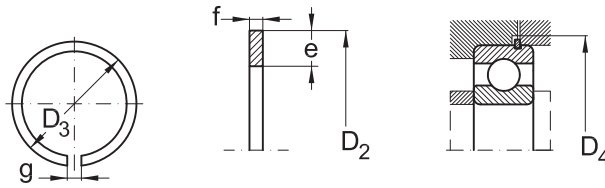
Snap ring groove and snap ring dimensions and tolerances



Snap ring groove

Outer diameter D	D ₁		a		Dimensions series		b		r _a	
	nom.	toler.	nom.	toler.	18	19	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

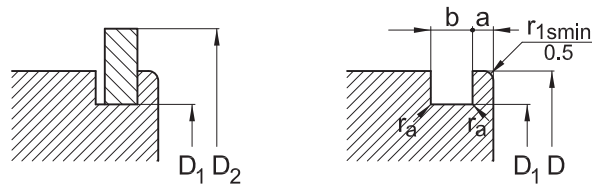
Table 7

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

1) D₂ dimensions refers to the mounted snap ring

2) D₃ represents dimensions before mounting

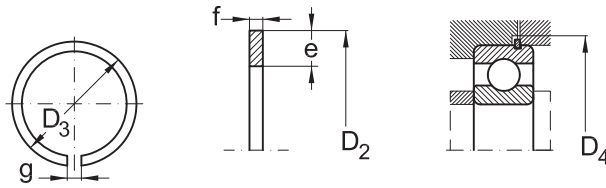
Snap ring groove and snap ring dimensions and tolerances



Snap ring groove

Outer diameter D	D ₁		a		Dimensions series		b		r _a	
	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

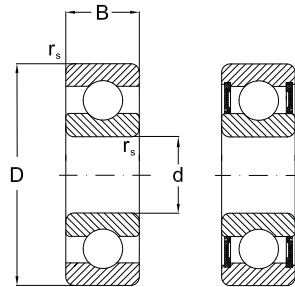
Table 8

Outer diameter D	D ₂ ¹⁾ max.	D ₃ ²⁾ nom.	toler.	D ₄ min.	e nom.	f nom.	g nom.	r min.	Weight	Snap ring designation
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

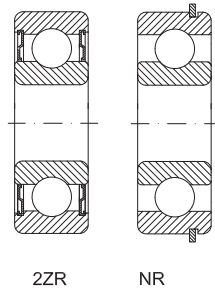
Deep groove ball bearings



2RSR

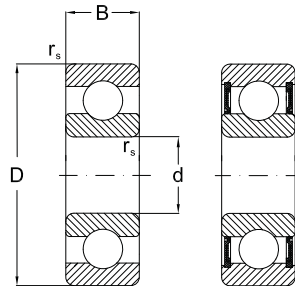
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN			min ⁻¹	-	kg
3	10	4	0,1	0,5	0,2	40000	48000	623	0,002
	10	4	0,1	0,5	0,2	40000		623 2ZR	0,002
4	13	5	0,2	0,9	0,3	38000	45000	624	0,003
	13	5	0,2	0,9	0,3	38000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

Deep groove ball bearings



Dimensions				Basical radial load		Speed limit		Designation	Weight
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	4,5	1,9	28000	34000	629	0,020
	26	8	0,3	4,5	1,9	26000		629 2ZR	0,020
	26	8	0,3	4,5	1,9	18000		629 2RSR	0,020
10	19	5	0,3	1,3	0,6	37000	43000	61800	0,005
	22	6	0,3	2	0,7	34000	41000	61900 TN	0,010
	26	8	0,3	4,5	1,9	28000	34000	6000 TN	0,020
	26	8	0,3	4,5	1,9	28000		6000 2ZR	0,020
	26	8	0,3	4,5	1,9	17000		6000 2RSR	0,020
	28	8	0,3	4,4	1,9	28000	34000	16100	0,023
	30	9	0,6	5,1	2,2	32000	38000	6200 TN	0,032
	30	9	0,6	5,1	2,2	26000		6200 2ZR	0,032
	30	9	0,6	5,1	2,2	17000		6200 2RSR	0,032
	35	11	0,6	8,1	3,2	20000	26000	6300	0,057
	35	11	0,6	8,1	3,2	20000		6300 2ZR	0,057
	35	11	0,6	8,1	3,2	15000		6300 2RSR	0,057
12	21	5	0,3	1,4	0,6	33000	39000	61801	0,006
	21	5	0,3	1,4	0,6	33000	39000	61801 NR	SR21 0,006
	24	6	0,3	2,1	0,9	31000	36000	61901	0,011
	24	6	0,3	2,1	0,9	31000	36000	61901 NR	SR24 0,011
	28	8	0,3	5,1	2,2	26000	32000	6001	0,022
	28	8	0,3	5,1	2,2	26000	32000	6001 TN	0,022
	28	8	0,3	5,1	2,2	26000		6001 2ZR	0,022
	28	8	0,3	5,1	2,2	17000		6001 2RSR	0,022
	30	8	0,3	4,8	2,2	26000	32000	16101	0,026
	32	10	0,6	6,9	2,9	22000	28000	6201	0,037
	32	10	0,6	6,9	2,9	22000	28000	6201 TN	0,037
	32	10	0,6	6,9	2,9	22000		6201 2ZR	0,037
	32	10	0,6	6,9	2,9	15000		6201 2RSR	0,037
	32	14	0,6	6,5	2,9	22000		62201 2RSR	0,049
	37	12	1	9,6	3,9	19000	24000	6301	0,065
	37	12	1	9,6	3,9	19000		6301 2ZR	0,065
	37	12	1	9,6	3,9	12000		6301 2RSR	0,065
15	24	5	0,3	1,5	0,8	28000	33000	61802	0,007
	24	5	0,3	1,5	0,8	28000	33000	61802 NR	SR24 0,007
	28	7	0,3	4,1	2,1	26000	30000	61902	0,017

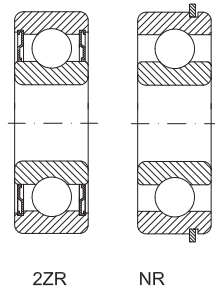
Deep groove ball bearings



2RSR

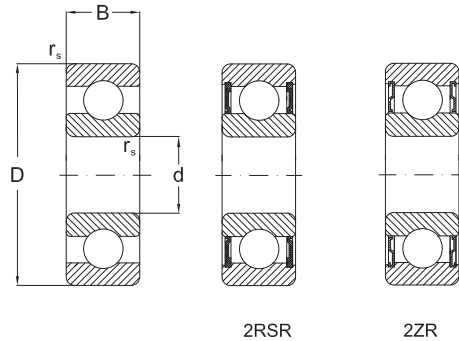
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r_s min	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN			min^{-1}	-	kg
15	28	7	0,3	4,1	2,1	26000	30000	61902 NR	SR28
	30	8	0,3	5,6	2,7	22000	28000	16002	
	32	9	0,3	5,6	2,7	22000	28000	6002	
	32	9	0,3	5,6	2,7	22000		6002 2ZR	
	32	9	0,3	5,6	2,7	14000		6002 2RSR	
	35	11	0,6	7,7	3,6	19000	24000	6202	
	35	11	0,6	7,7	3,6	19000		6202 2ZR	
	35	11	0,6	7,7	3,6	19000	24000	6202 TN	
	35	11	0,6	7,7	3,6	13000		6202 2RSR	
	35	14	0,6	7,4	3,6	13000		62202 2RSR	
	42	13	1	11,3	5,1	17000	20000	6302	
	42	13	1	11,3	5,1	17000		6302 2ZR	
	42	13	1	11,3	5,1	11000		6302 2RSR	
	42	17	1	10,8	5,1	17000		62302 2RSR	
17	26	5	0,3	1,6	0,9	26000	32000	61803	SP40
	30	7	0,3	4,4	2,4	26000	32000	61903	
	35	8	0,3	6,1	3,1	20000	26000	16003	
	35	10	0,3	6,1	3,1	20000	26000	6003	
	35	10	0,3	6,1	3,1	20000		6003 2ZR	
	35	10	0,3	6,1	3,1	12000		6003 2RSR	
	40	12	0,6	9,5	4,5	17000	20000	6203	
	40	12	0,6	9,5	4,5	17000	20000	6203 TN	
	40	12	0,6	9,5	4,5	17000		6203 2ZR	
	40	12	0,6	9,5	4,5	11000		6203 2RSR	
	40	12	0,6	9,5	4,5	17000	20000	6203 NR	
	40	16	1	9,5	4,5	17000	20000	62203 2RSR	
	47	14	1	9,1	4,5	16000	19000	6303	
	47	14	1	13,6	6,2	16000		6303 2ZR	
	47	14	1	13,6	6,2	11000		6303 2RSR	
	47	19	1	13,6	6,2	16000		62303 2RSR	
	62	17	1,1	12,8	6,2	12000	15000	6403	
	62	17	1,1	21,8	10,3	12000	15000	6403 NR	
20	32	7	0,3	21,8	10,3	20000	26000	61804	SR32
	32	7	0,3	3,8	2,2	21000	25000	61804 NR	
	37	9	0,3	3,8	2,2	19000	23000	61904	

Deep groove ball bearings



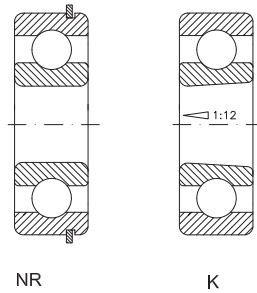
Dimensions				Basical radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		-		kg
20	37	9	0,3	6,1	3,5	19000	23000	61904 NR	SR37	0,036
	42	8	0,3	6,9	3,8	17000	20000	16004		0,050
	42	12	0,6	9,5	4,8	17000	20000	6004		0,070
	42	12	0,6	9,5	4,8	17000		6004 2ZR		0,070
	42	12	0,6	9,5	4,8	11000		6004 2RSR		0,070
	47	14	1	12,8	6,2	15000	18000	6204		0,118
	47	14	1	12,8	6,2	15000	18000	6204 TN		0,118
	47	14	1	12,8	6,2	15000		6204 2ZR		0,118
	47	14	1	12,8	6,2	10000		6204 2RSR		0,118
	47	14	1	12,8	6,2	15000	18000	6204 NR	SP47	0,118
	47	18	1	12,1	6,2	15000		62204 2RSR		0,131
	52	15	1,1	16	7,4	13000	16000	6304		0,158
	52	15	1,1			13000	16000	6304 TN		0,158
	52	15	1,1			13000	16000	6304 MAP5		0,158
	52	15	1,1	16	7,4	13000		6304 2ZR		0,158
	52	15	1,1	16	7,4	8000		6304 2RSR		0,158
	52	15	1,1			13000	16000	6304 NR	SP52	0,158
	52	21	1,1	15,1	7,4	13000		62304 2RSR		0,197
	72	19	1,1	29,2	14,3	10000	13000	6404		0,420
22	50	14	1	13,3	7,3	15000	17000	62/22		0,118
	50	14	1	13,3	7,3	15000		62/22 2ZR		0,118
	50	14	1	13,3	7,3	15000		62/22 2RSR		0,118
	56	16	1,1	17,7	8,8	13000	15000	63/22		0,201
	56	16	1,1	17,7	8,8	13000		63/22 2ZR		0,201
	56	16	1,1	17,7	8,8	13000		63/22 2RSR		0,201
25	37	7	0,3	4,1	2,5	18000	25000	61805		0,022
	42	9	0,3	6,7	4,1	16000	19000	61905		0,041
	47	8	0,3	7,7	4,5	15000	18000	16005		0,058
	47	12	0,6	11,3	6,2	15000	18000	6005 TN		0,086
	47	12	0,6	11,3	6,2	15000		6005 2ZR		0,086
	47	12	0,6	11,3	6,2	9500		6005 2RSR		0,086
	52	15	1	14,1	7,4	12000	15000	6205		0,142
	52	15	1	14,1	7,4	12000		6205 2ZR		0,142
	52	15	1	14,1	7,4	8000		6205 2RSR		0,142
	52	15	1	14,1	7,4	12000	15000	6205 NR	SP52	0,142

Deep groove ball bearings



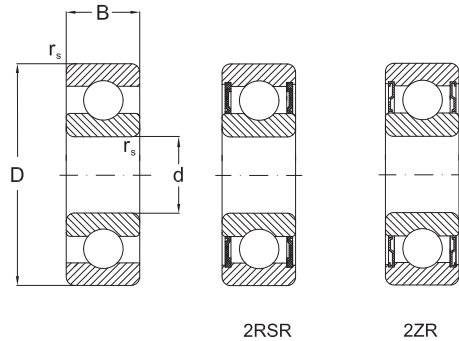
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	
mm				kN		min ⁻¹		-	kg
25	52	18	1	13,3	7,4	12000		62205 2RSR	0,148
	62	17	1,1	22,2	11	11000	14000	6305	0,250
	62	17	1,1			11000	14000	6305 MAP5	0,250
	62	17	1,1	22,2	11	11000		6305 2ZR	0,250
	62	17	1,1	22,2	11	7500		6305 2RSR	0,250
	62	17	1,1			11000	14000	6305 NR	0,250
	62	24	1,1	21,4	11	11000		62305 2RSR	0,317
	80	21	1,5	34	18,3	9000	11000	6405	0,575
	80	21	1,5			9000	11000	6405 NR	0,575
28	58	16	1	16	9	14000	16000	62/28	0,173
	58	16	1	16	9	14000		62/28 2ZR	0,173
	58	16	1	16	9	14000		62/28 2RSR	0,173
	68	18	1,1	23,8	13	10000	12000	63/28	0,328
	68	18	1,1	23,8	13	10000		63/28 2ZR	0,328
	68	18	1,1	23,8	13	10000		63/28 RSR	0,328
30	42	7	0,3	4,3	2,8	15000	18000	61806	0,027
	42	7	0,3	4,3	2,8	15000	18000	61806 NR	0,027
	47	9	0,3	6,9	4,3	14000	17000	61906	0,045
	47	9	0,3	6,9	4,3	14000	17000	61906 NR	0,045
	55	9	3	11,3	7	12000	15000	16006	0,087
	55	13	1	13,1	7,9	12000	15000	6006TN	0,129
	55	13	1	13,1	7,9	12000		6006 2ZR	0,129
	55	13	1	13,1	7,9	7000		6006 2RSR	0,129
	55	13	1			12000	15000	6006 NR	0,129
	62	16	1	19,3	10,6	10000	13000	6206	0,210
	62	16	1	19,3	10,6	10000		6206 2ZR	0,210
	62	16	1	19,3	10,6	7500		6206 2RSR	0,210
	62	16	1			10000	13000	6206 NR	0,210
	62	20	1	18,5	10,6	10000		62206 2RSR	0,236
	72	19	1,1	28,1	15,2	9000	11000	6306	0,371
	72	19	1,1			9000	11000	6306 MAP5	0,371
	72	19	1,1	28,1	15,2	9000		6306 2ZR	0,371
	72	19	1,1	28,1	15,2	6000		6306 2RSR	0,371
	72	19	1,1			9000	11000	6306 NR	0,371
	72	27	1,1	26,7	15,2	9000		62306 2RSR	0,473

Deep groove ball bearings



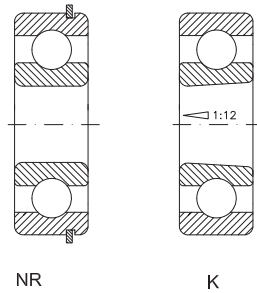
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN			min^{-1}	-	kg
30	90	23	1,5	41,4	22,4	8500	10000	6406	
	90	23	1,5	41,4	22,4	8500	10000	6406 NR	SP90
32	65	17	1	4,5	13	10000	12000	62/32	0,228
	65	17	1	9,1	13	10000		62/32 2ZR	0,228
	65	17	1	12,4	13	10000		62/32 2RSR	0,228
	75	20	1,1	16	16	9000	11000	63/32	0,437
	75	20	1,1	16	16	9000		63/32 2ZR	0,437
	75	20	1,1	16	16	9000		63/32 2RSR	0,437
35	47	7	0,3	4,5	3	13000	16000	61807	0,031
	55	10	0,6	9,1	6,5	12000	14000	61907	0,073
	62	9	0,3	12,4	7,7	10000	13000	16007	0,111
	62	14	1	16	9,7	10000	13000	6007	0,164
	62	14	1	16	9,7	10000		6007 2ZR	0,164
	62	14	1	16	9,7	7000		6007 2RSR	0,164
	62	14	1	16	9,7	10000	13000	6007 NR	SP62
	72	17	1,1	25,7	14,5	9000	11000	6207 K	0,315
	72	17	1,1	25,7	14,5	9000	11000	6207 TN	0,315
	72	17	1,1	25,7	14,5	9000	11000	6207 MAP6	0,315
	72	17	1,1	25,7	14,5	9000	11000	6207 P6	0,315
	72	17	1,1	25,7	14,5	9000	11000	6207 P5	0,315
	72	17	1,1	25,7	14,5	9000		6207 2ZR	0,315
	72	17	1,1	25,7	14,5	6000		6207 2RSR	0,315
	72	17	1,1	25,7	14,5	9000	11000	6207 NR	SP72
	72	17	1,1	25,7	14,5	9000	11000	6207 NRP6	SP72
	72	17	1,1	25,7	14,5	9000	11000	6207 MA	0,315
	72	23	1,1	24,2	14,5	9000		62207 2RSR	0,375
	80	21	1,5	33,3	18,1	8500	10000	6307	0,450
	80	21	1,5	33,3	18,1	8500	10000	6307 K	0,450
	80	21	1,5	33,3	18,1	8500	10000	6307 P6	0,450
	80	21	1,5	33,3	18,1	8500	10000	6307 P5	0,450
	80	21	1,5	33,3	18,1	8500		6307 2ZR	0,450
	80	21	1,5	33,3	18,1	8500		6307 2ZRP5	0,450
	80	21	1,5	33,3	18,1	6500		6307 2RSR	0,450
	80	21	1,5	33,3	18,1	6500		6307 2RSRP6	0,450
	80	21	1,5	33,3	18,1	6500		6307 2RSRP5	0,450

Deep groove ball bearings



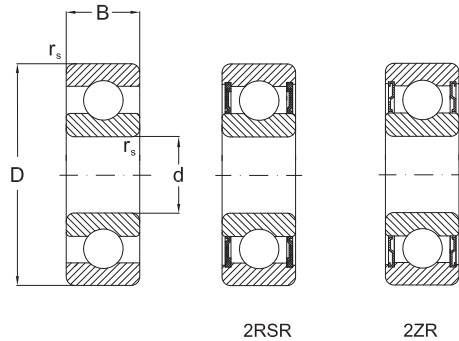
Dimensions				Basical radial load		Speed limit		Designation		Weight	
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring		
mm				kN		min ⁻¹		-		kg	
35	80	31	1,5	33,3	18,1	8500	10000	6307 NR	SP80	0,450	
	80	31	1,5	31,5	18,1	8500		62307 2RSR		0,658	
	100	25	1,5	52,5	29,5	7000	8500	6407		0,954	
	100	25	1,5	52,5	29,5	7000	8500	6407 NR	SP100	0,954	
40	52	7	0,3	4,7	3,3	11000	14000	61808 P5		0,034	
	52	7	0,3	4,7	3,3	12000	14000	61808 NR	SR52	0,034	
	62	12	0,6	13,1	9,5	11000	13000	61908		0,110	
	62	12	0,6	13,1	9,5	11000	13000	61908 NR	SR62	0,110	
	68	9	0,3	13,1	8,7	95000	12000	16008			0,130
	68	15	1	16,9	11	9500	12000	6008		0,210	
	68	15	1	16,9	11	9500		6008 2ZR		0,210	
	68	15	1	16,9	11	6000		6008 2RSR		0,210	
	68	15	1	16,9	11	9500	12000	6008 NR	SP68	0,210	
	80	18	1,1	30,9	18,1	8500	10000	6208			0,402
	80	18	1,1	30,9	18,1	8500	10000	6208 K			0,402
	80	18	1,1	30,9	18,1	8500	10000	6208 P6			0,402
	80	18	1,1	30,9	18,1	8500	10000	6208 P5			0,402
	80	18	1,1	30,9	18,1	8500		6208 2ZR			0,402
	80	18	1,1	30,9	18,1	8500		6208 2ZRP5			0,402
	80	18	1,1	30,9	18,1	5600		6208 2RSR			0,402
	80	18	1,1	30,9	18,1	5600		6208 2RSRP5			0,402
	80	18	1,1	30,9	18,1	8500	10000	6208 NR		SP80	0,402
	80	18	1,1	30,9	18,1	8500	10000	6208 MB			0,402
	80	18	1,1	30,9	18,1	8500	10000	6208 NMA			0,402
	80	23	1,1	29,2	18,1	8500		62208 2RSR			0,460
	90	23	1,5	40,2	22,8	7500	9000	6308			0,635
	90	23	1,5	40,2	22,8	7500	9000	6308 K			0,635
	90	23	1,5	40,2	22,8	7500	9000	6308 TN			0,635
	90	23	1,5	40,2	22,8	7500	9000	6308 P6			0,635
	90	23	1,5	40,2	22,8	7500	9000	6308 P5			0,635
	90	23	1,5	40,2	22,8	7500		6308 2ZR			0,635
	90	23	1,5	40,2	22,8	7500		6308 2ZRP5		0,635	
	90	23	1,5	40,2	22,8	7500		6308 2RSR		0,635	
	90	23	1,5	40,2	22,8	7500	9000	6308 NMA		0,635	
	90	23	1,5	40,2	22,8	7500	9000	6308 NR	SP90	0,635	

Deep groove ball bearings



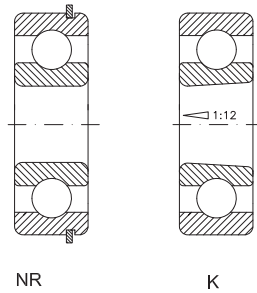
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN			min^{-1}	-	kg
40	90	33	1,5	39	22,8	7500		62308 2RSR	0,874
	110	27	2	60,5	34,7	6700	7500	6408	1,23
	110	27	2	60,5	34,7	6700	8000	6408 NR	SP110 1,23
45	58	7	0,3	6,3	5,8	9500	12000	61809	0,043
	68	12	0,6	13,3	10,3	9700	11000	61909	0,120
	75	10	0,6	15,7	10,3	9000	11000	16009	0,170
	75	16	1	21	13,9	9000	11000	6009	0,261
	75	16	1	21	13,9	9000	11000	6009 P5	0,261
	75	16	1	21	13,9	9000	11000	6009 P4	0,261
	75	16	1	21	13,9	9000		6009 2ZR	0,261
	75	16	1	21	13,9	9000		6009 2ZRP4	0,261
	75	16	1	21	13,9	5600		6009 2RSR	0,261
	75	16	1	21	13,9	9000	11000	6009 NR	SP75 0,261
	85	19	1,1	33,3	20,5	7500	9000	6209	0,414
	85	19	1,1	33,3	20,5	7500	9000	6209 K	0,414
	85	19	1,1	33,3	20,5	7500	9000	6209 P6	0,414
	85	19	1,1	33,3	20,5	7500	9000	6209 P5	0,414
	85	19	1,1	33,3	20,5	9000		6209 2ZR	0,414
	85	19	1,1	33,3	20,5	8000		6209 2ZRP5	0,414
	85	19	1,1	33,3	20,5	5600		6209 2RSR	0,414
	85	19	1,1	33,3	20,5	5600		6209 2RSRP6	0,414
	85	19	1,1			5600		6209 2RSRP5	0,414
	85	19	1,1	33,3	20,5	8000	9500	6209 NR	SP85 0,414
	85	23	1,1	31,5	20,5	8000		62209 2RSR	0,481
	100	25	1,5	52,5	29,9	6700	8000	6309	0,838
	100	25	1,5			6700	8000	6309 K	0,838
	100	25	1,5			6700	8000	6309 MB	0,838
	100	25	1,5			6700	8000	6309 MAP6	0,838
	100	25	1,5			6700	8000	6309 P6	0,838
	100	25	1,5			6700	8000	6309 P5	0,838
	100	25	1,5			6700		6309 2ZR	0,838
	100	25	1,5			6700		6309 2ZRP5	0,838
	100	25	1,5			4500		6309 2RSR	0,838
	100	25	1,5			4500		6309 2RSRP6	0,838
	100	25	1,5			4500		6309 2RSRP5	0,838

Deep groove ball bearings



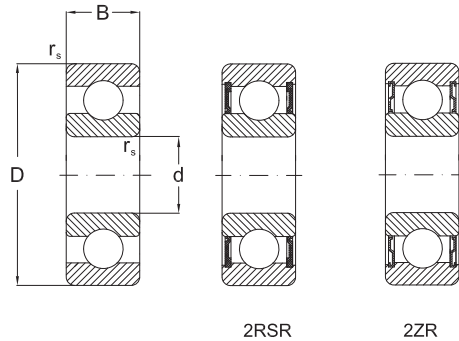
Dimensions				Basical radial load		Speed limit		Designation		Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring	
mm				kN		min ⁻¹		-		kg
45	100	25	1,5	52,5	29,9	6700	8000	6309 NR	SP100	0,838
	100	36	1,5	52,7	31,5	6700		62309 2RSR		1,18
	120	29	2	72,3	42,8	5600	6700	6409		1,54
	120	29	2	72,3	42,8	5600	6700	6409 NR	SP120	1,54
50	65	7	0,3	6,4	6,5	9500	12000	61810	SR65	0,057
	65	7	0,3	6,4	6,5	9700	11000	61810 NR		0,057
	72	12	0,6	13,9	11,2	9000	11000	61910	SR72	0,130
	72	12	0,6	13,9	11,2	9000	11000	61910 NR		0,130
	80	10	0,6	16	10,8	8500	10000	16010		0,188
	80	16	1	16	10,8	8500	10000	6010 K		0,260
	80	16	1	21,8	15,2	8500		6010 2ZR		0,260
	80	16	1	21,8	15,2	5300		6010 2RSR		0,260
	90	20	1,1	35,2	22	7000	8500	6210		0,460
	90	20	1,1	35,2	22	7000	8500	6210 K		0,460
	90	20	1,1	35,2	22	7000	8500	6210 M		0,460
	90	20	1,1	35,2	22	7000	8500	6210 MAP6		0,460
	90	20	1,1	35,2	22	7000	8500	6210 P6		0,460
	90	20	1,1	35,2	22	7000	8500	6210 P5		0,460
	90	20	1,1	35,2	22	7000		6210 2ZR		0,460
	90	20	1,1	35,2	22	7000		6210 2ZRP5		0,460
	90	20	1,1	35,2	22	4500		6210 2RSR		0,460
	90	20	1,1	35,2	22	4500		6210 2RSRP6		0,460
	90	20	1,1	35,2	22	4500		6210 2RSRP5		0,460
	90	20	1,1	35,2	22	7000	8500	6210 NR	SP90	0,460
	90	23	1,1	35,2	22	7000		62210 2RSR		0,514
	110	27	2	61,8	36,1	6300	7000	6310		1,06
	110	27	2	61,8	36,1	6300	7000	6310 K		1,06
	110	27	2	61,8	36,1	6300	7000	6310 MAP6		1,06
	110	27	2	61,8	36,1	6300		6310 2ZR		1,06
	110	27	2	61,8	36,1	4000		6310 2RSR		1,06
	110	27	2	61,8	36,1	6000	7000	6310 NR	SP10	1,06
	110	40	2	61,8	38	6000		62310 2RSR		1,65
	130	31	2,1	82,7	49,4	5000	6000	6410		1,89
	130	31	2,1	82,7	49,4	5000	6000	6410 NR	SP130	1,89

Deep groove ball bearings



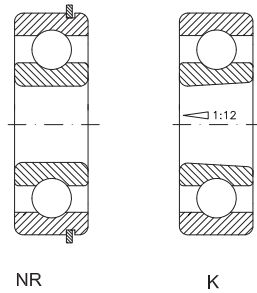
Dimensions				Basical radial load		Speed limit		Designation	snap ring	Weight
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing		
mm				kN			min^{-1}	-		kg
55	72	9	0,3	8,6	8,4	8500	10000	61811		0,083
	90	11	0,6	19,3	13,3	7500	9000	16011		0,26
	90	18	1,1	28,1	20,1	7500	9000	6011 MB		0,39
	90	18	1,1	28,1	20,1	7500		6011 2ZR		0,39
	90	18	1,1	28,1	20,1	4500		6011 2RSR		0,39
	90	18	1,1	28,1	20,1	7500	9000	6011 NR	SP90	0,39
	100	21	1,5	43,9	27,6	6300	7500	6211		0,611
	100	21	1,5	43,9	27,6	6300	7500	6211 K		0,611
	100	21	1,5	43,9	27,6	6300	7500	6211 MA		0,611
	100	21	1,5	43,9	27,6	6300		6211 2ZR		0,611
	100	21	1,5	43,9	27,6	4000		6211 2RSR		0,611
	100	21	1,5	43,9	27,6	6300	7500	6211 NR	SP100	0,611
	120	29	2	70,4	42,8	5300	6300	6311		1,38
	120	29	2	70,4	42,8	5300	6300	6311 K		1,38
	120	29	2	70,4	42,8	5300	6300	6311 MA		1,38
	120	29	2	70,4	42,8	5300		6311 2ZR		1,38
	120	29	2	70,4	42,8	3600		6311 2RSR		1,38
	120	29	2	70,4	42,8	5300	6300	6311 NR	SP120	1,38
	140	33	2,1	94,5	58,9	4800	5600	6411		2,30
	140	33	2,1	94,5	58,9	4800	5600	6411 NR	SP140	2,30
60	78	10	0,3	11,3	10,8	8000	9500	61812		0,120
	95	11	0,6	19,8	14,3	7000	8500	16012		0,280
	95	18	1,1	29,2	22	6700	8000	6012		0,420
	95	18	1,1	29,2	22	6700		6012 2ZR		0,420
	95	18	1,1	29,2	22	4300		6012 2RSR		0,420
	95	18	1,1	29,2	22	7000	8500	6012 NR	SP95	0,420
	110	22	1,5	52,5	34,2	6000	7000	6212		0,780
	110	22	1,5	52,5	34,2	6000	7000	6212 K		0,780
	110	22	1,5	52,5	34,2	6000	7000	6212 MA		0,780
	110	22	1,5	52,5	34,2	6000		6212 2ZR		0,780
	110	22	1,5	52,5	34,2	4000		6212 2RSR		0,780
	110	22	1,5	52,5	34,2	6000	7000	6212 NR	SP110	0,780
	130	31	2,1	80,9	49,4	5000	6000	6312		1,72
	130	31	2,1	80,9	49,4	5000	6000	6312 K		1,72
	130	31	2,1	80,9	49,4	5000		6312 2ZR		1,72

Deep groove ball bearings



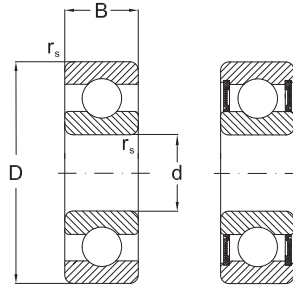
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r_s min	dyn. C_r	stat. C_{0r}	grease	oil	bearing	
mm				kN		min ⁻¹		-	kg
60	130	31	2,1	80,9	49,4	3400		6312 2RSR	1,72
	130	31	2,1	80,9	49,4	5000	6000	6312 NR	1,72
	150	35	2,1	103	66	4300	5000	6412	2,76
	150	35	2,1	103	66	4300	5000	6412 NR	2,76
62	110	22	1,5			6000	7000	62/62	0,600
65	85	10	0,6	11,8	12,1	7000	8500	61813	0,130
	100	11	0,6	21,4	15,8	6300	7500	16013	0,300
	100	18	1,1	30,3	23,8	6300	7500	6013 K	0,440
	100	18	1,1	30,3	23,8	6300		6013 2ZR	0,440
	100	18	1,1	30,3	23,8	4000		6013 2RSR	0,440
	100	18	1,1	30,3	23,8	6300	7500	6013 NR	0,440
	120	23	1,5	55,6	38,5	5300	6300	6213	0,995
	120	23	1,5	55,6	38,5	5300	6300	6213 M	0,995
	120	23	1,5	55,6	38,5	5300	6300	6213 MA	0,995
	120	23	1,5	55,6	38,5	5300		6213 2ZR	0,995
	120	23	1,5	55,6	38,5	3600		6213 2RSR	0,995
	120	23	1,5	55,6	38,5	5300	6300	6213 NR	0,995
	140	33	2,1	92,6	57	4800	5600	6313	2,10
	140	33	2,1	92,6	57	4800	5600	6313 MA	2,10
	140	33	2,1	92,6	57	4800	5600	6313 MB	2,10
	140	33	2,1	92,6	57	4800		6313 2ZR	2,10
	140	33	2,1	92,6	57	3000		6313 2RSR	2,10
	140	33	2,1	92,6	57	4800	5600	6313 NR	2,10
	160	37	2,1	113	74,1	4000	4800	6413	3,300
	160	37	2,1	113	74,1	4000	4800	6413 NR	3,300
70	90	10	0,6	11,8	12,5	6700	8000	61814	0,160
	110	13	0,6	27,6	23,8	6000	7000	16014	0,433
	110	20	1,1	37,7	29,5	6000	7000	6014	0,600
	110	20	1,1	37,7	29,5	6000	7000	6014 MAP5	0,600
	110	20	1,1	37,7	29,5	6000		6014 2ZR	0,600
	110	20	1,1	37,7	29,5	3600		6014 2RSR	0,600
	110	20	1,1	37,7	29,5	6000	7000	6014 NR	0,600
	125	24	1,5	60,5	42,8	5000	6000	6214	1,07
	125	24	1,5	60,5	42,8	5000	6000	6214 MA	1,07
	125	24	1,5	60,5	42,8	5000		6214 2ZR	1,07

Deep groove ball bearings



Dimensions				Basical radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN			min ⁻¹	-		kg
70	125	24	1,5	60,5	42,8	3400		6214 2RSR		1,07
	125	24	1,5	60,5	42,8	5000	6000	6214 NR	SP125	1,07
	150	35	2,1	105	64,6	4500	5300	6314		2,50
	150	35	2,1	105	64,6	4500	5300	6314 K		2,50
	150	35	2,1	105	64,6	4500	5300	6314 MAP6		2,50
	150	35	2,1	105	64,6	4500		6314 2ZR		2,50
	150	35	2,1	105	64,6	2800		6314 2RSR		2,50
	150	35	2,1	105	64,6	4500	5300	6314 NR	SP150	2,50
	180	42	3	136	98,8	3800	4500	6414		4,85
75	95	10	0,6	12,1	13,6	6300	7500	61815 P5		0,160
	95	10	0,6	12,1	13,6	4000		61815 2RSR		0,160
	115	13	0,6	28,7	25,7	5600	6700	16015		0,460
	115	20	1,1	39,5	31,8	5600	6700	6015 M		0,640
	115	20	1,1	39,5	31,8	5600	6700	6015 MAP5		0,640
	115	20	1,1	39,5	31,8	5600		6015 2ZR		0,640
	115	20	1,1	39,5	31,8	3400		6015 2RSR		0,640
	115	20	1,1	39,5	31,8	5600	6700	6015 NR	SP115	0,640
	130	25	1,5	65,5	46,6	4800	5600	6215		1,18
	130	25	1,5	65,5	46,6	4800	5600	6215 K		1,18
	130	25	1,5	65,5	46,6	4800		6215 2ZR		1,18
	130	25	1,5	65,5	46,6	3200		6215 2RSR		1,18
	130	25	1,5	65,5	46,6	4800	5600	6215 NR	SP130	1,18
	160	37	2,1	113	72,7	4000	4800	6315		3,03
	160	37	2,1			4000	4800	6315 MP6		3,03
	160	37	2,1	113	72,7	4000		6315 2ZR		3,03
	160	37	2,1	113	72,7	2800		6315 2RSR		3,03
	160	37	2,1	113	72,7	4000	5000	6315 NR	SP160	3,03
	190	45	3	145	108	3600	4300	6415		6,50
80	100	10	0,6	12,4	14,3	6000	7000	61816		0,160
	110	16	1	25,1	20,4	5600	6700	61916		0,380
	125	14	0,6	33,3	29,9	5300	6300	16016		0,600
	125	22	1,1	46,9	38	5300	6300	6016 MA		0,850
	125	22	1,1	46,9	38	5300		6016 2ZR		0,850
	125	22	1,1	46,9	38	3600		6016 2RSR		0,850
	125	22	1,1	46,9	38	5300	6300	6016 NR	SP125	0,850

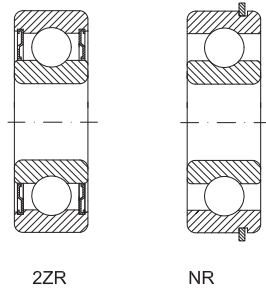
Deep groove ball bearings



2RSR

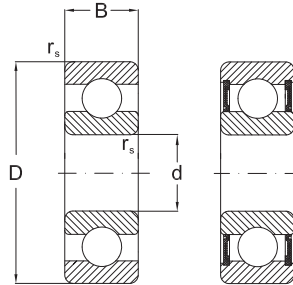
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
80	140	26	2	69,2	52,3	4500	5300	6216	1,40
	140	26	2	69,2	52,3	4500	5300	6216 K	1,40
	140	26	2	69,2	52,3	4500	5300	6216 MA	1,40
	140	26	2	69,2	52,3	4500		6216 2ZR	1,40
	140	26	2	69,2	52,3	3000		6216 2RSR	1,40
	140	26	2	69,2	52,3	4500	5300	6216 NR	SP140 1,40
	170	39	2,1	124	82,2	3800	4500	6316 K	3,60
	170	39	2,1	124	82,2	3800	4500	6316 M	3,60
	170	39	2,1	124	82,2	3800		6316 2ZR	3,60
	170	39	2,1	124	82,2	3800	4500	6316 NR	SP170 3,60
	200	48	3	155	119	3400	4000	6416	7,50
85	110	13	1	18,5	19,8	5300	6300	61817	0,290
	130	14	1	34	31,8	5000	6000	16017	0,630
	130	22	1,1	49,4	40,9	5000	6000	6017	0,890
	130	22	1,1	49,4	40,9	5000		6017 2ZR	0,890
	130	22	1,1	49,4	40,9	3400		6017 2RSR	0,890
	130	22	1,1	49,4	40,9	5000	6000	6017 NR	SP130 0,890
	150	28	2	82,7	60,8	4300	5000	6217	1,80
	150	28	2	82,7	60,8	4300	5000	6217 K	1,80
	150	28	2	82,7	60,8	4300	5000	6217 MP6	1,80
	150	28	2			4300		6217 2R	1,80
	150	28	2	82,7	60,8	2800		6217 2RSR	1,80
	150	28	2	82,7	60,8	4300	5000	6217 NR	SP150 1,80
	180	41	3	133	91,7	3600	4300	6317	4,20
	180	41	3	133	91,7	3600	4300	6317 K	4,20
	180	41	3	133	91,7	3600	4300	6317 MA	4,20
	180	41	3	133	91,7	3600	4300	6317 MB	4,20
	180	41	3	133	91,7	3600		6317 2ZR	4,20
	180	41	3	133	91,7	3600	4300	6317 NR	SP180 4,20
	210	52	4	165	130	3200	3800	6417	9,00
90	115	13	1	18,5	20,9	5300	6300	61818	0,300
	140	16	1	41,4	37,1	4500	5300	16018	0,850
	140	24	1,5	57,5	47,5	4500	5300	6018 MA	1,16
	140	24	1,5	57,5	47,5	4500	5300	6018 MP6	1,16
	140	24	1,5	57,5	47,5	4500		6018 2ZR	1,16

Deep groove ball bearings



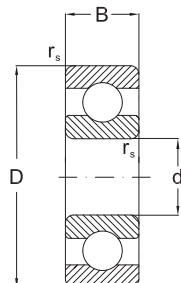
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	
mm				kN			min ⁻¹	-	kg
90	140	24	1,5	57,5	47,5	3000		6018 2RSR	1,16
	140	24	1,5	57,5	47,5	4500	5600	6018 NR	1,6
	160	30	2	96	69,8	3800	4500	6218	2,16
	160	30	2	96	69,8	3800	4500	6218 K	2,16
	160	30	2	96	69,8	3800	4500	6218 MA	2,16
	160	30	2	96	69,8	3800	4500	6218 MP6	2,16
	160	30	2	96	69,8	3800		6218 2ZR	2,16
	160	30	2	96	69,8	3800	4500	6218 NR	2,16
	190	43	3	143	103	3400	4000	6318	4,90
	190	43	3	143	103	3400	4000	6318 K	4,90
	190	43	3	143	103	3400	4000	6318 M	4,90
	190	43	3	143	103	3400		6318 2ZR	4,90
	190	43	3	143	103	3400	4000	6318 NR	4,90
	225	54	4	177	143	3000	3600	6418	11,5
	145	16	1	18,9	21,7	4300	5000	16019	0,890
	145	24	1,5	42,6	39,4	4300	5000	6019	1,20
95	145	24	1,5	60,5	51,3	4300		6019 2ZR	1,20
	145	24	1,5	60,5	51,3	2800		6019 2RSR	1,20
	145	24	1,5	60,5	51,3	4300	5000	6019 NR	1,20
	170	32	2,1	60,5	51,3	3600	4300	6219 MBP6	2,60
	170	32	2,1	108	77,4	3600	4300	6219 NR	2,60
	200	45	3	108	77,4	3200	3800	6319	5,60
	200	45	3	151	112	3200	3800	6319 MAP6	5,60
100	125	13	1	151	112	4800	5600	61820 MAP5	0,320
	150	16	1	18,9	22,8	4300	5000	16020	0,910
	150	24	1,5	43,9	41,8	4300	5000	6020 MAP6	1,25
	150	24	1,5	60,5	51,3	4300		6020 2ZR	1,25
	150	24	1,5	60,5	51,3	2800		6020 2RSR	1,25
	150	24	1,5	60,5	51,3	4300	5000	6020 NR	1,25
	180	34	2,1	60,5	51,3	3400	4000	6220	3,10
	180	34	2,1	121	88,4	3400	4000	6220 MA	3,15
	180	34	2,1	121	88,4	3400	4000	6220 MP6	3,15
	180	34	2,1	121	88,4	3400	4000	6220 NR	3,15
	215	47	3	121	88,4	3000		6320 2ZR	7,00
	215	47	3	165	133	3000	3600	6320 MAP6	7,00

Deep groove ball bearings



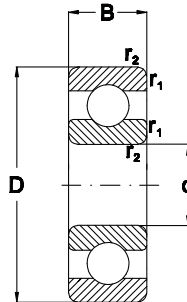
2RSR

Dimensions				Basical radial load		Speed limit		Designation	Weight
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	19,8	18,6	4500	5300	61821	0,350
	160	18	1	51,3	48,5	4000	4800	16021	1,20
	160	26	2	72,3	62,2	3800	4500	6021 M	1,60
	190	36	2,1	133	98,8	3200	3800	6221	3,70
	190	36	2,1	133	98,8	3200	3800	6221 MA	3,70
	225	49	3	173	145	2800	3400	6321 MA	8,00
110	140	16	1	26,7	24,7	4300	5000	61882	0,600
	170	19	1	57,2	54,2	3800	4500	16022	1,46
	170	28	2	80,9	69,8	3600	4300	6022	1,95
	200	38	2,1	143	112	3000	3600	6222	4,35
	200	38	2,1	143	112	3000	3600	6222 M	4,35
	200	38	2,1	143	112	3000	3600	6222 NR	4,35
	240	50	3	193	171	2600	3200	6322	9,58
	240	50	3	193	171	2600	3200	6322 MA	9,58
120	150	16	1	27,6	26,6	3800	4500	61824	0,650
	180	19	1	60,5	60,8	3400	4000	16024	1,70
	180	28	2	84	76	3400	4000	6024 MP6	2,09
	215	40	2,1	139	112	2800	3400	6224	5,15
	215	40	2,1	139	112	2800	3400	6224 MB	5,15
	215	40	2,1	139	112	2800	3400	6224 MAP6	5,15
	215	40	2,1	139	112	2800		6224 2ZR	5,15
	215	40	2,1	139	112	2800	3400	6224 NR	5,15
	260	55	3	198	177	2400	3000	6324 MA	13,6
130	165	18	1,1	35,8	40,9	3600	4300	61826 MAP5	0,930
	200	22	1,1	79	77,4	3200	3800	16026	2,50
	200	33	2	106	95	3000	3600	6026	3,25
	230	40	3			2600	3200	6226	6,00
	230	40	3	148	125	2600	3200	6226 M	6,00
	280	58	4			2200	2800	6326 MA	17,0
140	175	18	1,1	37,1	44,2	3400	4000	61828	1,00
	210	22	1,1	76,6	82,2	2800	3400	16028	2,70
	210	33	2	105	103	2800	3400	6028 MP6	3,35
	250	42	3	157	143	2400	3000	6228	7,50
	250	42	3	157	143	2400	3000	6228 MA	7,50
	300	62	4	238	233	2000	2600	6328 MA	21,0



Dimensions				Basical radial load		Speed limit		Designation	Weight
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	46,4	58	3000	3600	61830	1,40
	225	24	1,1	87,6	93,1	2600	3200	16030	3,40
	225	35	2,1	119	119	2600	3200	6030 MA	4,75
	270	45	3	165	158	2000	2600	6230 MA	9,60
	320	65	4	276	285	1900	2400	6330 MA	25,0
160	200	20	1,1	46,9	60,8	2800	3400	61832	1,49
	240	25	1,5	94,5	103	2400	3000	16032	3,60
	240	38	2,1	136	136	2400	3000	6032 MA	5,85
	290	48	3	177	177	1900	2400	6232 MA	15,0
170	215	22	1,1	58,7	74,1	2600	3200	61834 P6	2,00
	260	28	1,5	113	123	2200	2800	16034	5,70
	260	42	2,1	160	164	2200	2800	6034 MA	7,80
	310	52	4	201	213	1900	2400	6234 MA	17,5
180	225	22	1,1	59,3	77,4	2400	3000	61836 P5	2,00
	250	33	2	131	139	2200	2800	16036 MA	4,90
	280	31	2	181	190	2000	2600	6036	7,00
	280	46	2,1	218	228	2000	2600	6236	10,5
	320	52	4	333	385	1800	2200	6336	18,5
190	240	24	1,5	72,3	93,1	2200	2800	61838	2,60
	290	31	2	141	158	2000	2600	16038	7,90
	290	46	2,1	185	205	2000	2600	6038 MA	11,0
	290	46	2,1	185	205	2000	2600	6038 MB	11,0
	290	46	2,1	185	205	2000	2600	6038 MAP6	11,0
	290	46	2,1	185	205	2000	2600	6038 MBP5	11,0
	340	55	4	242	266	1700	2000	6238 MB	23,0
	340	55	4	72,3	96,9	1700	2000	61840 MB	23,0
200	250	24	1,5	141	158	2200	2800	61940 MB	2,70
	280	38	2,1	160	181	2200	2800	16040 MBP6	7,25
	310	34	2	160	181	1900	2400	16040 MBP5	9,00
	310	34	2	205	233	1900	2400	6040 MA	9,00
	310	51	2,1	205	233	1900	2400	6040 MB	13,5
	310	51	2,1	205	233	1900	2400	6040 MBP52	13,5
	310	51	2,1	257	295	1900	2400	6240 M	13,5
	360	58	4	257	295	1700	2000	6240 MB	28,0
	360	58	4	280	314	1700	2000	6240 MB	27,0

Single Row Deep Groove Ball Bearings



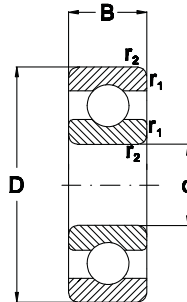
Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	dyn. Cr	stat. C0r	grease	oil		
mm				kN		min ⁻¹			kg
220	270	24	1,5	74,1	105	1900	2400	61844	3
	300	38	2,1	143	171	1900	2400	61944	8
	340	37	2,1	165	194	1800	2200	16044	12
	340	56	3	235	276	1700	2000	6044	18
	400	65	4	281	347	1500	1800	6244	36,9
	460	88	5	390	494	1300	1600	6344	74,5
240	300	28	2	103	143	1800	2200	61848	4,5
	320	38	2,1	151	190	1800	2200	61948	8,6
	360	37	2,1	193	242	1600	1900	16048	14,3
	360	56	3	242	299	1600	1900	6048	19,9
	440	72	4	340	442	1400	1700	6248	50,2
	500	95	5	420	556	1100	1400	6348	96
260	320	28	2	105	155	1700	2000	61852	4,8
	360	46	2,1	201	257	1600	1900	61952	14,5
	400	44	3	226	295	1500	1800	16052	21,2
	400	65	4	276	356	1400	1700	6052	31,1
	480	80	5	371	504	1100	1400	6252	66,6
	540	102	6	482	675	1000	1300	6352	119
280	350	33	2	131	190	1600	1900	61856	7,4
	380	46	2,1	131	190	1500	1800	61956	15,5
	420	44	3	230	318	1400	1700	16056	23,1
	420	65	4	287	385	1400	1700	6056	33
	500	80	5	402	570	1100	1400	6256	70,5
	580	108	6	543	808	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	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
300	380	38	2,1	163	233	1400	1700	61860	10,5
	420	56	3	257	356	1300	1600	61960	24,5
	460	50	4	272	385	1300	1600	16060	32,7
	460	74	4	340	475	1200	1500	6060	43,2
320	400	38	2,1	163	242	1300	1600	61864	11
	440	56	3	205	295	1200	1500	61964	25,5
	480	50	4	267	385	1200	1500	16064	34,4
	480	74	4	352	513	1200	1500	6064	49,4
340	420	38	2,1	169	261	1200	1500	61868	11,5
	460	56	3	267	404	1100	1400	61968	26,5
	520	57	4	328	494	1100	1400	16068	47,3
	520	74	5	402	608	1100	1400	6068	61,4
360	440	38	2,1	173	271	1100	1400	61872	12
	480	56	3	276	428	1100	1400	61972	28
	540	57	4	333	523	1000	1300	16072	49,5
	540	82	5	439	698	1000	1300	6072	64,4
380	480	38	2,1	230	371	1000	1300	61876	20
	520	56	4	321	513	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	235	385	1000	1300	61880	20,5
	540	65	4	328	542	950	1200	61980	41,5
	600	90	5	494	822	900	1100	6080	87,2

Single Row Deep Groove Ball Bearings



Dimensions				Basical radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	dyn. Cr	stat. C0r	grease	oil		
mm				kN		min ⁻¹			kg
420	520	46	2,1	238	404	950	1200	61884	21,5
	560	65	4	333	570	900	1100	61984	43
	620	90	5	482	836	900	1100	6084	93
440	540	46	2,1	242	418	900	1100	61888	22,5
	600	74	4	390	684	900	1100	61988	60,5
	650	94	6	525	917	850	1000	6088	105
460	580	56	3	303	542	900	1100	61892	35
	620	74	4	402	713	850	1000	61992	62,5
	680	100	6	553	1007	900	950	6092	121
480	600	56	3	309	570	850	1000	61896	36,5
	650	78	5	427	774	800	950	61996	74
	700	100	6	587	1083	750	900	6096	126
500	620	56	3	315	589	800	950	618/500	37,5
	670	78	5	439	822	750	900	619/500	77
	720	100	6	575	1083	740	890	60/500	135
530	650	56	3	315	622	850	900	618/530	39,5
	710	82	5	464	884	700	850	619/530	90,5
	780	112	6	670	1290	670	800	60/530	186
560	680	56	3	328	660	700	850	618/560	42
	750	85	5	469	931	670	800	619/560	105
	820	115	6	630	1397	630	750	60/560	208
600	730	60	3	346	727	670	800	618/600	52
	800	90	5	556	1159	630	750	619/600	125
	870	118	6	692	1425	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	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
630	920	128	7,5	778	1672	560	670	60/630	285
670	820	69	4	420	950	560	670	618/670	77,5
	900	103	6	642	1425	530	630	619/670	185
	980	136	7,5	859	1938	500	600	60/670	345
710	1030	140	7,5	501	1188	480	560	618/750	370
750	920	78	5	723	1710	500	600	619/750	110
	1000	112	6	531	1359	500	600	618/850	255
850	1030	82	5	587	1520	430	500	618/900	140
900	1090	85	5	605	1644	380	450	618/950	1600
1000	1220	100	6	605	1710	340	400	618/1000	245
1060	1280	100	6	692	2014	300	360	618/1000	260



Single Row Deep Groove Ball Bearing - Stainless Steel Series

Standards, Boundary dimensions

Standard plans	DIN 616
Deep groove ball bearing	DIN 625

General

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

DAS LAGER 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

DAS LAGER 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

DAS LAGER 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

DAS LAGER 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 **DAS LAGER 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).

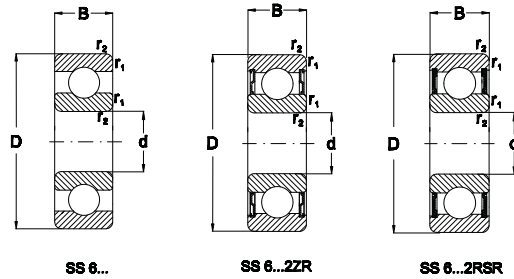
The values of internal clearance groups are as for standard deep groove ball bearings according to DIN 620/part 4 and ISO 5753-1981, respectively.

Designation

DAS LAGER - Stainless Steel Deep groove ball bearing are identified by a prefix "**SS**" (**SS** stands for "**S**tainless **S**teel").

Example: **SS 6205.2RSR**

Single Row Deep Groove Ball Bearings - Stainless Steel Series



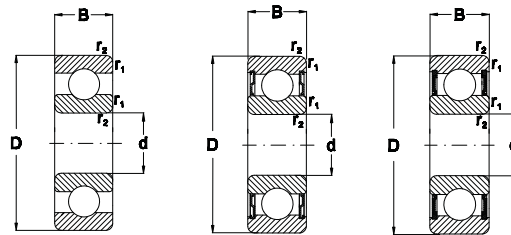
Dimensions				Basic load ratings		Speed ratings		Designation	Weight
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹			kg
3	10	4	0,15	0,64	0,32	40000	48000	SS 623	0,002
	10	4	0,15	0,64	0,32	40000	-	SS 623.2ZR	0,002
4	11	4	0,15	0,96	0,35	48000	56000	SS 619/4	0,01
	12	4	0,2	0,8	0,28	52000	62000	SS 604	0,002
	13	5	0,2	1,29	0,49	38000	45000	SS 624	0,003
	13	5	0,2	1,29	0,49	38000	45000	SS 624ZR	0,003
	13	5	0,2	1,29	0,49	38000	-	SS 624.2ZR	0,003
	16	5	0,3	1,46	0,6	36000	43000	SS 634	0,006
	16	5	0,3	1,46	0,6	36000	-	SS 634.2ZR	0,006
5	13	4	0,2	1,08	0,43	43000	50000	SS 619/5	0,02
	16	5	0,3	1,46	0,6	36000	43000	SS 625	0,005
	16	5	0,3	1,46	0,6	36000	43000	SS 625ZR	0,005
	16	5	0,3	1,46	0,6	36000	-	SS 625.2ZR	0,005
	19	6	0,3	2,45	1,06	32000	38000	SS 635	0,009
	19	6	0,3	2,45	1,06	32000	-	SS 635.2ZR	0,009
6	17	6	0,3	2,25	0,84	38000	45000	SS 619/6	0,04
	19	6	0,3	2,45	1,06	32000	38000	SS 626	0,009
	19	6	0,3	2,45	1,06	21500	-	SS 626RSR	0,009
	19	6	0,3	2,45	1,06	21500	-	SS 626.2RSR	0,009
	19	6	0,3	2,45	1,06	32000	38000	SS 626ZR	0,009
	19	6	0,3	2,45	1,06	32000	-	SS 626.2ZR	0,009
7	17	6	0,3	1,6	0,7	36000	43000	SS 619/7	0,05
	19	6	0,3	2,45	1,06	32000	38000	SS 607	0,008
	19	6	0,3	2,45	1,06	20000	-	SS 607.2RSR	0,008
	19	6	0,3	2,45	1,06	32000	-	SS 607.2ZR	0,008
	22	7	0,3	3,25	1,37	30000	36000	SS 627	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	Weight
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	-	SS 627RSR	0,013
	22	7	0,3	3,25	1,37	20000	-	SS 627.2RSR	0,013
	22	7	0,3	3,25	1,37	30000	36000	SS 627ZR	0,013
	22	7	0,3	3,25	1,37	30000	-	SS 627.2ZR	0,013
8	19	6	0,3	2,24	0,91	36000	43000	SS 619/8	0,07
	22	7	0,3	3,25	1,37	30000	36000	SS 608	0,013
	22	7	0,3	3,25	1,37	20000	-	SS 608.2RSR	0,013
	22	7	0,3	3,25	1,37	30000	-	SS 608.2ZR	0,013
9	20	6	0,3	1,72	0,84	34000	40000	SS 619/9	0,08
	24	7	0,3	3,65	1,63	30000	36000	SS 609	0,015
	24	7	0,3	3,65	1,63	18000	-	SS 609.2RSR	0,015
	24	7	0,3	3,65	1,63	30000	-	SS 609.2ZR	0,015
	26	8	0,6	4,55	1,96	28000	34000	SS 629	0,02
	26	8	0,6	4,55	1,96	18500	-	SS 629RSR	0,02
	26	8	0,6	4,55	1,96	18500	-	SS 629.2RSR	0,02
	26	8	0,6	4,55	1,96	28000	34000	SS 629.2ZR	0,02
	26	8	0,6	4,55	1,96	28000	-	SS 629.2ZR	0,02
10	19	5	0,3	1,73	0,83	34000	40000	SS 61800	0,005
	19	5	0,3	1,38	0,59	22000	-	SS 61800/2RSR	0,005
	19	5	0,3	1,38	0,59	34000	-	SS 61800.2ZR	0,005
	22	6	0,3	0,95	0,75	34000	40000	SS 61900	0,01
	22	6	0,3	0,95	0,75	22000	-	SS 61900.2RSR	0,01
	22	6	0,3	0,95	0,75	34000	-	SS 61900.2ZR	0,01
	26	8	0,3	4,5	1,95	28000	34000	SS 6000	0,018
	26	8	0,3	4,5	1,95	17000	-	SS 6000.2RSR	0,02
	26	8	0,3	4,5	1,95	28000	-	SS 6000.2ZR	0,02

Single Row Deep Groove Ball Bearings - Stainless Steel Series



SS 6...

SS 6...2ZR

SS 6...2RSR

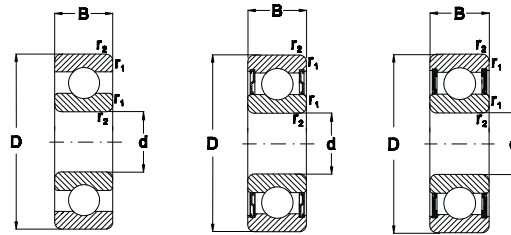
Dimensions				Basic load ratings		Speed ratings		Designation	Weight
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min^{-1}			kg
10	30	9	0,6	6	2,6	26000	32000	SS 6200	0,03
	30	9	0,6	6	2,6	17000	-	SS 6200.2RSR	0,032
	30	9	0,6	6	2,6	26000	-	SS 6200.2ZR	0,032
	35	11	0,6	8,2	3,5	22000	28000	SS 6300	0,055
	35	11	0,6	8,2	3,5	14500	-	SS 6300.2RSR	0,057
	35	11	0,6	8,2	3,5	22000	-	SS 6300.2ZR	0,057
12	21	5	0,3	1,4	0,65	32000	37000	SS 61801	0,006
	21	5	0,3	1,4	0,65	21000	-	SS 61801.2RSR	0,006
	21	5	0,3	1,4	0,65	32000	-	SS 61801.2ZR	0,006
	24	6	0,3	2,3	1,0	30000	36000	SS 61901	0,011
	24	6	0,3	2,3	1,0	20000	-	SS 61901.2RSR	0,011
	24	6	0,3	2,3	1,0	30000	-	SS 61901.2ZR	0,011
	28	8	0,3	5,1	2,4	26000	32000	SS 6001	0,018
	28	8	0,3	5,1	2,4	17000	-	SS 6001.2RSR	0,02
	28	8	0,3	5,1	2,4	26000	-	SS 6001.2ZR	0,02
	32	10	0,6	6,95	3,1	24000	30000	SS 6201	0,037
	32	10	0,6	6,95	3,1	16000	-	SS 6201.2RSR	0,04
	32	10	0,6	6,95	3,1	24000	-	SS 6201.2ZR	0,04
	37	12	1	9,8	4,2	20000	26000	SS 6301	0,06
	37	12	1	9,8	4,2	13000	-	SS 6301.2RSR	0,065
	37	12	1	9,8	4,2	20000	-	SS 6301.2ZR	0,065
15	24	5	0,3	1,56	0,8	28000	34000	SS 61802	0,007
	24	5	0,3	1,56	0,8	18500	-	SS 61802.2RSR	0,007
	24	5	0,3	1,56	0,8	28000	-	SS 61802.2ZR	0,007
	28	7	0,3	4,0	2,0	24000	30000	SS 61902	0,016
	28	7	0,3	4,0	2,0	16000	-	SS 61902.2RSR	0,016
	28	7	0,3	4,0	2,0	24000	-	SS 61902.2ZR	0,016
	32	9	0,3	5,6	2,9	24000	30000	SS 6002	0,029

Single Row Deep Groove Ball Bearings - Stainless Steel Series

Abutment and fillet
dimensions see on
page 86

Dimensions				Basic load ratings		Speed ratings		Designation	Weight
d	D	B	$r_{1,2}$ min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹			kg
15	32	9	0,3	5,6	2,9	15000	-	SS 6002.2RSR	0,031
	32	9	0,3	5,6	2,9	24000	-	SS 6002.2ZR	0,031
	35	11	0,6	7,8	3,8	20000	26000	SS 6202	0,043
	35	11	0,6	7,8	3,8	13000	-	SS 6202.2RSR	0,046
	35	11	0,6	7,8	3,8	20000	-	SS 6202.2ZR	0,046
	42	13	1	11,5	5,5	18000	22000	SS 6302	0,09
	42	13	1	11,5	5,5	12000	-	SS 6302.2RSR	0,092
	42	13	1	11,5	5,5	18000	-	SS 6302.2ZR	0,092
17	26	5	0,3	1,7	0,95	24000	30000	SS 61803	0,008
	26	5	0,3	1,7	0,95	16000	-	SS 61803.2RSR	0,008
	26	5	0,3	1,7	0,95	24000	-	SS 61803.2ZR	0,008
	28	7	0,3	4,35	2,3	22000	28000	SS 61903	0,018
	28	7	0,3	4,35	2,3	14500	-	SS 61903.2RSR	0,018
	28	7	0,3	4,35	2,3	22000	-	SS 61903.2ZR	0,018
	35	10	0,3	6	3,25	22000	28000	SS 6003	0,037
	35	10	0,3	6	3,25	13000	-	SS 6003.2RSR	0,04
	35	10	0,3	6	3,25	22000	-	SS 6003.2ZR	0,04
	40	12	0,6	9,6	4,8	18000	22000	SS 6203	0,063
	40	12	0,6	9,6	4,8	12000	-	SS 6203.2RSR	0,07
	40	12	0,6	9,6	4,8	18000	-	SS 6203.2ZR	0,07
	47	14	1	13,7	6,7	16000	19000	SS 6303	0,11
	47	14	1	13,7	6,7	10500	-	SS 6303.2RSR	0,119
	47	14	1	13,7	6,7	16000	-	SS 6303.2ZR	0,119
20	32	7	0,3	2,7	1,5	19000	24000	SS 61804	0,018
	32	7	0,3	2,7	1,5	12500	-	SS 61804.2RSR	0,018
	32	7	0,3	2,7	1,5	19000	-	SS 61804.2ZR	0,018
	37	9	0,3	6,4	3,7	18000	22000	SS 61904	0,018
	37	9	0,3	6,4	3,7	12000	-	SS 61904.2RSR	0,018

Single Row Deep Groove Ball Bearings - Stainless Steel Series



SS 6...

SS 6...2ZR

SS 6...2RSR

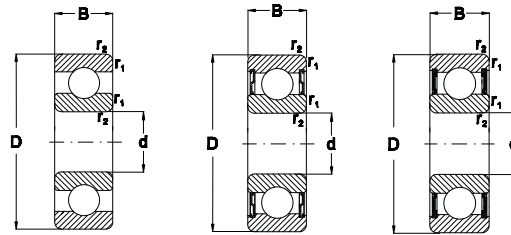
Dimensions				Basic load ratings		Speed ratings		Designation	Weight
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min^{-1}			kg
20	37	9	0,3	6,4	3,7	18000	-	SS 61904.2ZR	0,018
	42	12	0,6	9,4	5,1	17000	20000	SS 6004	0,057
	42	12	0,6	9,4	5,1	11000	-	SS 6004.2RSR	0,06
	42	12	0,6	9,4	5,1	17000	-	SS 6004.2ZR	0,06
	47	14	1	12,8	6,7	15000	18000	SS 6204	0,104
	47	14	1	12,8	6,7	9900	-	SS 6204.2RSR	0,105
	47	14	1	12,8	6,7	15000	-	SS 6204.2ZR	0,105
	52	15	1,1	17,3	8,5	14000	17000	SS 6304	0,148
	52	15	1,1	17,3	8,5	9300	-	SS 6304.2RSR	0,158
	52	15	1,1	17,3	8,5	14000	-	SS 6304.2ZR	0,158
25	37	7	0,3	4,35	2,6	17000	20000	SS 61805	0,022
	37	7	0,3	4,35	2,6	11000	-	SS 61805.2RSR	0,022
	37	7	0,3	4,35	2,6	17000	-	SS 61805.2ZR	0,022
	42	9	0,3	6,6	4	16000	19000	SS 61950	0,045
	42	9	0,3	6,6	4	10500	-	SS 61950.2RSR	0,045
	42	9	0,3	6,6	4	16000	-	SS 61950.2ZR	0,045
	47	12	0,6	10,1	5,9	16000	19000	SS 6005	0,071
	47	12	0,6	10,1	5,9	10500	-	SS 6005.2RSR	0,081
	47	12	0,6	10,1	5,9	16000	-	SS 6005.2ZR	0,081
	52	15	1	14,3	8	14000	17000	SS 6205	0,134
	52	15	1	14,3	8	9300	-	SS 6205.2RSR	0,142
	52	15	1	14,3	8	14000	-	SS 6205.2ZR	0,142
	62	17	1,1	22,4	11,4	11000	14000	SS 6305	0,25
	62	17	1,1	22,4	11,4	7300	-	SS 6305.2RSR	0,269
	62	17	1,1	22,4	11,4	11000	-	SS 6305.2ZR	0,269
30	42	7	0,3	4,49	2,9	15000	18000	SS 61806	0,027
	42	7	0,3	4,49	2,9	10000	-	SS 61806.2RSR	0,027
	42	7	0,3	4,49	2,9	15000	-	SS 61806.2ZR	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	Weight
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	SS 61906	0,051
	47	9	0,3	7,25	4,55	9500	-	SS 61906.2RSR	0,051
	47	9	0,3	7,25	4,55	14000	-	SS 61906.2ZR	0,051
	55	13	1	13,2	8,2	13000	16000	SS 6006	0,126
	55	13	1	13,2	8,2	8500	-	SS 6006.2RSR	0,131
	55	13	1	13,2	8,2	13000	-	SS 6006.2ZR	0,131
	62	16	1	19,3	11,2	11000	14000	SS 6206	0,193
	62	16	1	19,3	11,2	7300	-	SS 6206.2RSR	0,2
	62	16	1	19,3	11,2	11000	-	SS 6206.2ZR	0,2
	72	19	1,1	29	16,3	9500	12000	SS 6306	0,348
	72	19	1,1	29	16,3	6300	-	SS 6306.2RSR	0,369
	72	19	1,1	29	16,3	9500	-	SS 6306.2ZR	0,369
35	47	7	0,3	4,75	3,2	13000	16000	SS 61807	0,03
	47	7	0,3	4,75	3,2	8500	-	SS 61807.2RSR	0,03
	47	7	0,3	4,75	3,2	13000	-	SS 61807.2ZR	0,03
	55	10	0,6	9,55	6,2	11000	14000	SS 61907	0,08
	55	10	0,6	9,55	6,2	7500	-	SS 61907.2RSR	0,08
	55	10	0,6	9,55	6,2	11000	-	SS 61907.2ZR	0,08
	62	14	1	16,3	10,4	11000	14000	SS 6007	0,14
	62	14	1	16,3	10,4	7300	-	SS 6007.2RSR	0,147
	62	14	1	16,3	10,4	11000	-	SS 6007.2ZR	0,147
	72	17	1,1	25,7	15,6	9500	12000	SS 6207	0,287
	72	17	1,1	25,7	15,6	6300	-	SS 6207.2RSR	0,295
	72	17	1,1	25,7	15,6	9500	-	SS 6207.2ZR	0,295
	80	21	1,5	33,5	19,2	8500	10000	SS 6307	0,448
	80	21	1,5	33,5	19,2	5600	-	SS 6307.2RSR	0,438
	80	21	1,5	33,5	19,2	8500	-	SS 6307.2ZR	0,438
40	52	7	0,3	4,9	3,4	11000	14000	SS 61808	0,034
40	52	7	0,3	4,9	3,4	7000	-	SS 61808.2RSR	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	Weight
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	-	SS 61808.2ZR	0,034
	62	12	0,6	13,7	9,2	10000	13000	SS 61908	0,12
	62	12	0,6	13,7	9,2	6500	-	SS 61908.2RSR	0,12
	62	12	0,6	13,7	9,2	10000	-	SS 61908.2ZR	0,12
	68	15	1	17	11,8	10000	13000	SS 6008	0,182
	68	15	1	17	11,8	6600	-	SS 6008.2RSR	0,19
	68	15	1	17	11,8	10000	-	SS 6008.2ZR	0,19
	80	18	1,1	32,6	20	8500	10000	SS 6208	0,342
	80	18	1,1	32,6	20	5600	-	SS 6208.2RSR	0,353
	80	18	1,1	32,6	20	8500	-	SS 6208.2ZR	0,353
	90	23	1,5	42,5	25	7500	9000	SS 6308	0,641
	90	23	1,5	42,5	25	5000	-	SS 6308.2RSR	0,641
	90	23	1,5	42,5	25	7500	-	SS 6308.2ZR	0,641
45	58	7	0,3	6,05	4,3	9500	12000	SS 61809	0,04
	58	7	0,3	6,05	4,3	6300	-	SS 61809.2RSR	0,04
	58	7	0,3	6,05	4,3	9500	-	SS 61809.2ZR	0,04
	68	12	0,6	10	6,5	9000	11000	SS 61909	0,14
	68	12	0,6	10	6,5	6000	-	SS 61909.2RSR	0,14
	68	12	0,6	10	6,5	9000	-	SS 61909.2ZR	0,14
	100	25	1,5	53	32	6700	8000	SS 6309	0,795
	100	25	1,5	53	32	4400	-	SS 6309.2RSR	0,819
	100	25	1,5	53	32	6700	-	SS 6309.2ZR	0,819





Single Row Deep Groove Ball Bearing - with filling slots

A single row deep groove ball bearing with filling slots has a filling slot in both the inner and outer rings enabling more and larger balls to be incorporated than in standard deep groove ball bearings. (see figure 1). Because of that they have special cage design. 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 DAS LAGER deep groove ball bearings with filling slots comprises

DAS LAGER single row deep groove ball bearing with filling slot are manufactured following constructive versions.

- Basic design open bearings
- Shielded bearings
- Bearings with a snap ring groove.

Basic design bearings

Basic design bearings with filling slots are open without any seal and shield. Those bearings that are also produced in shielded version may have seal recesses in the outer ring, for manufacturing reason. (see figure 2).

Shielded bearings

DAS LAGER deep groove ball bearings with filling slots are available with shields on one side designation suffixes ZR (see figure 3-a) or both sides, designation suffixes 2ZR (see figure 3-b). The shield forms a narrow gap to the inner ring shoulder (see figure 3).



Figure 1

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.

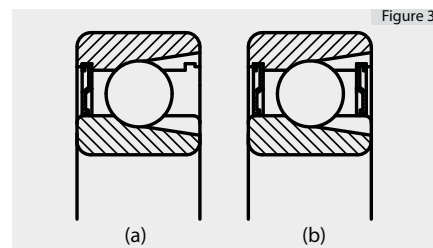


Figure 3

Bearings with a snap ring groove

For easy, space saving axial location of the bearing in the housing, DAS LAGER deep groove ball bearings with filling slots are available with a snap ring groove in the outer ring, designation suffix N (see figure 4-a). 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 (see figure 4-b).

DAS LAGER 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 (see figure 5-a) or with two shields (see figure 5-b).

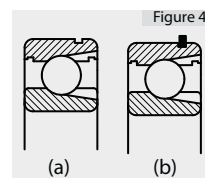


Figure 4

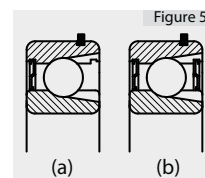


Figure 5

Dimensions

The boundary dimensions of DAS LAGER 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

DAS LAGER 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

DAS LAGER 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 page 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

DAS LAGER deep groove ball bearings with filling slots are fitted with a pressed riveted steel cage, ball centred, no designation suffix (see figure 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

$$F_{rm} = k_r \left(\frac{vn}{1000} \right)^{2/3} \left(\frac{d_m}{100} \right)^2$$

where

F_{rm} = 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

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

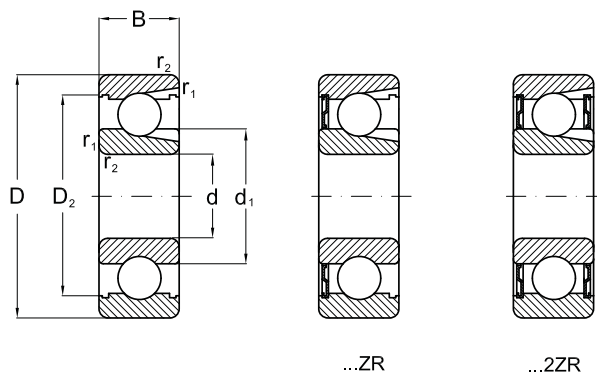
provided $F_a/F_r \leq 0,6$.

Supplementary designations

The designation suffixes used to identify certain features of DAS LAGER 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

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



Dimensions			Basical load ratings dynamic static		Fatigue load limit	Speed ratings		Weight
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

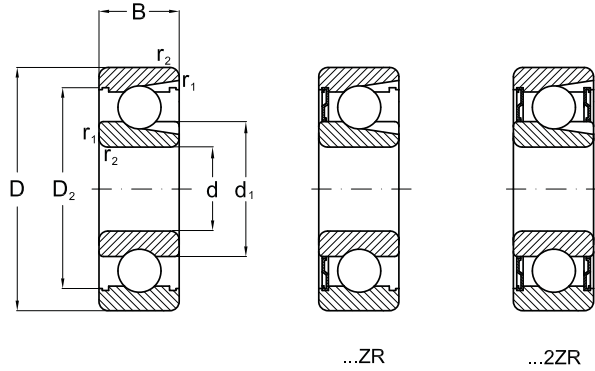
¹⁾ For 2ZR design, limiting speeds are about 80% of the quoted value.

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



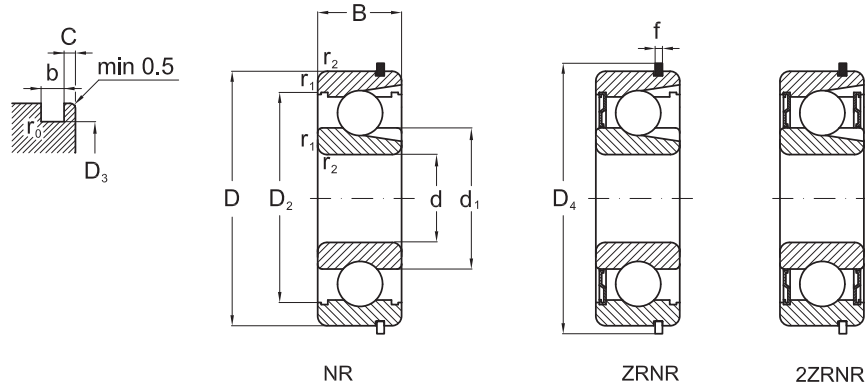
Dimensions			Basic load ratings dynamic static		Fatigue load limit	Speed ratings		Weight
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾	
mm			kN			min ⁻¹		kg
90	160	30	112	114	4,3	7000	4500	2,35
	190	43	157	160	5,7	6300	4000	5,40
95	170	32	121	122	4,5	6700	4300	2,70
100	180	34	134	140	5	6300	4000	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	220-ZR	220-2ZR	112	168	2

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



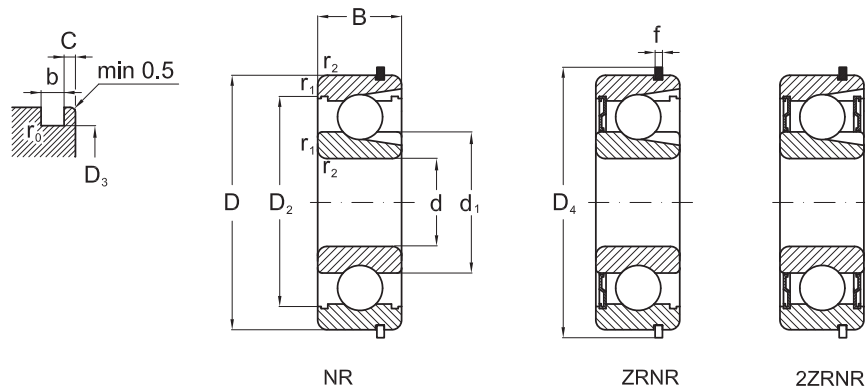
Dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Weight	Designations			Snap ring
			dynamic						Bearing open	with shields on		
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾					
										one side	two sides	
mm	kN					min ⁻¹	kg	-				
25	62	17	23	16	1	20000	13000	0,24	305 NR	305-ZRNR	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 dynamic static			Fatigue load limit	Speed ratings		Weight	Designations Bearing open with shields on			Snap ring
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾						
mm			kN			min ⁻¹		kg	- one side two sides				
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	

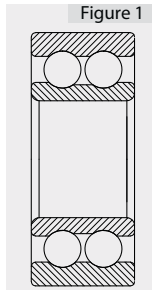
Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm

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

Double row deep groove ball bearings (see figure 1) have similar constructive design to single row deep groove ball bearings. They have two deep raceways and high conformity between the balls and raceways. They are able to carry axial loads acting in both directions in addition to radial loads. Double row deep groove ball bearings are very suitable for bearing arrangements where the load carrying capacity of a single row bearing is inadequate. For the same outside and bore diameters, double row bearings are slightly wider than single row bearings but have considerably higher load carrying capacity than single row bearings in the 62 and 63 series.



Design:

DAS LAGER 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.

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.

Tolerances

DAS LAGER double row deep groove ball bearings are produced to Normal tolerances. The values for tolerances correspond to ISO 492:2002 and can be found in table 3.1 on starting page 27

Internal clearance

DAS LAGER double row deep groove ball bearings have Normal radial internal clearance as standard. The clearance limits are as specified in ISO 5753:1991 and can be found in table 1 on page 83.

Misalignment

Misalignment of the inner ring relative to the outer ring of a double row deep groove ball bearing can only be accommodated by force, which leads to increased ball loads and cage forces and a reduction in bearing service life. For this reason, the maximum permissible angular misalignment is two minutes of arc. Any misalignment of the bearing rings will result in increased noise during operation.

Cage

DAS LAGER double row deep groove ball bearings are fitted with two glass fibre reinforced polyamide 6,6 cages, designation suffix TN

These bearing sizes are also available with pressed steel cages.

Minimum load

In order to obtain satisfactory operation, double row deep groove ball bearings, like all ball and roller bearings, must 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 cages, and the friction in the lubricant, can have a detrimental effect on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the balls and raceways.

The requisite minimum load to be applied to double row deep groove ball bearings can be estimated using

$$F_{rm} = k_r \left(\frac{vn}{1000} \right)^{2/3} \left(\frac{d_m}{100} \right)^2$$

where

F_{rm} = minimum radial load, kN

k_r = minimum radial load factor (from product table)

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 double row deep groove ball bearings must be subjected to additional radial load.

Axial load carrying capacity

If double row deep groove ball bearings are subjected to a purely axial load, this axial load should generally not exceed the value of 0,5 C_0 . Excessive axial loads can lead to a substantial reduction in bearing life.

Equivalent dynamic bearing load

For dynamically loaded double row deep groove ball bearings

$$P = F_r \quad \text{when } F_a/F_r \leq e$$

$$P = 0,56 F_r + Y F_a \quad \text{when } F_a/F_r > e$$

The factors e and Y depend on the relationship $f_0 F_a/C_0$ where f_0 is a calculation factor (see product table), F_a the axial component of the load and C_0 the basic static load rating.

If the bearings are mounted with the usual fits (shaft tolerance j5 or k5, depending on the shaft diameter, and housing bore tolerance J7) the values for e and Y given in table 1 can be used to calculate the equivalent load.

Equivalent static bearing load

For statically loaded double row deep groove ball bearings

$$P_0 = 0,6 F_r + 0,5 F_a$$

If $P_0 < F_r$, $P_0 = F_r$ should be used.

Table 1

Calculation factors for double row deep groove ball bearings		
$f_0 F_a/C_0$	e	Y
0,172	0,19	2,3
0,345	0,22	1,99
0,689	0,26	1,71
1,03	0,28	1,55
1,38	0,3	1,45
2,07	0,34	1,31
3,45	0,38	1,15
5,17	0,42	1,04
6,89	0,44	1



Double Row Deep Groove Ball Bearings

Dimensions				Basical load ratings		Speed ratings		Designation	Weight
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	8,8	4,9	18000	22000	4200 B.TN	0,049
12	32	14	0,6	10,1	5,9	17000	20000	4201 B.TN	0,053
15	35	14	0,6	11,3	7,1	14000	17000	4202 B.TN	0,059
	42	17	1	14,1	9	12000	15000	4302 B.TN	0,12
17	40	16	0,6	14,1	9	12000	15000	4203 B.TN	0,090
	47	19	1	18,5	12,5	10000	13000	4303 B.TN	0,16
20	47	18	1	16,9	11,9	10000	13000	4204 B.TN	0,14
	52	21	1,1	22,2	15,2	9500	12000	4304 B.TN	0,21
25	52	18	1	18,1	13,9	9000	11000	4205 B.TN	0,16
	62	24	1,1	30,3	21,3	8500	10000	4305 B.TN	0,34
30	62	20	1	24,7	19,8	8000	9500	4206 B.TN	0,26
	72	27	1,1	39	28,5	7000	8500	4306 B.TN	0,50
35	72	23	1,1	33,3	27,1	6700	8000	4207 B.TN	0,40
	80	31	1,5	48,2	36,1	6300	7500	4307 B.TN	0,69
40	80	23	1,1	35,2	30,9	6000	7000	4208 B.TN	0,50
	90	33	1,5	53,1	42,8	5600	6700	4308 B.TN	0,95

Double Row Deep Groove Ball Bearings

*Abutment and fillet
dimensions see on
page 86*

Dimensions				Basical load ratings		Speed ratings		Designation	Weight
d	D	B	r ₁ , r ₂ min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
45	85	23	1,1	37,1	34,2	5600	6700	4209 B.TN	0,54
	100	36	1,5	65,5	53,2	5000	6000	4309 B.TN	1,25
50	90	23	1,1	39	38	5000	6000	4210 B.TN	0,58
	110	40	2	77,8	66	4500	5300	4310 B.TN	1,70
55	100	25	1,5	42,7	41,8	4800	5600	4211 B.TN	0,80
	120	43	2	92,6	78,9	4300	5000	4311 B.TN	2,15
60	110	28	1,5	54,3	52,3	4500	5300	4212 B.TN	1,10
	130	46	2,1	106	93,1	3800	4500	4312 B.TN	2,65
65	120	31	1,5	64,2	63,7	4000	4800	4213 B.TN	1,45
70	125	31	1,5	66,7	69,8	3600	4300	4214 B.TN	1,50
75	130	31	1,5	69,2	76	3400	4000	4215 B.TN	1,60
80	140	33	2	76,6	85,5	3200	3800	4216 B.TN	2,00
85	150	36	2	93,6	102	3000	3600	4217 B.TN	2,55
90	160	40	2	106	116	2800	3400	4218 B.TN	3,20

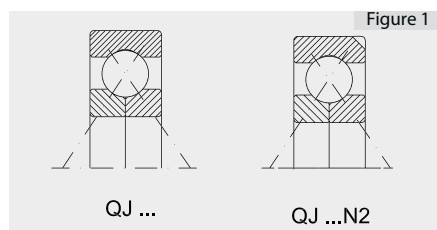


Four Point Contact Ball Bearings

Four-point contact ball bearings, also called "Duplex Bearings". Four-point contact ball bearings are radial single row angular contact ball bearings with raceways that are designed to support axial loads acting in both directions. Therefore require significantly less space in an axial direction than double row designs.

The bearings consist of solid outer rings, split inner rings and ball and cage assemblies with brass or polyamide cages. Due to the two-piece inner rings, a large number of balls can be accommodated. The halves of the inner ring are matched to the specific bearing and must not be interchanged with those of bearings of the same size. The outer ring with the ball and cage assembly can be fitted separately from the halves of the inner ring.

DAS LAGER four-point contact ball bearings of the QJ design have a contact angle of either 35° or 45°. The inner ring is split. This enables a large number of balls to be incorporated in the bearing thus giving the bearing high load carrying capacity.



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, four point contact ball bearing outer rings are often produced with locating slots.

For this reason, **DAS LAGER 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

DAS LAGER four point contact ball bearings are produced to normal class tolerance (PN) as standard. Upon request they can produce more precision P6 and P5 class. The values of tolerances are given in on page 27.

CAGE

DAS LAGER four-point contact ball bearings can produce following cages designs

- Machined solid brass cages with suffix MA
- Moulded polyamide cage suffix TN
- Machined light metal alloy solid cage suffix L

Internal Clearance

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

DAS LAGER 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 **DAS LAGER 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
Clearance group C2	min		20	30	40	50	60	70	80	100
	max		60	70	90	100	120	140	160	180
Clearance group CN (NORMAL)	min		50	60	80	90	100	120	140	160
	max		90	110	130	140	160	180	200	220
Clearance group C3	min		80	100	120	130	140	160	180	200
	max		120	150	170	180	200	220	240	260
Clearance group C4	min		115	135	155	165	185	205	225	250
	max		165	185	205	225	245	265	295	325

Special clearance

For applications not covered by the standard clearances groups or where bearings with standard clearances do not achieve optimum perform, **DAS LAGER** 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 dinamic 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.

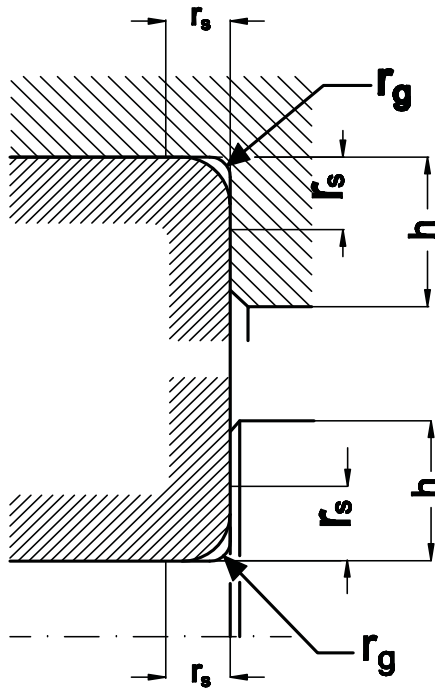
The bearing rings, however, must only contact adjacent parts with there side faces.

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]

$r_{s \min}$	$r_{g \max}$	$r_{s \min}$ 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



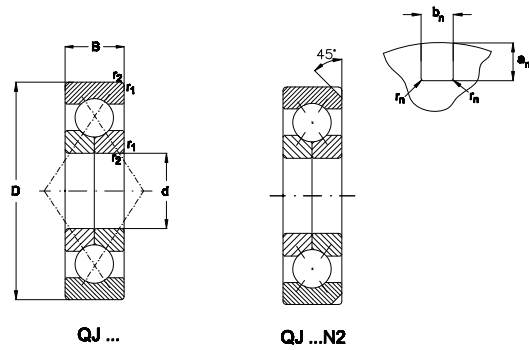
Standards, Boundards

Standard plans DIN616
Single row angular contact ball bearings
Four points contact ball bearings DIN628

Suffix:

- C2** Axial internal clearance smaller than Normal
- C3** Axial internal clearance greater than Normal
- C4** Axial internal clearance greater than C3
- L** Machined light metal alloy solid cage
- MA** Machined window-type brass cage, outer ring centred
- N2** Two locating slots (notches), 180° apart, in the large outer ring side face
- P6** Dimensional and running accuracy to ISO tolerance class 6
- P63** P6 + C3
- P64** P6 + C4
- S1** Bearing rings dimensionally stabilized for use at operating temperatures up to +200 °C
- TN** Moulded polyamide cage

Four Point Contact Ball Bearings



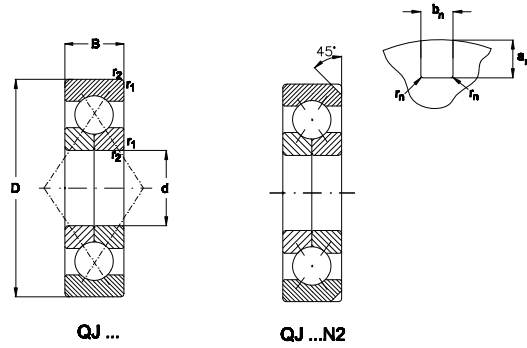
For $D \geq 160$ mm
standard design
with 2 location
slots in outer
ring (N2)

Dimensions								Basical radial load		Speed limit		Designation	Weight
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	-	-	-	30,4	20,5	10000	15000	QJ 304	0,18
25	52	15	1	27	-	-	-	25,7	20,1	9500	14000	QJ 205	0,17
	62	17	1	31	-	-	-	37,1	26,6	9500	13500	QJ 305	0,25
30	62	16	1	32	-	-	-	35,6	29	8500	12000	QJ 206	0,30
	72	19	1,1	36	-	-	-	50,4	39,4	7500	10000	QJ 306	0,37
35	72	17	1,1	38	-	-	-	46,6	39,4	7500	10000	QJ 207	0,46
	80	21	1,5	41	-	-	-	60,8	48,5	7000	9500	QJ 307	0,50
40	80	18	1,1	42	-	-	-	53,2	46,6	6700	9000	QJ 208	0,39
	90	23	1,5	46	-	-	-	74,1	60,8	6300	8500	QJ 308	0,69
45	85	19	1,1	45	-	-	-	59,9	53,2	6300	8500	QJ 209	0,48
	100	25	1,5	51	-	-	-	95	78,9	5600	7500	QJ 309	0,95
50	90	20	1,1	49	-	-	-	62,2	58	5600	7500	QJ 210	0,64
	110	27	2	56	-	-	-	112	95	5000	6700	QJ 310	1,37
55	100	21	1,5	54	-	-	-	80,8	78,9	5300	7000	QJ 211	0,68
	120	29	2	61	-	-	-	130	112	4500	6000	QJ 311	1,74
60	110	22	1,5	60	-	-	-	91,7	88,4	4800	6300	QJ 212	0,87
	130	31	2,1	67	-	-	-	148	130	4300	5600	QJ 312	2,18
65	120	23	1,5	65	-	-	-	105	106	4300	5600	QJ 213	1,24
	140	33	2,1	72	-	-	-	167	148	4000	5300	QJ 313	2,69
70	125	24	1,5	68	-	-	-	114	116	4300	5600	QJ 214	1,39
	150	35	2,1	77	-	-	-	190	171	3600	4800	QJ 314	3,25
75	130	25	1,5	72	-	-	-	119	125	4000	5300	QJ 215	1,77
	160	37	2,1	82	10,1	8,5	2	205	190	3400	4500	QJ 315 N2	3,93
80	140	26	2	77	-	-	-	139	148	3600	4800	QJ 216	1,8
	170	39	2,1	88	10,1	8,5	2	220	217	3200	4300	QJ 316 N2	4,61

Four Point Contact Ball Bearings

Dimensions								Basical radial load		Speed limit		Designation	Weight
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
85	150	28	2	82	-	-	-	148	164	3400	4500	QJ 217	2,25
	180	41	3	93	11,7	10,5	2	238	242	3000	4000	QJ 317 N2	5,49
90	160	30	2	88	8,1	6,5	1	177	190	3200	4300	QJ 218 N2	2,89
	190	43	3	98	11,7	10,5	2	255	265	2800	3800	QJ 318 N2	6,34
95	170	32	2,1	93	8,1	6,5	1	201	220	3000	4000	QJ 219 N2	3,37
	200	45	3	103	11,7	10,5	2	290	323	2600	3600	QJ 319 N2	7,4
100	180	34	2,1	98	10,1	8,5	2	224	252	2800	3800	QJ 220 N2	4,03
	215	47	3	110	11,7	10,5	2	328	380	2400	3400	QJ 320 N2	8,98
105	190	36	2,1	103	10,1	8,5	2	232	260	2700	3700	QJ 221 N2	6,11
	200	38	2,1	109	10,1	8,5	2	266	309	2400	3600	QJ 222 N2	5,67
110	240	50	3	123	11,7	10,5	2	371	456	2000	3000	QJ 322 N2	12,2
	215	40	2,1	117	11,7	10,5	2	285	347	2200	3200	QJ 224 N2	6,74
120	260	55	3	133	11,7	10,5	2	394	504	1900	2800	QJ 324 N2	15,6
	230	40	3	127	11,7	10,5	2	295	380	1900	2800	QJ 226 N2	7,67
130	280	58	4	144	12,7	10,5	2	432	580	1800	2600	QJ 326 N2	19,2
	250	42	3	137	11,7	10,5	2	328	451	1800	2600	QJ 228 N2	9,69
140	300	62	4	154	12,7	10,5	2	475	660	1700	2400	QJ 328 N2	23,2
	270	45	3	147	11,7	10,5	2	380	542	1700	2400	QJ 230 N2	12,2
150	320	65	4	165	12,7	10,5	2	504	727	1600	2200	QJ 330 N2	27,8
	290	48	3	158	12,7	10,5	2	428	637	1600	2200	QJ 232 N2	20
160	340	68	4	175	12,7	10,5	2	542	836	1500	2100	QJ 332 N2	32,5
	310	52	4	168	12,7	10,5	2	432	684	1600	2200	QJ 234 N2	18,9
170	360	72	4	186	12,7	10,5	2	622	988	1400	1900	QJ 334 N2	38,4
	320	52	4	175	12,7	10,5	2	451	727	1500	2000	QJ 236 N2	23,1
180	380	75	4	196	12,7	10,5	2	646	969	1300	1800	QJ 336 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	Weight
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	464	741	1400	1900	QJ 238 N2	24
200	360	58	4	196	12,7	10,5	2	513	869	1300	1800	QJ 240 N2	33,3
220	400	65	4	217	12,7	10,5	2	630	1120	1250	1700	QJ 244 N2	49,3
240	440	72	4	238	15	12,5	2,5	618	1140	1100	1500	QJ 248 N2	68,3





Angular contact ball bearings, single row

Double Row Angular Contact Ball Bearing

Single row angular contact ball bearings are rigid, non-separable radial bearings. They have raceways in the inner and outer rings that are displaced with respect to each other in the direction of the bearing axis. They are suitable for high-speed applications and can accommodate both radial and thrust forces including combined loads and tilting moments.

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.

As single row angular contact ball bearings accept thrust loads in one direction only, they must be used in pairs where there are both side thrust load. The axial load carrying capacity of angular contact ball bearings increases with increasing contact angle. The higher contact angle the better the ability for accepting thrust loads. The contact angle α is defined as the angle between the line joining the points of contact of the ball and the raceways in the radial plane, along which the load is transmitted from one raceway to another, and a line perpendicular to the bearing axis (see figure 1).

DAS LAGER single row angular contact ball bearings are produced with several different contact angles, these contact angles are identified by the suffixes (see table 1)

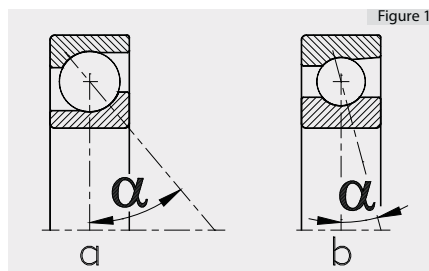
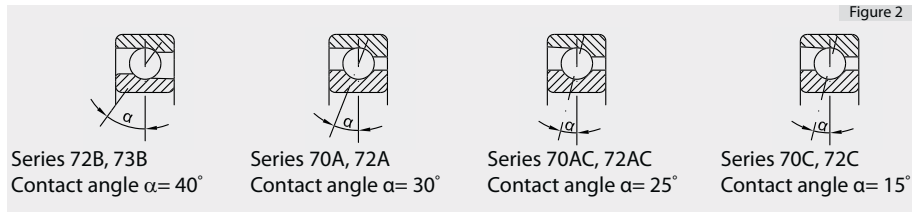


Table 1

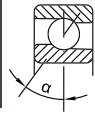
Suffix	Contact Angle (α)
B	40°
A	30°
AC	25°
C	15°

Single row angular contact bearings are manufactured in various constructive versions, with various contact angles, depending on the application (see figure 2). 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. Those with bore diameters up to $d = 100$ mm are manufactured to tolerance classes P5, P4 and P2 and have a contact angle of 15° suffix code (C) and 25° suffix code (AC) respectively. Standard bearing have a contact angle is 30° and suffix code (A). Therefore the code "A" will usually be omitted.



Standard



- Available in bearing series 79, 70, 72, 72B, 73, and 73B.
- Contact angles: 30° and 40° (with B) available.

High Speed

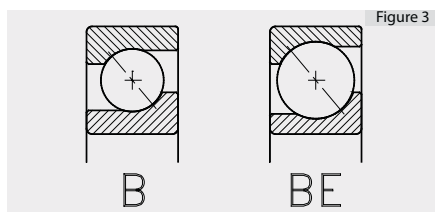


- Available in bearing series 78C, 79C, 70C, 72C, and 73C.
- Contact angles: 15°
- All bearing accuracies P5 or higher.

BE Design: (see figure 3)

DAS LAGER single row angular contact ball bearings, series 72 and 73 are also produced with a reinforced internal design, suffix code BE.

The use of larger ball sizes in BE-design bearings allows for significantly higher load ratings when compared to "conventional" design bearings while maintaining the same overall dimensions



Bearing Pair

Single row angular contact ball bearings in universal design usually used in pairs or sets (see Figure 3). Paired mounting is used when the load carrying capacity of a single bearing is inadequate (tandem arrangement) or when combined or axial loads act in both directions (back-to-back and face-to-face arrangements).

DT: Tandem arrangement (see figure 4-a)

When arranged in tandem the load lines are parallel and the radial and axial loads are equally shared by the bearings. However, the bearing set can only accommodate axial loads acting in one direction. If axial loads act in the opposite direction, or if combined loads are present, a

third bearing adjusted against the tandem pair must be added.

DB: Back to Back Arrangement (see figure 4-b)

The load lines of bearings arranged back-to-back diverge towards the bearing axis. Axial loads acting in both directions can be accommodated, but only by one bearing in each direction. Bearings mounted back-to-back provide a relatively stiff bearing arrangement that can also accommodate tilting moments.

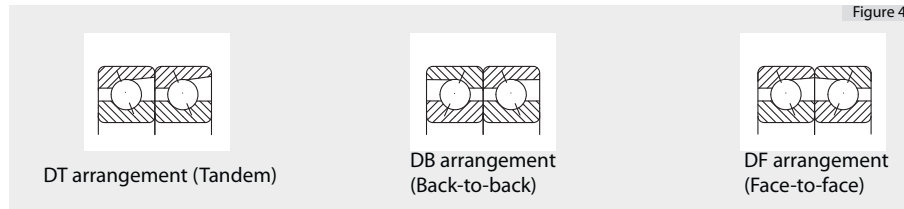
Bearing pairs arranged back-to-back are not able to compensate for misalignments.

DF: Face to Face Arrangement (see figure 4-c)

The load lines of bearings mounted face-to-face (fig) converge towards the bearing axis. Axial loads acting in both directions can be accommodated, but only by one bearing in each direction. This arrangement is not as stiff as the back-to-back arrangement and is less suitable for the accommodation of 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.

For bearing pairs arranged face-to-face temperature increase of the shaft causes a reduction of axial internal clearance or an increase of preloading forces, respectively.



Internal Clearance and Preload

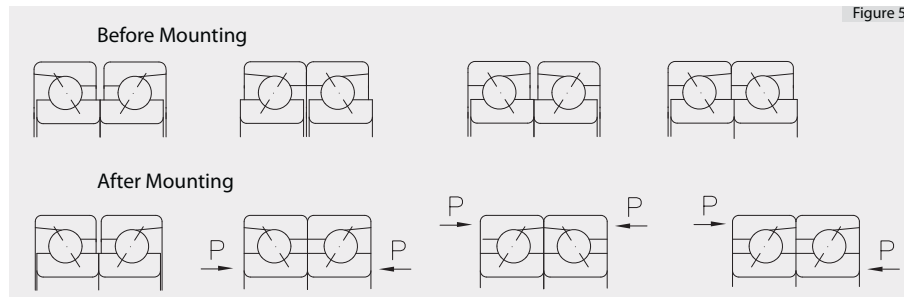
DAS LAGER single row angular contact ball bearings in universal design, with normal bearing mounting fits, are matched in sets or pairs, respectively, to give a defined axial play or preloading, respectively.

The "normal" fits are:

- Shaft fits: j5
- Housing fits: J6

Internal clearance in single row angular contact ball bearings is only obtained after mounting and is dependent on adjustment against a second bearing, which provides axial location in the opposite direction.

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



DAS LAGER universally matchable bearings are produced in three different clearance and preload classes each. The classes for bearing sets with clearance are

- CA - smaller than Normal axial clearance
- CB - Normal axial clearance (standard)
- CC - larger than Normal axial clearance.

DAS LAGER universally matchable bearings with clearance can be combined in sets of any number of bearings.

The classes for bearing sets with preload are

- GA - light preload (standard)
- GB - moderate preload
- GC - heavy preload.

The values of preload and clearance are given in Table 2 for series 72 B and 73 B

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						Preload													
	CA		CB		CC		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											N	µm	N		µm	N			
-	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		

Table 2

The values of preload and clearance are given in Table 3 for high accuracy single row angular contact ball bearings series 70C, 70A and 72A

Values of axial preload of bearings of series 70C, 70A and 72A, in DB and DF arrangements														Table 3	
Bore		Axial preload Series 70C			Series 72C			Series 70A			Series 72A				
d	Symbol	L	M	S	L	M	S	L	M	S	L	M	S		
mm	-	N													
10	00	15	30	60	20	40	80	25	50	100	35	70	140		
12	01	15	30	60	20	40	80	25	50	100	35	70	140		
15	02	20	40	80	30	60	120	30	60	120	45	90	180		
17	03	25	50	100	35	70	140	40	80	160	60	120	240		
20	04	35	70	140	45	90	180	50	100	200	70	140	280		
25	05	35	70	140	50	100	200	60	120	240	80	160	320		
30	06	50	100	200	90	180	360	90	180	360	150	300	600		
35	07	60	120	240	120	240	480	90	180	360	190	380	760		
40	08	60	120	240	150	300	600	100	200	400	240	480	960		
45	09	110	220	440	160	320	640	170	340	680	260	520	1040		
50	10	110	220	440	170	340	680	180	360	720	260	520	1040		
55	11	150	300	600	210	420	840	230	460	920	330	660	1320		
60	12	150	300	600	250	500	1000	240	480	960	400	800	1600		
65	13	160	320	640	290	580	1160	240	480	960	450	900	1800		
70	14	200	400	800	300	600	1200	300	600	1200	480	960	1920		

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	-	-	-		

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.

On 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 4.

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 4	
Bore d		Δ_{dmp} Δ_{Dmp}						Δ_{BS}	
		low	high	low	high	low	high	low	high
over	up to								
(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

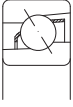
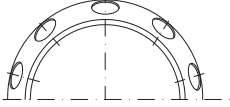
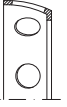
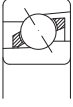
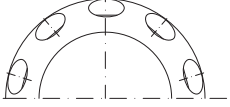
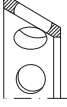
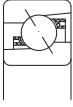
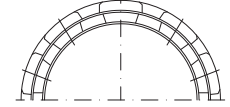
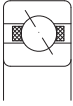
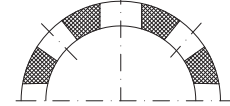
Cages

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 $+120^\circ\text{C}$.

Cages design and some technical data are given in table 5

Cages design and some technical data					
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

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

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

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 6, 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:

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

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

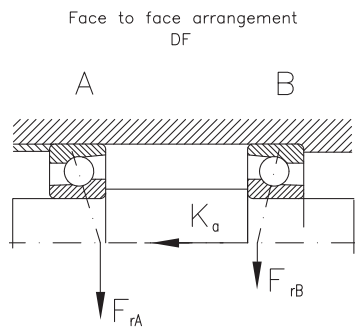
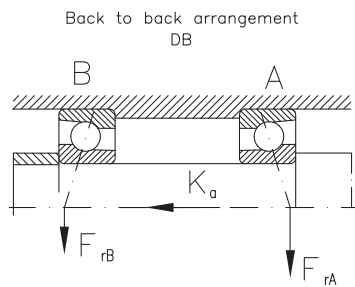
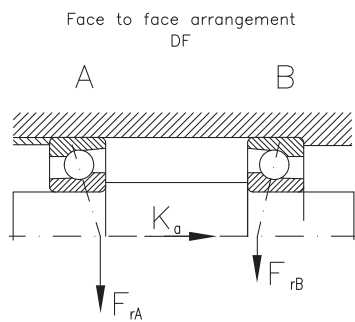
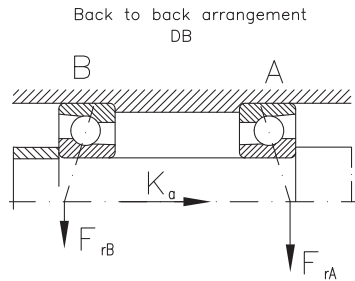
The values of factor Y depend on the values of the ratio f_0 i F_a/C_{0r} and are given in table 7. Factor f_0 can be found in diagram in page 156 as a function of dimensions series and bearing mean diameter. "i" represents the number of bearings or bearings pairs in a bearing stack.

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 7 (f_0 from diagram below).



Determination of axial loads

Table 6

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) $F_{rA} > F_{rB}$ $K_a < 1,14 (F_{rA} - F_{rB})$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} - K_a$

Suffix Code:

A	- bearing with extended outer ring	P5	- tolerance class more accurate than P6
A	- bearing with contact angle $\alpha = 30^\circ$	P4	- tolerance class more accurate than P5
AC	- bearing with contact angle $\alpha = 25^\circ$	P2	- tolerance class more accurate than P4
B	- bearing with extended outer ring	Q	- four bearings set
B	- bearing with contact angle $\alpha = 40^\circ$	QBC	- tandem pairs in O arrangement
BB	- bearing with $\alpha = 40^\circ$ and extended inner ring	QBT	- tandem pairs plus O arrangement
C	- bearing with contact angle $\alpha = 15^\circ$	QFC	- tandem pairs in X arrangement
CA	- bearing with radial clearance smaller than normal	QFT	- tandem pairs plus X arrangement
CB	- bearing with normal radial clearance	QT	- tandem pairs
CC	- radial bearing with axial clearance larger than normal	S	- heavy preload, bearings series 70C, 70A, 72A
D	- two bearings set	S0	- maximum bearings operating temperature of $+ 150^\circ\text{C}$
D	- bearing with two-pieces inner ring	S1	- maximum bearings operating temperature of $+ 200^\circ\text{C}$
DB	- two bearings set in back-to-back arrangement, (O)	S2	- maximum bearings operating temperature of $+ 250^\circ\text{C}$
DF	- two bearings set in face-to-face arrangement, (X)	S3	- maximum bearings operating temperature of $+ 300^\circ\text{C}$
DT	- two bearings set in tandem arrangement	S5	- maximum bearings operating temperature of $+ 350^\circ\text{C}$
E	- bearing with contact angle $\alpha = 20^\circ$	T	- three bearings set
FA	- bearing with machined cage of steel or cast iron, guided on the outer ring	T	- bearing set total width (T168, T200)
FB	- bearing with machined cage of steel or cast iron, guided on the inner ring	TBT	- three bearings set in O arrangement, plus T
GA	- light preload, bearings series 72B, 73B	TFT	- three bearings set in X arrangement, plus T
GB	- moderate preload, bearings series 72B, 73B	TT	- three bearings set in tandem arrangement
GC	- heavy preload, bearings series 72B, 73B	TN	- polyamide cage
L	- light preload, bearings series 70C, 70A, 72A	V	- full complement bearing
M	- moderate preload, bearings series 70C, 70A, 72A	U	- bearings of universal design, with deviations of d and D and Ki, Ke in P2 class
M	- machined brass cage, ball guided	UA	- bearings with small axial clearance at DB and DF arrangements
MA	- machined brass cage, guided in the outer ring	UL	- bearings with light preload at DB and DF arrangements
MB	- machined brass cage, guided in the inner ring	UO	- bearings without small axial clearance at DB and DF arrangements
O	- bearing set without axial clearance	UP	- tolerance class with deviations of d and D in P4 class and of Ki and Ke in P2 class.
P0	- normal tolerance class		
P6	- tolerance class more accurate than normal		

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:

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

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

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

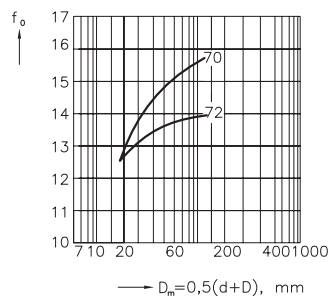
$$P_r = F_r + Y_1 F_a, \text{ kN, for } F_a/F_r \leq e$$

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

Values for Y_1 and Y_2 are given in table 7.

Values of factors e, Y, Y ₁ and Y ₂				
f_0 i F_a C_{0r}				
	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

Table 7



Equivalent static load

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

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

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

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

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

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

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

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

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

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

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

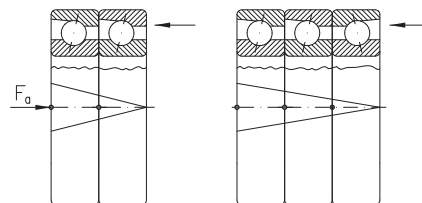
For bearings in DB and DF arrangement, the following equation is available:

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

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

Every set is delivered as an unit, separately packed.

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_0 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 8.

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 8.

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

Abutment dimensions

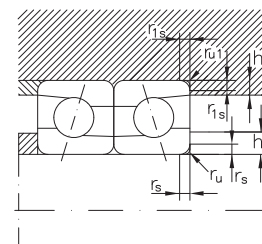
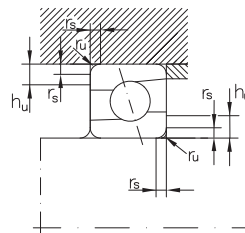
For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft

(housing) maximum connection radius $r_{u \max}$ should be less than bearing minimum mounting chamfer $r_{1 \min}, r_{2 \min}$.

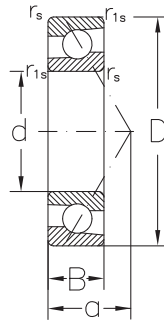
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connection radii and support shoulder height are given in table 9.

Abutment dimensions			
Table 9			
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

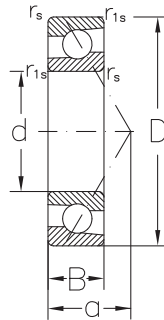


Angular contact ball bearings, single row



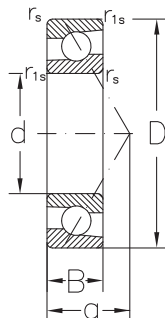
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	r_{1s} min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
10	30	9	0,6	0,3	13	6,4	3	19000	28000	7200B	0,031
12	32	10	0,6	0,3	14	6,8	3,4	17000	24000	7201B	0,045
15	35	11	0,6	0,3	16	8,6	4,6	16000	22000	7202B	0,048
	35	11	0,6	0,3	16	8,6	4,6	16000	22000	7202BP6	0,048
	35	11	0,6	0,3	16	8,6	4,6	16000	22000	7202BP5	0,048
	42	13	1	0,6	19	11,8	6,1	14000	19000	7302B	0,090
17	40	12	0,6	0,6	18	11	6,1	14000	19000	7203B	0,070
	40	12	0,6	0,6	18	10	5,3	14000	19000	7203BP6	0,070
	40	12	0,6	0,6	18	10	5,3	14000	19000	7203BP5	0,070
	47	14	1	0,6	21	14,3	7,5	12000	17000	7303B	0,120
20	47	14	1	0,6	21	12	6,9	11000	16000	7204B	0,110
	47	14	1	0,6	21	12	6,9	11000	16000	7204BP6	0,110
	47	14	1	0,6	21	12	6,9	11000	16000	7204BP5	0,110
	52	15	1,1	0,6	23	17,2	9	10000	15000	7304B	0,150
	52	15	1,1	0,6	23	17,3	9,7	10000	15000	7304BP6	0,150
25	52	15	1	0,6	24	14,1	9	9500	14000	7205B	0,130
	52	15	1	0,6	24	14,1	9	9500	14000	7205BP6	0,130
	52	15	1	0,6	24	14,1	9	9500	14000	7205BP5	0,130
	62	17	1,1	0,6	27	23,5	14,1	8500	12000	7305B	0,250
	62	17	1,1	0,6	27	23,5	14,1	8500	12000	7305BP6	0,250
	62	17	1,1	0,6	27	23,5	14,1	8500	12000	7305AMA	0,250
30	62	16	1	0,6	27	21,7	14,1	8500	12000	7206B	0,210
	62	16	1	0,6	27	21,7	14,1	8500	12000	7206BP6	0,210
	62	16	1	0,6	27	21,7	14,1	8500	12000	7206BP5	0,210
	62	16	1	0,6	27	21,7	14,1	8500	12000	7206ATAP2	0,210
	72	19	1,1	0,6	31	32	19,1	7500	10000	7306B	0,370
	72	19	1,1	0,6	31	32	19,1	7500	10000	7306BP6	0,370
	72	19	1,1	0,6	31	32	19,1	7500	10000	7306BP5	0,370
	72	19	1,1	0,6	31	32	19,1	7500	10000	7306AMA	0,370
35	72	17	1,1	0,6	31	28	18,8	7500	10000	7207	0,300
	72	17	1,1	0,6	31	28	18,8	7500	10000	7207BP5	0,300
	80	21	1,5	1	35	37,4	23,9	7000	9500	7307B	0,510
	80	21	1,5	1	35	37,4	23,9	7000	9500	7307BP5	0,510
40	80	18	1,1	0,6	34	32,9	23,5	6700	9000	7208B	0,390
	80	18	1,1	0,6	34	32,9	23,5	6700	9000	7208BP6	0,390
	80	18	1,1	0,6	34	32,9	23,5	6700	9000	7208BP5	0,390
	90	23	1,5	1	39	45,1	29,4	6300	8500	7308B	0,670
	90	23	1,5	1	39	45,1	29,4	6300	8500	7308BP6	0,670
	90	23	1,5	1	39	45,1	29,4	6300	8500	7308BP5	0,670
45	85	19	1,1	0,6	37	34	25,3	6300	8500	7209B	0,440

Angular contact ball bearings, single row



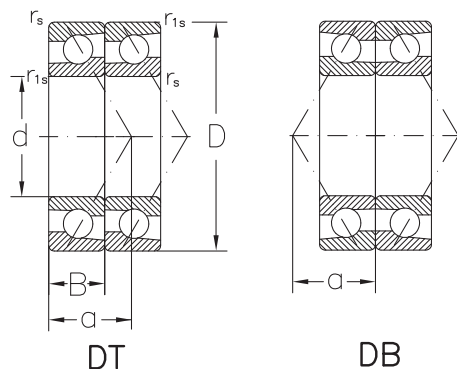
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
45	85	19	1,1	0,6	37	55,1	36,6	6300	8500	7209BP5	0,440
	100	25	1,5	1	43	55,1	36,6	5600	7500	7309B	0,900
	100	25	1,5	1	43	55,1	36,6	5600	7500	7309BP6	0,900
	100	25	1,5	1	43	55,1	36,6	5600	7500	7309BP5	0,900
50	90	20	1,1	0,6	39	35,2	27,6	5600	7500	7210B	0,490
	90	20	1,1	0,6	39	35,2	27,6	5600	7500	7210BP6	0,490
	90	20	1,1	0,6	39	35,2	27,6	5600	7500	7210BP5	0,490
	110	27	2	1	47	66,9	46,1	5000	6700	7310B	1,15
	110	27	2	1	47	66,9	46,1	5000	6700	7310BP6	1,15
	110	27	2	1	47	66,9	46,1	5000	6700	7310BP5	1,15
55	100	21	1,5	1	43	44,1	34,3	5300	7000	7211B	0,650
	120	29	2	1	52	76,9	54,2	4500	6000	7311B	1,45
60	110	22	1,5	1	47	51,6	41	4800	6300	7212B	0,840
	110	22	1,5	1	47	51,6	41	4800	6300	7212BP5	0,840
	130	31	2,1	1,1	56	51,6	41	4300	5600	7312B	1,85
	130	31	2,1	1,1	56	86,3	62,7	4300	5600	7312BP5	1,85
65	120	23	1,5	1	50	59,9	48,7	4300	5600	7213B	1,05
	120	23	1,5	1	50	59,9	48,7	4300	5600	7213BP6	1,05
	120	23	1,5	1	50	59,9	48,7	4300	5600	7213BP5	1,05
	140	33	2,1	1,1	60	97,9	72,2	4000	5300	7313B	2,25
70	125	24	1,5	1	53	64,5	54,2	4300	5600	7214B	1,15
	150	35	2,1	1,1	64	115	88,4	3800	5000	7314B	2,75
	150	35	2,1	1,1	64	115	88,4	3800	5000	7314BP6	2,75
	150	35	2,1	1,1	64	115	88,4	3800	5000	7314BP5	2,75
	150	35	2,1	1,1	64	115	88,4	3800	5000	7314BTN	2,75
75	130	25	1,5	1	56	65,7	57,8	4000	5300	7215B	1,30
	130	25	1,5	1	56	65,7	57,8	4000	5300	7215BP6	1,30
	130	25	1,5	1	56	65,7	57,8	4000	5300	7215BP5	1,30
	160	37	2,1	1,1	68	120	96	3400	4500	7315B	3,30
	160	37	2,1	1,1	68	120	96	3400	4500	7315BMAP6	3,30
	160	37	2,1	1,1	68	120	96	3400	4500	7315AMA	3,30
80	140	26	2	1	59	75,1	66,3	3800	5000	7216B	1,55
	170	39	2,1	1,1	72	129	106	3200	4300	7316B	3,90
	170	39	2,1	1,1	72	129	106	3200	4300	7316BP6	3,903
	170	39	2,1	1,1	72	129	106	3200	4300	7316BMAP6	3,903
85	150	28	2	1	64	86,3	75	3400	4500	7217B	1,953
	180	41	3	1,1	76	132	110	3000	4000	7317B	4,603
	180	41	3	1,1	76	132	110	3000	4000	7317BP6	4,603
	180	41	3	1,1	76	132	110	3000	4000	7317BMP6	4,603

Angular contact ball bearings, single row



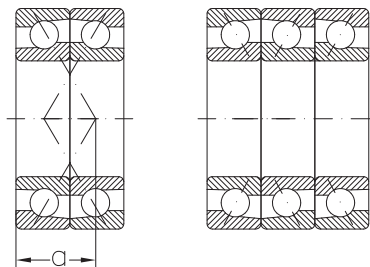
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	r_{1s} min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
90	160	30	2	1	67	97,9	87,1	3200	4300	7218B	2,403
	160	30	2	1	67	97,9	87,1	3200	4300	7218BMB	2,403
	190	43	3	1,1	80	149	132	2800	3800	7318B	5,403
95	170	32	2,1	1,1	71	117	106	3000	4000	7219B	2,903
	200	45	3	1,1	84	162	147	2600	3600	7319B	6,253
100	180	34	2,1	1,1	76	122	110	2800	3800	7220B	3,453
	180	34	2,1	1,1	76	122	110	2800	3800	7220BP6	3,453
	180	34	2,1	1,1	76	122	110	2800	3800	7220BMA	3,453
	180	34	2,1	1,1	76	122	110	2800	3800	7220BMAP6	3,453
	180	34	2,1	1,1	76	122	110	2800	3800	7220BMAP4	3,453
	180	34	2,1	1,1	76	122	110	2800	3800	7220BMB	3,453
	215	47	3	1,1	90	195	188	2400	3400	7320B	7,753
	215	47	3	1,1	90	195	188	2400	3400	7320BP6	7,753
	215	47	3	1,1	90	195	188	2400	3400	7320BM	7,753
110	200	38	2,1	1,1	84	138	129	2400	3400	7222B	4,803
	200	38	2,1	1,1	84	138	129	2400	3400	7222BMB	4,803
	240	50	3	1,1	99	203	202	2000	3000	7322B	10,53
	240	50	3	1,1	99	203	202	2000	3000	7322BP5	10,53
	240	50	3	1,1	99	203	202	2000	3000	7322BM	10,53
140	250	42	3	1,1	10,3	180	191	1700	2400	7228B	8,803
	300	62	4	1,5	123	273	312	1700	2400	7328B	21,63
	300	62	4	1,5	123	273	312	1700	2400	7328BMBP5	21,63
150	190	24	1,1	0,6	35	60,5	79,2	2200	3000	72830CMA	3,363
	270	45	3	1,1	111	195	217	2000	2800	7230BM	11,63
	320	65	4	1,5	131	299	352	1600	2000	7330BM	26,53
	320	65	4	1,5	131	299	352	1600	2000	7330BMP5	26,53
160	220	28	2	1	58	118	145	2200	3000	71932AMAP5	3,263
180	250	33	2	2	33	160	201	2000	2800	71936AM	5,36
200	250	30	1,5	0,6	45	102	141	3000	5600	72840CMA4	3,43

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



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

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

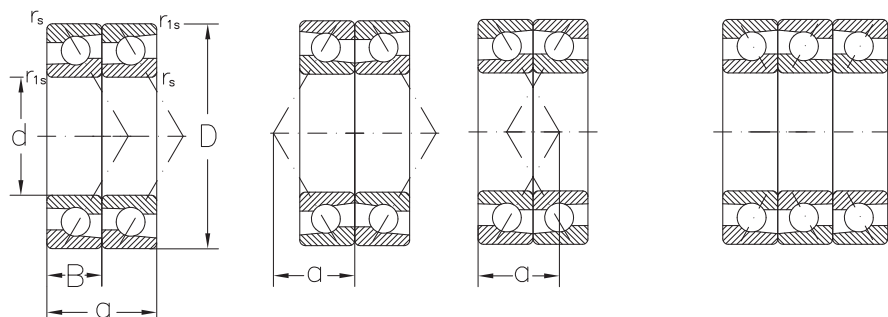


DF

TFT

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

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



DT

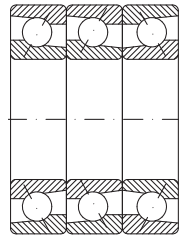
DB

DF

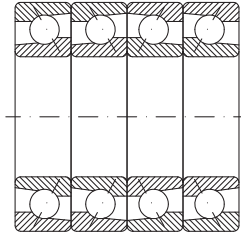
TFT

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

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



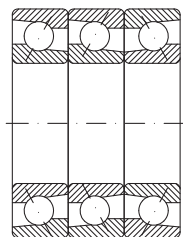
TBT



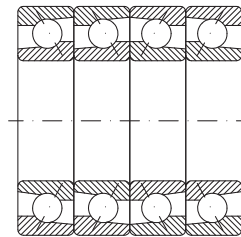
QFC

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

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



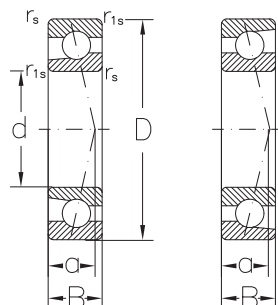
TBT



QFC

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
100	215	47	3	1,1	90	308	356	2200	3000	7320BMDT	15,53
110	200	38	2,1	1,1	84	248	290	2200	3000	7222BDT	9,603
	200	38	2,1	1,1	84	248	290	1900	2800	7222BDB	9,603
	240	50	3	1,1	99	365	458	1800	2800	7322BDT	21,03
	240	50	3	1,1	99	365	458	1600	2400	7322BDB	21,03
	240	50	3	1,1	99	536	687	1400	2200	7322BTBT	31,53
	240	50	3	1,1	99	365	458	1800	2800	7322BP5DT	21,03
140	240	50	3	1,1	99	365	458	1600	2400	7322BMDF	21,03
	250	42	3	1,1	103	172	189	1400	1900	7228BDT	17,63
	300	62	4	1,5	123	470	668	1400	2200	7328BDT	43,23
	300	62	4	1,5	123	470	668	1200	1900	7328BDB	43,23
150	300	62	4	1,5	123	470	668	1400	2200	7328BM8P5DT	43,23
	270	45	3	1,1	111	156	444	2400	3800	7230BDB	23,23
	270	45	3	1,1	111	156	444	2400	3800	7230BMD8	23,23
	320	65	4	1,5	131	254	760	1400	1800	7330BMDF	53,03
160	320	65	4	1,5	131	254	760	1400	1800	7330BM8P5DT	53,03
	220	28	2	1	58	176	268	1600	2400	71932AMAP5DB	6,523
180	250	33	2	2	33	210	324	1500	2200	71936AMDB	10,83
200	250	30	1,5	0,6	45	165	282	1400	2000	72840CMAP4DB	6,863
	250	30	1,5	0,6	45	220	423	1300	1800	72840CMAP4TBT	10,23

High precision angular contact ball bearings single row

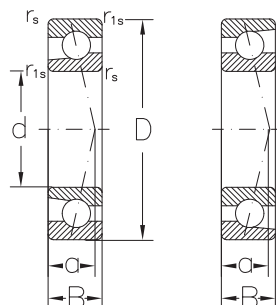


TA

TB

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

High precision angular contact ball bearings single row

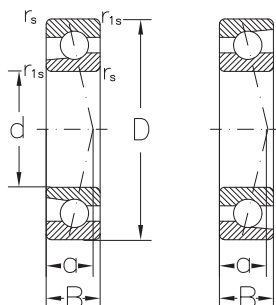


TA

TB

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

High precision angular contact ball bearings single row

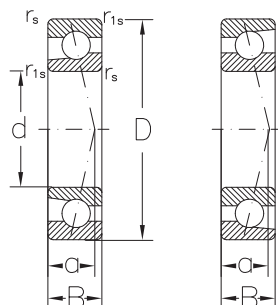


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TB

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
45	75	16	1	0,3	22	22	17,3	15000	26000	7009ATAP2	0,250
	85	19	1,1	0,6	18	40	29	15000	26000	7209CTAP4	0,400
	85	19	1,1	0,6	18	40	29	15000	26000	7209CTAP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209ATAP4	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209ATAP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209ATBP4	0,400
50	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209ATBP2	0,400
	80	16	1	0,3	17	25,1	20,7	15000	26000	7010CTAP4	0,260
	80	16	1	0,3	17	25,1	20,7	15000	26000	7010CTAP2	0,260
	80	16	1	0,3	23	23,2	20	13000	22000	7010ATAP4	0,260
	80	16	1	0,3	23	23,2	20	13000	22000	7010ATAP2	0,260
	90	20	1,1	0,6	20	42,8	31,7	14000	24000	7210CTAP4	0,450
	90	20	1,1	0,6	20	42,8	31,7	14000	24000	7210CTAP2	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210ATAP4	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210ATAP2	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210ATBP4	0,450
55	90	20	1,1	0,6	27	42	31	12000	20000	7210ATBP2	0,450
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	7011CTAP4	0,390
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	7011CTAP2	0,390
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	7011CTBP4	0,390
	90	18	1,1	0,6	26	32,3	27,1	12000	20000	7011ATAP4	0,390
	90	18	1,1	0,6	26	32,3	27,1	12000	20000	7011ATAP2	0,390
	100	21	1,5	1	21	53	40	12000	20000	7211CTAP4	0,600
	100	21	1,5	1	21	53	40	12000	20000	7211CTAP2	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211ATAP4	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211ATAP2	0,600
60	100	21	1,5	1	29	50,6	38,3	11000	19000	7211ATBP4	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211ATBP2	0,600
	95	18	1,1	0,6	20	35	30,5	12000	20000	7012CTAP4	0,420
	95	18	1,1	0,6	20	35	30,5	12000	20000	7012CTAP2	0,420
	95	18	1,1	0,6	20	35	30,5	12000	20000	7012CTBP2	0,420
	95	18	1,1	0,6	27	33,2	29,1	11000	19000	7012ATAP4	0,420
	95	18	1,1	0,6	27	33,2	29,1	11000	19000	7012ATAP2	0,420
	110	22	1,5	1	23	64,2	49	11000	19000	7212CTAP4	0,770
	110	22	1,5	1	23	64	49	11000	19000	7212CTAP2	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212ATAP4	0,770
65	110	22	1,5	1	31	61	47,5	9500	17000	7212ATAP2	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212ATBP4	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212ATBP2	0,770
	100	18	1,1	0,6	20	36	32,5	12000	20000	7013CTAP4	0,460
65	100	18	1,1	0,6	20	36	32,5	12000	20000	7013CTAP2	0,460
	100	18	1,1	0,6	28	34	31	10000	18000	7013AMB4	0,460

High precision angular contact ball bearings single row

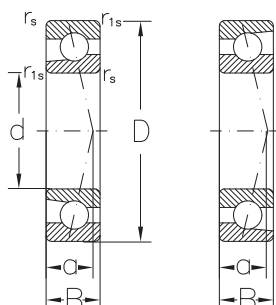


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TB

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

High precision angular contact ball bearings single row

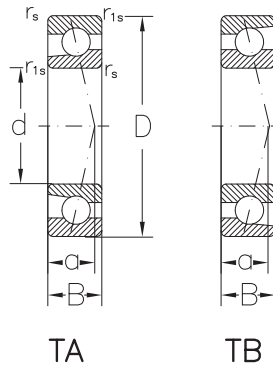


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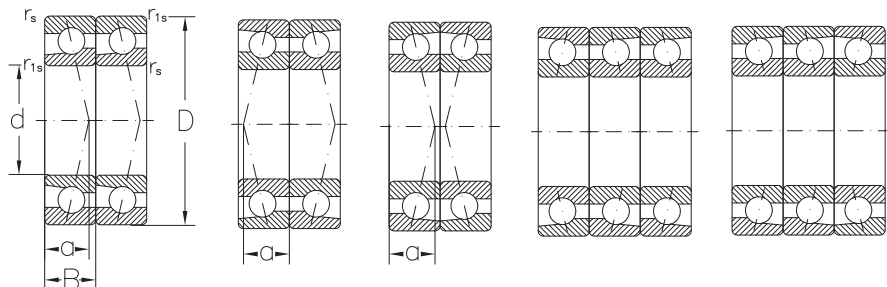
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
85	130	22	1,1	0,6	26	60,2	58,6	8500	15000	7017CTAP4	0,930
	130	22	1,1	0,6	26	60,2	58,6	8500	15000	7017CTAP2	0,930
	130	22	1,1	0,6	36	57	56	7500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

High precision angular contact ball bearings single row



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

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



DT

DB

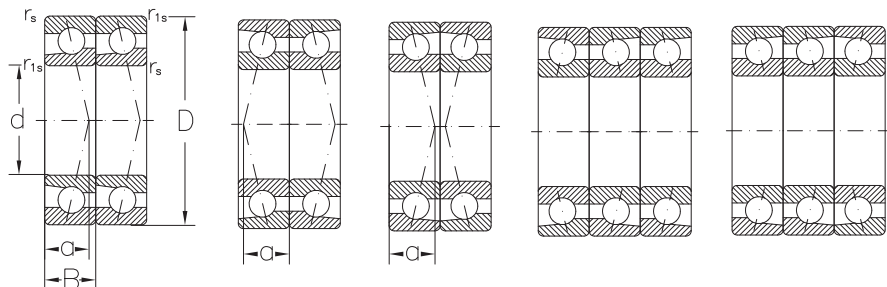
DF

TBT

TFT

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
10	26	8	0,3	0,1	6	8,6	4,9	48000	80000	7000CTAP4DT	0,040
	26	8	0,3	0,1	6	8,6	4,9	43000	70000	7000CTAP4DB	0,040
	26	8	0,3	0,1	6	8,6	4,9	43000	70000	7000CTAP4DF	0,040
	30	9	0,6	0,3	7	9,4	5,9	43000	70000	7200CTAP4DT	0,058
	30	9	0,6	0,3	7	9,4	5,9	38000	63000	7200CTAP4DB	0,058
	30	9	0,6	0,3	7	9,4	5,9	38000	63000	7200CTAP4DF	0,058
12	28	8	0,3	0,1	7	8,75	5,2	43000	70000	7001CTAP4DT	0,046
	28	8	0,3	0,1	7	8,75	5,2	38000	63000	7001CTAP4DB	0,046
	28	8	0,3	0,1	7	8,75	5,2	38000	63000	7001CTAP4DF	0,046
	32	10	0,6	0,3	10	12,2	6,8	38000	63000	7201ATAP4DT	0,060
	32	10	0,6	0,3	10	12,2	6,8	34000	56000	7201ATAP4DB	0,060
	32	10	0,6	0,3	10	12,2	6,8	34000	56000	7201ATAP4DF	0,060
15	32	9	0,3	0,1	8	10,2	6,8	36000	60000	7002CTAP4DT	0,060
	32	9	0,3	0,1	8	10,2	6,8	32000	53000	7002CTPA4DB	0,060
	32	9	0,3	0,1	8	10,2	6,8	32000	53000	7002CTAP4DF	0,060
	32	9	0,3	0,1	8	16,6	13,6	28000	48000	7002CTAP4QBC	0,120
	32	9	0,3	0,1	8	10,2	6,8	36000	60000	7002CTAP2DT	0,060
	32	9	0,3	0,1	8	10,2	6,8	36000	60000	7002CTBP4DT	0,060
	35	11	0,6	0,3	9	14,4	9	34000	56000	7202CTAP4DT	0,084
	35	11	0,6	0,3	9	14,4	9	30000	50000	7202CTAP4DB	0,084
	35	11	0,6	0,3	9	14,4	9	30000	50000	7202CTAP4DF	0,084
	35	11	0,6	0,3	12	14,1	8,8	30000	50000	7202CTAP4DT	0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	7202ATAP4DB	0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	7202ATAP4DF	0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	7202ATAP2DB	0,084
17	35	10	0,3	0,1	9	11,7	8,4	32000	53000	7003CTAP4DT	0,078
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	7003CTAP4DB	0,078
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	7003CTAP4DF	0,078
	35	10	0,3	0,1	9	15,6	16,8	28000	45000	7003CTAP4TBT	0,117
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	7003CTAP2DB	0,078
	40	12	0,6	0,3	10	17,7	11,6	30000	50000	7203CTAP4DT	0,120
	40	12	0,6	0,3	10	17,7	11,6	28000	45000	7203CTAP4DB	0,120
	40	12	0,6	0,3	10	17,7	11,6	28000	45000	7203CTAP4DF	0,120
	40	12	0,6	0,3	13	14,6	10,2	26000	43000	7203ATAP4DT	0,120
	40	12	0,6	0,3	13	14,6	10,2	22000	38000	7203ATAP4DB	0,120
20	40	12	0,6	0,3	13	14,6	10,2	22000	38000	7203ATAP4DF	0,120
	42	12	0,6	0,3	10	17	12,2	28000	45000	7004CTAP4DT	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	7004CTAP4DB	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	7004CTAP4DF	0,140
	42	12	0,6	0,3	10	27,7	24,2	22000	36000	7004CTAP4QBC	0,280

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



DT

DB

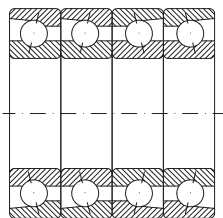
DF

TBT

TFT

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
20	42	12	0,6	0,3	10	17	12,2	24000	40000	7004CTAP2DB	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	7004CTBP4DB	0,140
	42	12	0,6	0,3	10	17	12,2	28000	45000	7004CTBP2DT	0,140
	42	12	0,6	0,3	13	16,2	11,6	24000	40000	7004ATAP4DT	0,140
	42	12	0,6	0,3	13	16,2	11,6	22000	36000	7004ATAP4DB	0,140
	42	12	0,6	0,3	13	16,2	11,6	22000	36000	7004ATAP4DF	0,140
	47	14	1	0,6	12	25,3	18	26000	43000	7204CTAP4DT	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204CTAP4DB	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204CTAP4DF	0,200
	47	14	1	0,6	12	25,3	18	26000	43000	7204CTBP4DT	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204CTBP4DB	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204CTBP4DF	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204CTBP2DF	0,200
	47	14	1	0,6	15	24,2	17,2	22000	38000	7204ATAP4DT	0,200
	47	14	1	0,6	15	24,2	17,2	20000	34000	7204ATAP4DB	0,200
	47	14	1	0,6	15	24,2	17,2	20000	34000	7204ATAP4DF	0,200
25	47	12	0,6	0,3	11	17	14,8	24000	40000	7005CTAP4DT	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005CTAP4DB	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005CTAP4DF	0,160
	47	12	0,6	0,3	11	19	14,8	24000	40000	7005CTAP2DT	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005CTAP2DB	0,160
	47	12	0,6	0,3	11	25,3	22,2	20000	34000	7005CTAP2TBT	0,240
	47	12	0,6	0,3	11	19	14,8	24000	40000	7005CTBP2DT	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005CTBP2DB	0,160
	47	12	0,6	0,3	15	16,9	13,9	22000	36000	7005ATAP4DT	0,160
	47	12	0,6	0,3	15	16,9	13,9	19000	32000	7005ATAP4DB	0,160
	47	12	0,6	0,3	15	16,9	13,9	19000	32000	7005ATAP4DF	0,160
	52	15	1	0,6	13	26,9	20,6	22000	38000	7205CTAP4DT	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205CTAP4DB	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205CTAP4DF	0,240
	52	15	1	0,6	13	43,8	41,2	18000	30000	7205CTAP4QBC	0,120
	52	15	1	0,6	13	26,9	20,6	22000	38000	7205CTAP2DT	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205CTAP2DB	0,240
	52	15	1	0,6	13	26,9	20,6	22000	38000	7205CTBP4DT	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205CTBP4DB	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205CTBP4DF	0,240
25	52	15	1	0,6	13	43,8	41,2	18000	30000	7205CTBP4QBC	0,480
	52	15	1	0,6	17	22,2	17,6	20000	34000	7205ATAP4DT	0,240
	52	15	1	0,6	17	22,2	17,6	18000	30000	7205ATAP4DB	0,240
	52	15	1	0,6	17	22,2	17,6	18000	30000	7205ATAP4DF	0,240
	52	15	1	0,6	17	29,6	26,4	17000	28000	7205ATAP4TFT	0,360

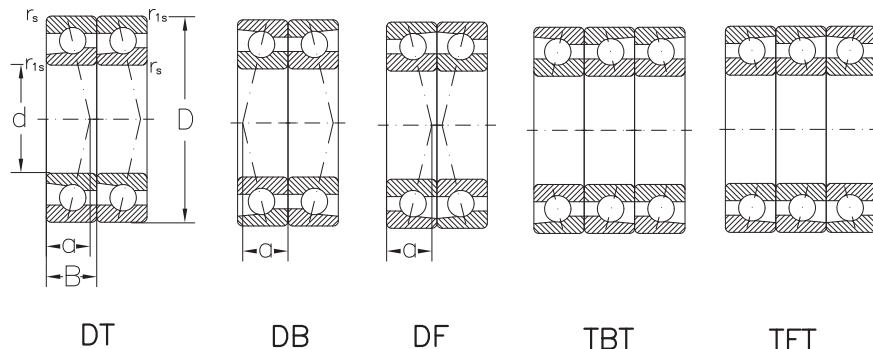
High precision angular contact ball bearings, single row, for paired and stack mounted



QBC

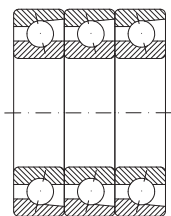
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
30	55	13	1	0,3	12	24,5	20,6	22000	36000	7006CTAP4DT	0,240
	55	13	1	0,3	12	24,5	20,6	19000	32000	7006CTAP4DB	0,240
	55	13	1	0,3	12	24,5	20,6	19000	32000	7006CTAP4DF	0,240
	55	13	1	0,3	12	32,6	30,9	18000	30000	7006CTAP4TBT	0,360
	55	13	1	0,3	12	24,5	20,6	19000	32000	7006CTAP2DB	0,240
	55	13	1	0,3	12	24,5	20,6	22000	36000	7006CTBP2DT	0,240
	55	13	1	0,3	17	21,7	19	19000	32000	7006ATAP4DT	0,240
	55	13	1	0,3	17	21,7	19	17000	28000	7006ATAP4DB	0,240
	55	13	1	0,3	17	21,7	19	17000	28000	7006ATAP4DF	0,240
	62	16	1	0,6	14	37,3	29,6	20000	34000	7206CTAP4DT	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206CTAP4DB	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206CTAP4DF	0,380
	62	16	1	0,6	14	49,7	44,4	17000	28000	7206CTAP4TT	0,570
	62	16	1	0,6	14	49,7	44,4	17000	28000	7206CTAP4TBT	0,570
	62	16	1	0,6	14	60,7	59,2	16000	26000	7206CTAP4QFC	0,760
	62	16	1	0,6	14	37,3	29,6	20000	34000	7206CTAP2DT	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206CTAP2DB	0,380
	62	16	1	0,6	14	37,3	29,6	20000	34000	7206BTBP4DT	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206CTBP4DB	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206CTBP4DF	0,380
	62	16	1	0,6	14	49,7	44,4	17000	28000	7206CTBP4TT	0,570
	62	16	1	0,6	14	60,7	59,2	16000	26000	7206CTBP4QFC	0,760
	62	16	1	0,6	19	35,7	28,2	18000	30000	7206ATAP4DT	0,380
	62	16	1	0,6	19	35,7	28,2	17000	28000	7206ATP4DB	0,380
	62	16	1	0,6	19	35,7	28,2	17000	28000	7206ATAP4DF	0,380
35	62	14	1	0,3	14	31,1	27,4	19000	32000	7007CTAP4DT	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007CTAP4DB	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007CTAP4DF	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007CTAP2DB	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007CTBP4DB	0,320
	62	14	1	0,3	14	31,1	27,4	19000	32000	7007CTBP2DT	0,320
	62	14	1	0,3	19	29,5	26,2	17000	28000	7007ATAP4DT	0,320
	62	14	1	0,3	19	29,5	26,2	16000	26000	7007ATAP4DB	0,320
	62	14	1	0,3	19	29,5	26,2	16000	26000	7007ATAP4DF	0,320
	72	17	1,1	0,6	16	49,3	40,4	18000	30000	7207CTAP4DT	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207CTAP4DB	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207CTAP4DF	0,540
	72	17	1,1	0,6	16	65,7	60,6	16000	26000	7207CTAP4TFT	0,810
	72	17	1,1	0,6	16	80,3	80,8	14000	24000	7207CTAP4QFC	1,083

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

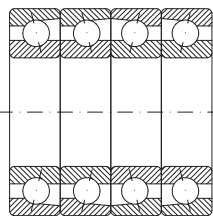


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
35	72	17	1,1	0,6	16	49,3	40,4	18000	30000	7207CTBP4DT	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207CTBP4DB	0,540
	72	17	1,1	0,6	16	49,3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

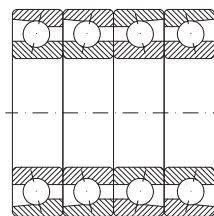
High precision angular contact ball bearings, single row, for paired and stack mounted



TT



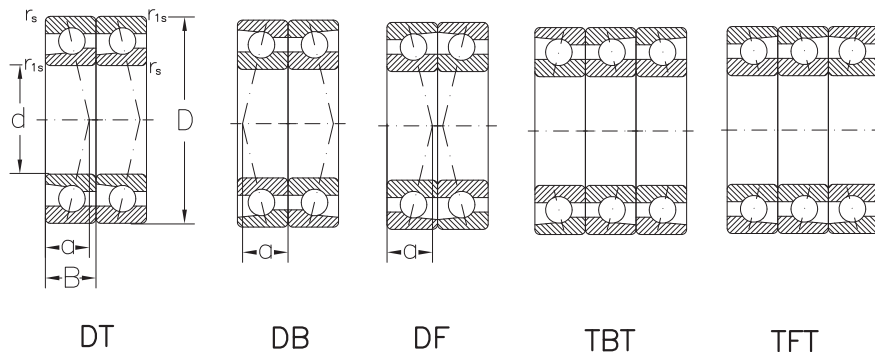
QFC



QBC

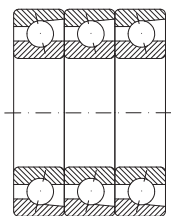
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
45	75	16	1	0,3	22	35,7	34,6	14000	24000	7009ATAP4DT	0,500
	75	16	1	0,3	22	35,7	34,6	12000	20000	7009ATAP4DB	0,500
	75	16	1	0,3	22	35,7	34,6	12000	20000	7009ATAP4DF	0,500
	85	19	1,1	0,6	18	64,8	58	14000	24000	7209CTAP4DT	0,800
	85	19	1,1	0,6	18	64,8	58	12000	20000	7209CTAP4DB	0,800
	85	19	1,1	0,6	18	64,8	58	12000	20000	7209CTAP4DF	0,800
	85	19	1,1	0,6	18	64,8	58	14000	24000	7209CTAP2DT	0,800
	85	19	1,1	0,6	25	59,6	55	12000	20000	7209ATAP4DT	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209ATAP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209ATAP4DF	0,800
	85	19	1,1	0,6	18	64,8	58	11000	18000	7209CTAP2DB	0,800
	85	19	1,1	0,6	25	59,6	55	12000	20000	7209ATBP4DT	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209ATBP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209ATBP4DF	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209ATBP2DT	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209ATBP2DB	0,800
50	80	16	1	0,3	17	40,7	41,4	14000	24000	7010CTAP4DT	0,520
	80	16	1	0,3	17	40,7	41,4	12000	20000	7010CTAP4DB	0,520
	80	16	1	0,3	17	40,7	41,4	12000	20000	7010CTAP4DF	0,520
	80	16	1	0,3	17	66,3	82,8	11000	18000	7010CTAP4QBC	1,043
	80	16	1	0,3	17	40,7	41,4	14000	24000	7010CTAP2DT	0,520
	80	16	1	0,3	17	40,7	41,4	12000	20000	7010CTAP2DB	0,520
	80	16	1	0,3	23	37,6	40	12000	20000	7010ATAP4DT	0,520
	80	16	1	0,3	23	37,6	40	11000	18000	7010ATAP4DB	0,520
	80	16	1	0,3	23	37,6	40	11000	18000	7010ATAP4DF	0,520
	90	20	1,1	0,6	20	69,4	63,4	13000	22000	7210CTAP4DT	0,900
	90	20	1,1	0,6	20	69,4	63,4	11000	19000	7210CTAP4DB	0,900
	90	20	1,1	0,6	20	69,4	63,4	11000	19000	7210CTAP4DF	0,900
	90	20	1,1	0,6	27	68	62	11000	18000	7210ATAP4DT	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210ATAP4DB	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210ATAP4DF	0,900
	90	20	1,1	0,6	27	68	62	11000	18000	7210ATBP4DT	0,900
55	90	20	1,1	0,6	27	68	62	9500	16000	7210ATBP4DB	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210ATBP4DF	0,900
	90	20	1,1	0,6	27	68	62	11000	18000	7210ATAP2DT	0,900
	90	18	1,1	0,6	19	55,3	57,2	12000	20000	7011CTAP4DT	0,780
	90	18	1,1	0,6	19	55,3	57,2	11000	18000	7011CTAP4DB	0,780
	90	18	1,1	0,6	19	55,3	57,2	11000	18000	7011CTAP4DF	0,780
	90	18	1,1	0,6	19	73,7	85,2	10000	17000	7011CTAP4TT	1,173
	90	18	1,1	0,6	19	73,7	85,2	10000	17000	7011CTAP4TBT	1,173
55	90	18	1,1	0,6	26	52,3	54,2	11000	18000	7011ATAP4DT	0,780
	90	18	1,1	0,6	26	52,3	54,2	9500	16000	7011ATAP4DB	0,780

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

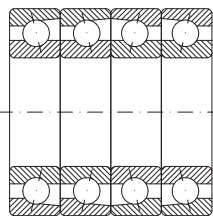


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
55	90	18	1,1	0,6	26	523	54,2	9500	16000	7011ATAP4DF	0,780
	100	21	1,5	1	21	85,9	80	11000	18000	7211CTAP4DT	1,203
	100	21	1,5	1	21	85,9	80	9500	16000	7211CTAP4DB	1,203
	100	21	1,5	1	21	85,9	80	9500	16000	7211CTAP4DF	1,203
	100	21	1,5	1	29	82	76,6	10000	17000	7211ATAP4DT	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211ATAP4DB	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211ATAP4DF	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211ATAP2DB	1,203
	100	21	1,5	1	29	82	76,6	10000	17000	7211ATBP4DT	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211ATBP4DB	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211ATBP4DF	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211ATBP4DF	1,203
60	95	18	1,1	0,6	20	56,7	61	11000	18000	7012CTAP4DT	0,840
	95	18	1,1	0,6	20	56,7	61	9500	16000	7012CTAP4DB	0,840
	95	18	1,1	0,6	20	56,7	61	9500	16000	7012CTAP4DF	0,840
	95	18	1,1	0,6	20	75,6	91,5	9500	15000	7012CTAP4TBT	1,263
	95	18	1,1	0,6	20	92,4	122	8500	14000	7012CTAP4QBC	1,683
	95	18	1,1	0,6	20	56,7	61	9500	16000	7012CTBP2DB	0,840
	95	18	1,1	0,6	27	53,8	58,2	10000	17000	7012ATAP4DT	0,840
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	7012ATAP4DB	0,840
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	7012ATAP4DF	0,840
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	7012ATAP2DF	0,840
	110	22	1,5	1	23	104	98	10000	17000	7212CTAP4DT	1,543
	110	22	1,5	1	23	104	98	9000	15000	7212CTAP4DB	1,543
	110	22	1,5	1	23	104	98	9000	15000	7212CTAP4DF	1,543
	110	22	1,5	1	23	138	147	8500	14000	7212CTAP4TBT	2,313
	110	22	1,5	1	23	104	98	9000	15000	7212CTAP2DB	1,543
	110	22	1,5	1	31	98,8	95	9000	15000	7212ATAP4DT	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212ATAP4DB	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212ATAP4DF	1,543
	110	22	1,5	1	31	98,8	95	9000	15000	7212ATBP4DT	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212ATBP4DB	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212ATBP4DF	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212ATBP4DF	1,543
65	100	18	1,1	0,6	20	58,3	65	11000	18000	7013CTAP4DT	0,920
	100	18	1,1	0,6	20	58,3	65	9500	16000	7013CTAP4DB	0,920
	100	18	1,1	0,6	20	58,3	65	9500	16000	7013CTAP4DF	0,920
	100	18	1,1	0,6	20	77,8	97,5	9000	15000	7013CTAP4TBT	1,383
	100	18	1,1	0,6	20	95	130	8500	14000	7013CTAP4QBC	1,843
	100	18	1,1	0,6	20	77,8	97,5	9000	15000	7013CTAP2TBT	1,383
	100	18	1,1	0,6	28	55	62	9500	16000	7013AMP4DT	0,920
	100	18	1,1	0,6	28	55	62	8500	14000	7013ATAP4DB	0,920

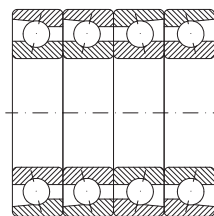
High precision angular contact ball bearings, single row, for paired and stack mounted



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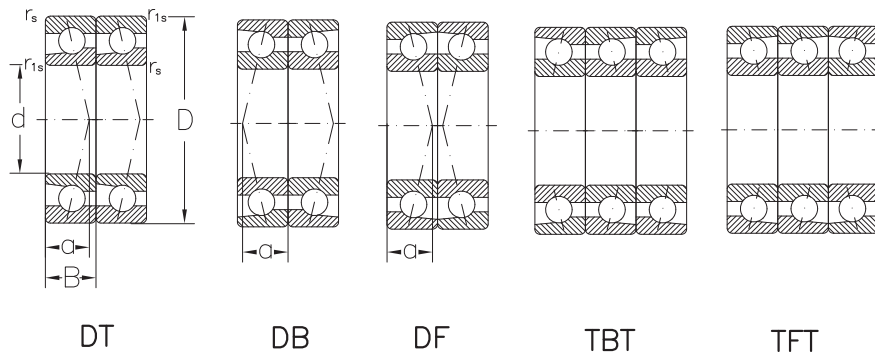
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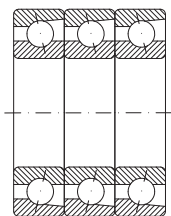
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
65	100	18	1,1	0,6	28	55	62	8500	14000	7013ATAP4DF	0,920
	120	23	1,5	1	24	117	114	9500	20000	7213CTAP4DT	1,943
	120	23	1,5	1	24	117	114	8500	14000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

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

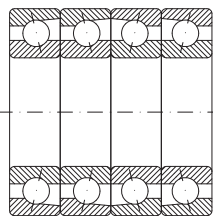


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
75	115	20	1,1	0,6	32	71,3	82,4	7000	12000	7015ATBP2DB	1,363
	130	25	1,5	1	26	130	131	8500	14000	7215CTAP4DT	2,303
	130	25	1,5	1	26	130	131	8000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

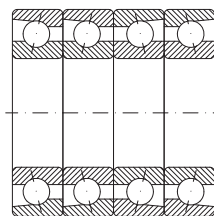
High precision angular contact ball bearings, single row, for paired and stack mounted



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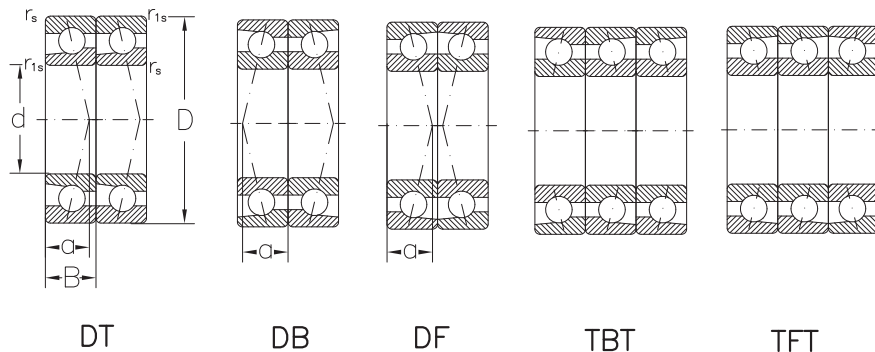
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Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
85	150	28	2	1	30	168	180	6000	10000	7217CTAP4DB	3,503
	150	28	2	1	30	168	180	6000	10000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

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



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





Angular contact ball bearings, double row

Double Row Angular Contact Ball Bearing

DAS LAGER double row angular contact ball bearings correspond in design to two single row angular contact ball bearings in the back-to-back arrangement but take up less axial space. There is a narrower profile for the same bearing size. They can accommodate radial loads as well as axial loads acting in both directions. They provide stiff bearing arrangements and are able to accommodate tilting moments.

Bearing Series 52xx & 53xx

Standard design of 32xx & 33xx series identical to corresponding bearings in the 52xx & 53xx series. They have same performance characteristics and dimensional features (except for the width of size 5200). But they have different grease. Series 52xx & 53xx use a mineral oil based high temperature grease with polyurea thickener.

Design Variants

Double row angular contact ball bearings with Filling Slot: (see figure 1-a)

Double row angular contact ball bearings have a contact angle of 32° and a pressed steel cage and filling slots on one side.

These bearings must be mounted in such a way that the large thrust force acts towards the raceways without the filling slots. These designs are designated by the suffix E

Standard Double row angular contact ball bearings: (see figure 1-b)

Standard Double row angular contact ball bearings do not have such filling slots and are capable of accommodating thrust forces equally well in both directions.

They have contact angles of 32° and are fitted with polyamide cages; these designs are designated by the suffix (B-TN).

Standard design are available with shields suffix B-TN-2Z (see figure 1-c) or with two contacting seals, (suffix B-TN-2RSR), (see figure 1-d) fitted on both sides.

Double row angular contact ball bearing with two-piece inner ring: (See figure 1-e)

In addition to the basic design bearings, double row angular contact ball bearings are also available with a two-piece inner ring. These bearings incorporate a large number of large balls and have a high load carrying capacity, especially in the axial direction.

These bearings provide a very rigid bearing arrangement, and are capable of accommodating thrust forces equally well in both directions. This bearing design is identified by the suffix D.

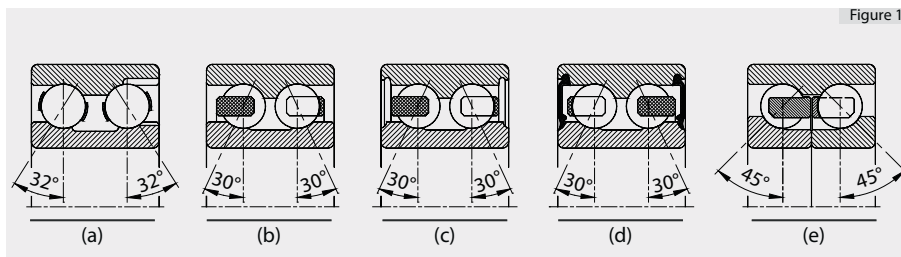


Figure 1

Dimensions

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

Misalignment

Double row angular contact ball bearings must not be exposed to any 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. Upon request they can produce P6, P5 tolerances 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.

Minimum Load

Bearings require a minimum load under all operating conditions to ensure kinematically correct rolling element function.

For DAS LAGER double row angular contact ball bearings the minimum load must be 1% of the dynamic load rating.

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:

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

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

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

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

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

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

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

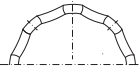
$$P_r = 0,57 F_r + 0,93 F_a, \text{ kN, for } F_a/F_r > 1,14$$

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					
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 $\alpha = 40^\circ$:

$$P_{0r} = F_r + 0,52 F_{a'}, \text{ kN}$$

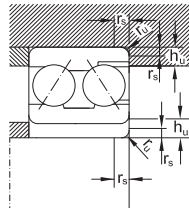
Abutment dimensions

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.

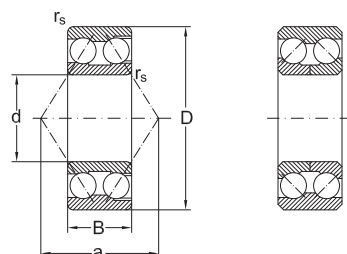
Abutment dimensions		
r_s min.	r_u max.	h_u min.
Bearing series 32; 33; 33D		
mm		
0,6	0,6	2,1
1	1	2,8
1,1	1,1	3,5
1,5	1,5	4,5
2	2	5,5
2,1	2,1	6
3	2,5	7



Suffix:

- A** No filling slots
- CB** Controlled axial internal clearance
- C2** Axial internal clearance smaller than Normal
- C3** Axial internal clearance greater than Normal
- D** Two-piece inner ring
- E** Max type bearing, with filling slot
- M** Machined window-type brass cage, ball centred
- MA** Pronged machined brass cage, outer ring centred
- N** Snap ring groove in the outer ring
- NR** Snap ring groove in the outer ring with snap ring
- P5** Dimensional and running accuracy in accordance with ISO tolerance class 5
- P6** Dimensional and running accuracy in accordance with ISO tolerance class 6
- P62** P6 + C2
- P63** P6 + C3
- TN** Injection moulded snap-type cage of glass fibre reinforced polyamide 66, ball centred
- 2RS1** on both sides contact rubber (NBR) seal of the bearing
- 2Z** Shield of pressed sheet steel on both sides of the bearing

Angular contact ball bearings, double row

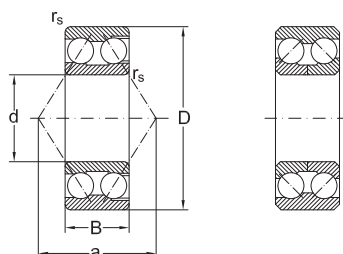


32;33

33D

Dimensions					Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		-	Kg
10	30	14,3	0,6	19	7,2	4,1	16000	22000	3200	0,050
12	32	15,9	0,6	22	9,6	5,3	15000	20000	3201	0,060
15	35	15,9	0,6	23	10,6	6,5	13000	18000	3202	0,070
	42	19	1	27	14,3	8,8	10000	15000	3302	0,130
17	40	17,5	0,6	27	13,6	8,4	10000	15000	3203	0,100
	47	22,2	1	31	20,5	12,1	9500	14000	3303	0,190
20	47	20,6	1	31	19	11,4	9000	13000	3204	0,170
	52	22,2	1,1	34	22,4	13,9	8500	12000	3304	0,230
	52	22,2	1,1	46	24	11	8500	12000	3304D	0,230
25	52	20,6	1	35	20,5	13,6	8000	11000	3205	0,190
	62	25,4	1,1	40	30,4	19,4	7500	10000	3305	0,370
	62	25,4	1,1	57	30	19	7500	10000	3305D	0,380
30	62	23,8	1	41	28,5	19,4	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	39,4	26,1	6300	8500	3306D	0,600
35	72	27	1,1	47	38	26,6	6000	8000	3207	0,480
	80	34,9	1,5	54	51	30	5600	7500	3307	0,780
	80	34,9	1,5	76	49,4	33,7	5600	7500	3307D	0,780
40	80	30,2	1,1	52	45,1	32,3	5600	7500	3208	0,650
	90	36,5	1,5	58	62	39	5000	6700	3308	1,05
	90	36,5	1,5	84	60,8	41,8	5000	6700	3308D	1,15
45	85	30,2	1,1	56	48,5	37,1	5000	6700	3209	0,700
	100	39,7	1,5	64	71	57	4500	6000	3309	1,41
	100	39,7	1,5	93	71,3	50,4	4500	6000	3309D	1,61
50	90	30,2	1,1	59	48,5	37,1	4800	6300	3210	0,740
	110	44,4	2	73	85	75	4000	5300	3310	1,90
	110	44,4	2	102	85,5	60,8	4000	5300	3310D	2,05
55	100	33,3	1,5	64	57	45,1	4300	5600	3211	1,05
	120	49,2	2	80	98	88	3600	4800	3311	2,48
	120	49,2	2	114	106	77,4	3600	4800	3311D	2,68
60	110	36,5	1,5	71	69,8	55,6	3800	5000	3212	1,36
	130	54	2,1	86	114	112	3400	4500	3312	3,17
	130	54	2,1	123	121	90,3	3400	4500	3312D	3,42
65	120	38,1	1,5	76	76,6	69,8	3600	4800	3213	1,76
	140	58,7	2,1	94	129	130	3200	4300	3313	4,01
	140	58,7	2,1	132	139	105	3200	4300	3313D	4,31

Angular contact ball bearings, double row



32;33

33D

Dimensions					Basic radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm					kN		min ⁻¹		-	Kg
70	125	39,7	1,5	81	84	76	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	155	119	2800	3800	3314D	5,40
75	130	41,3	1,5	84	90,8	83,6	3200	4300	3215	2,08
	160	68,3	2,1	107	163	166	2600	3600	3315	6,16
	160	68,3	2,1	140	167	133	2600	3600	3315D	6,66
80	140	44,4	2	91	101	90,3	2800	3800	3216	2,64
	170	68,3	2,1	112	176	186	2400	3400	3316	6,93
	170	68,3	2,1	149	173	148	2400	3400	3316D	7,53
85	150	49,2	2	97	118	105	2600	3600	3217	3,39
	180	73	3	119	185	167	2200	3200	3317	8,30
	180	73	3	155	185	167	2200	3200	3317D	9,00
90	160	52,4	2	104	124	114	2400	3400	3218	4,14
	190	73	3	125	185	171	2000	3000	3318	9,23
	190	73	3	125	185	139	2000	3000	3318D	10,0
95	170	55,6	2,1	111	151	139	2200	3200	3219	5,00
	200	77,8	3	133	214	205	1900	2800	3319D	11,4
100	180	60,3	2,1	118	169	158	2000	3000	3220	6,10
	215	82,6	3	139	242	242	1800	2600	3320D	14,2
110	200	69,8	2,1	132	201	201	1900	2800	3222	8,79
	240	92,1	3	153	276	290	1800	2600	3322D	19,0



Self-aligning ball bearings

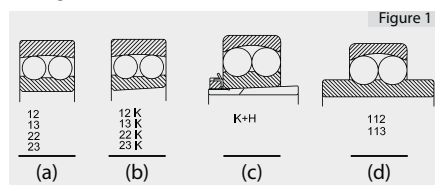
Self-aligning ball bearings are non-separable double row radial bearings. Both rows of balls rotate, in parallel, within the spherical outer ring. This feature allows angular misalignment of the shaft relative to the housing. Therefore self-aligning ball bearings are particularly used in case of bearings where misalignment can occur from errors in mounting or from shaft bending.

Self-aligning ball bearings are suitable for low to medium radial loads and low amounts of thrust forces.

Additionally, the self-aligning ball bearing has the lowest friction of all rolling bearings, which enables it to run cooler even at high speeds.

Double row self-aligning ball bearings are manufactured both with cylindrical bore (see figure 1-a) and tapered bore (taper 1:12) (see figure 1-b).

Upon request self-aligning bearings with tapered bore can be delivered with adapter sleeves (see figure 1-c) and extended inner ring (see figure 1-d).



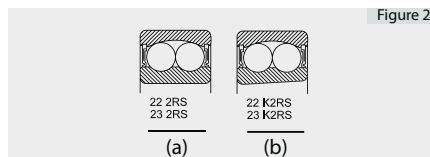
Self-aligning Ball Bearings with Extended Inner Ring: (see figure 1-d)

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.

Self-aligning ball bearings with Seal: (see figure 2)

Self-aligning ball bearings are also available in a sealed version with seals at both sides (suffix 2RS). 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 -300C and +800C. Grease service life is much reduced if bearing operates at a temperature higher than +800C (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 bearing with seal are available tapered inner ring (see figure 2-b).



Dimensions

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

Misalignment

The design of self-aligning ball bearings is such that angular misalignment between the outer and the inner rings can be accommodated without any negative effect on bearing performance.

Self-aligning ball bearings allow within certain limits an angular misalignment of the outer ring in relation to the inner ring. 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.

On 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 d		Designation of clearance group									
		C2 Bearing radial clearance		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm									
2,5	6	1	8	5	15	10	20	15	25	21	33
6	10	2	9	6	17	12	25	19	33	27	42
10	14	2	10	6	19	13	26	21	35	30	48
14	18	3	12	8	21	15	28	23	37	32	50
18	24	4	14	10	23	17	30	25	39	34	52
24	30	5	16	11	24	19	35	29	46	40	58
30	40	6	18	13	29	23	40	34	53	46	66
40	50	6	19	14	31	25	44	37	57	50	71
50	65	7	21	16	36	30	50	45	69	62	88
65	80	8	24	18	40	35	60	54	83	76	108
80	100	9	27	22	48	42	70	64	96	89	124
100	120	10	31	25	56	50	83	75	114	105	145
120	140	10	38	30	68	60	100	90	135	125	175
140	160	15	44	35	80	70	120	110	161	150	210
With tapered bore											
Table 3											
18	24	7	17	13	26	20	33	28	42	37	55
24	30	9	20	15	28	23	39	33	50	44	62
30	40	12	24	19	35	29	46	40	59	52	72
40	50	14	27	22	39	33	52	45	65	58	79
50	65	18	32	27	47	41	61	56	80	73	99
65	80	23	39	35	57	50	75	69	98	91	123
80	100	29	47	42	68	62	90	84	116	109	144
100	120	35	56	50	81	75	108	100	139	130	170
120	140	40	68	60	98	90	130	120	165	155	205
140	160	45	74	65	110	100	150	140	191	180	240

Equivalent dynamic radial load

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

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

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

Equivalent static radial load

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

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

Axial load on bearings with adapter sleeves

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

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

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

where:

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

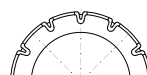
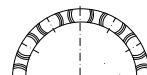
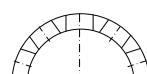
B - bearing width, mm

d - bearing bore diameter, mm

Cages

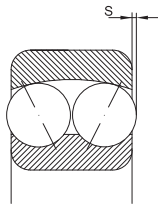
Self-aligning ball bearings are generally fitted with pressed steel cages of sheet. On special request, when bearings operate under fluctuating loads, at high speeds and where large sizes are required, machined brass cages are recommended to be used. Glass fibre reinforced polyamide 6.6 cages are also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

Cage design and technical data are given in table 4.

Cage design and technical data						
Cage	Design bearing	cage	Application	Max. value		
				$D_m n$		
				oil	grease	
Pressed sheet cage				- General application - Moderate speeds - Sealed bearings series 12, 13, 22, 23	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.



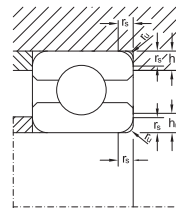
Values of dimension S		Table 5
Bearing	S	
	mm	
1224	1,3	
1226	0,7	
1318	1,0	
1319	1,5	
1320	2,5	
1321	2,6	
1322	2,6	

Abutment dimensions

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

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

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



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

Self-aligning ball bearings with adapter sleeves

Abutment dimensions

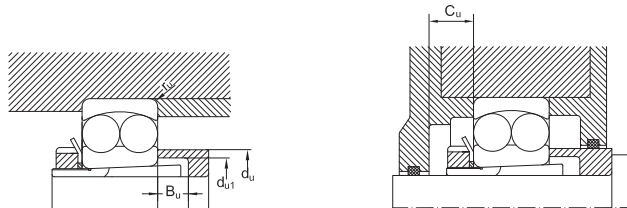
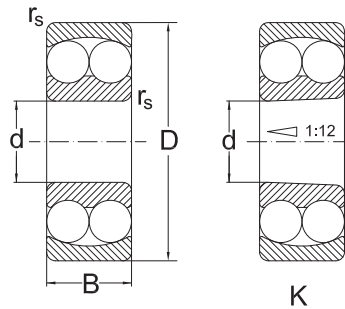


Table 7

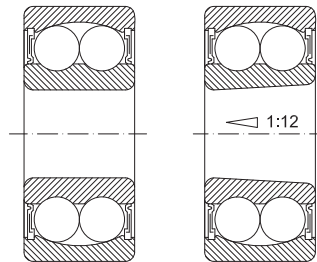
Bore symbol	Shaft diameter	Bearing series												All series
		12K			22K			13K			23K			
		d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	
mm														
04	17	23	27	5	23	27	5	23	30	8	24	28	5	
05	20	28	32	6	28	32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

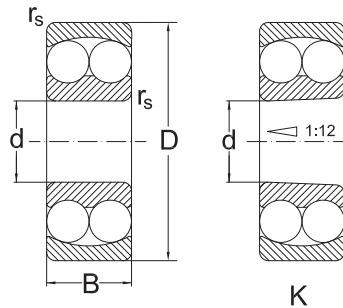


2RS

K2RS

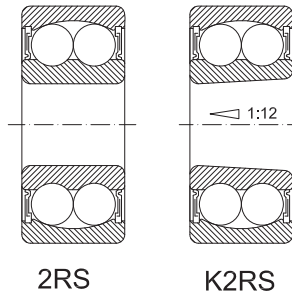
Dimensions				Basical radial load		Factors				Speed limit		Designation	Weight
d	D	B	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		-	Kg
30	62	16	1	14,1	0,25	2,5	3,9	4,2	2,7	10000	13000	1206	0,220
	62	16	1	14,1	0,25	2,5	3,9	4,2	2,7	10000	13000	1206 K	0,220
	62	20	1	21,5	0,4	1,6	2,5	6,1	1,7	9500	12000	2206	0,260
	62	20	1	21,5	0,4	1,6	2,5	6,1	1,7	9500	12000	2206 K	0,260
	62	20	1	21,5	0,4	1,6	2,5	6,1	1,7	9500	12000	2206 M	0,260
	62	20	1	21,5	0,25	2,5	3,9	6,1	2,7	5300		2206 2RS	0,260
	62	20	1	21,5	0,25	2,5	3,9	6,1	2,7	5300		2206 K2RS	0,260
	72	19	1,1	20,3	0,24	2,6	4,1	6,2	2,8	9000	11000	1306	0,380
	72	19	1,1	20,3	0,24	2,6	4,1	6,2	2,8	9000	11000	1306 K	0,380
	72	27	1,1	28,1	0,4	1,6	2,5	8	1,7	8500	10000	2306	0,500
	72	27	1,1	28,1	0,4	1,6	2,5	8	1,7	8500	10000	2306 K	0,500
	72	27	1,1	28,1	0,24	2,6	4,1	8	2,8	5600		2306 2RS	0,500
35	72	17	1,1	17,2	0,23	2,8	4,2	5,4	2,9	9000	11000	1207	0,320
	72	17	1,1	17,2	0,23	2,8	4,2	5,4	2,9	9000	11000	1207 K	0,320
	72	17	1,1	17,2	0,23	2,8	4,2	5,4	2,9	9000	11000	1207 M	0,320
	72	23	1,1	27,7	0,37	1,7	2,6	8	1,8	8500	10000	2207	0,400
	72	23	1,1	27,7	0,37	1,7	2,6	8	1,8	8500	10000	2207 K	0,400
	72	23	1,1	27,7	0,23	2,8	4,2	8	2,9	5600		2207 RS	0,400
	72	23	1,1	27,7	0,23	2,8	4,2	8	2,9	5600		2207 2RS	0,400
	80	21	1,5	23,9	0,25	2,5	3,9	7,7	2,7	7500	9000	1307	0,510
	80	21	1,5	23,9	0,25	2,5	3,9	7,7	2,7	7500	9000	1307 K	0,510
	80	31	1,5	35,8	0,43	1,5	2,3	10,1	1,6	7000	8500	2307	0,670
	80	31	1,5	35,8	0,43	1,5	2,3	10,1	1,6	7000	8500	2307 K	0,670
	80	31	1,5	35,8	0,25	2,5	3,9	10,1	2,7	4500		2307 2RS	0,670
40	80	18	1,1	18	0,22	2,9	4,5	6,3	3	8500	10000	1208	0,410
	80	18	1,1	18	0,22	2,9	4,5	6,3	3	8500	10000	1208 K	0,410
	80	23	1,1	28,8	0,33	1,9	3	9	2	7500	9000	2208	0,500
	80	23	1,1	28,8	0,33	1,9	3	9	2	7500	9000	2208 K	0,500
	80	23	1,1	28,8	0,33	1,9	3	9	2	7500	9000	2208 M	0,500
	80	23	1,1	28,8	0,22	2,9	4,5	9	3	4800		2208 2RS	0,500
	80	23	1,1	28,8	0,22	2,9	4,5	9	3	4800		2208 K2RS	0,500
	90	23	1,5	30,5	0,24	2,6	4,1	10,1	2,8	6700	8000	1308	0,710
	90	23	1,5	30,5	0,24	2,6	4,1	10,1	2,8	6700	8000	1308 K	0,710
	90	33	1,5	48,7	0,39	1,6	2,5	14,4	1,7	6300	7500	2308	0,920
	90	33	1,5	48,7	0,39	1,6	2,5	14,4	1,7	6300	7500	2308 K	0,920
	90	33	1,5	48,7	0,39	1,6	2,5	14,4	1,7	6300	7500	2308 M	0,920
	90	33	1,5	48,7	0,24	2,6	4,1	14,4	2,8	4000		2308 2RS	0,920
45	85	19	1,1	20,7	0,21	3	4,7	7	3,2	7500	9000	1209	0,460
	85	19	1,1	20,7	0,21	3	4,7	7	3,2	7500	9000	1209 K	0,460
	85	23	1,1	29,4	0,31	2	3,1	9,6	2,1	7000	8500	2209	0,540

Self-aligning ball bearings



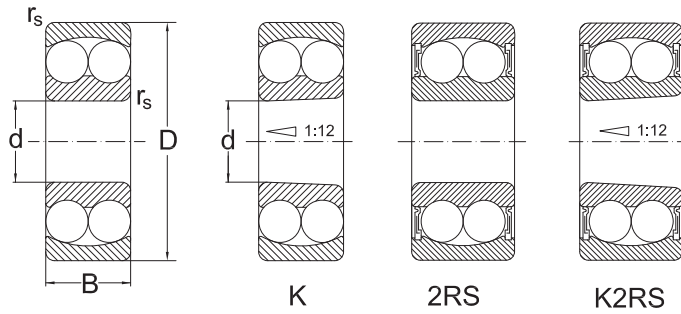
Dimensions				Basical		Factors				Speed limit		Designation	Weight
d	D	B	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		-	Kg
45	85	23	1,1	29,4	0,31	2	3,1	9,6	2,1	7000	8500	2209 K	0,540
	85	23	1,1	29,4	0,21	3	4,7	9,6	3,2	4500		2209 2RS	0,540
	85	23	1,1	29,4	0,21	3	4,7	9,6	3,2	4500		2209 K2RS	0,540
	100	25	1,5	35,2	0,24	2,6	4,1	12,1	2,8	6300	7500	1309	0,950
	100	25	1,5	35,2	0,24	2,6	4,1	12,1	2,8	6300	7500	1309 K	0,950
	100	36	1,5	57,5	0,31	2	3,1	17,4	2,1	5600	6700	2309	1,23
	100	36	1,5	57,5	0,31	2	3,1	17,4	2,1	5600	6700	2309 K	1,23
	100	36	1,5	57,5	0,24	2,6	4,1	17,4	2,8	3600		2309 2RS	1,23
50	90	20	1,1	23,9	0,21	3	4,7	8,3	3,2	7000	8500	1210	0,520
	90	20	1,1	23,9	0,21	3	4,7	8,3	3,2	7000	8500	1210 K	0,520
	90	23	1,1	30,5	0,29	2,2	3,4	10,1	2,3	6300	7500	2210	0,590
	90	23	1,1	30,5	0,29	2,2	3,4	10,1	2,3	6300	7500	2210 K	0,590
	90	23	1,1	30,5	0,21	3	4,6	10,1	3,2	4000		2210 2RS	0,590
	90	23	1,1	30,5	0,21	3	4,6	10,1	3,2	4000		2210 K2RS	0,590
	110	27	2	39,3	0,24	2,6	4,1	12,6	2,8	5600	6700	1310	1,21
	110	27	2	39,3	0,24	2,6	4,1	12,6	2,8	5600	6700	1310 K	1,21
	110	40	2	57,5	0,42	1,5	2,3	18,1	1,6	5300	6300	2310	1,23
	110	40	2	57,5	0,42	1,5	2,3	18,1	1,6	5300	6300	2310 K	1,23
	110	40	2	57,5	0,24	2,6	4,1	18,1	2,8	3400		2310 2RS	1,64
55	100	21	1,5	24,9	0,2	3,2	4,9	9,6	3,3	6300	7500	1211	0,700
	100	21	1,5	24,9	0,2	3,2	4,1	9,6	3,3	6300	7500	1211 K	0,700
	100	25	1,5	35,2	0,27	2,3	3,6	12,1	2,5	6000	7000	2211	0,810
	100	25	1,5	35,2	0,27	2,3	3,6	12,1	2,5	6000	7000	2211 K	0,810
	120	29	2	45,8	0,23	2,3	4,2	16,2	2,9	5000	6000	1311	1,58
	120	29	2	45,8	0,23	2,8	4,2	16,2	2,9	5000	6000	1311 K	1,58
	120	43	2	68,7	0,41	1,5	2,4	21,7	1,6	4800	5600	2311	2,10
	120	43	2	68,7	0,41	1,5	2,4	21,7	1,6	4800	5600	2311 K	2,10
60	110	22	1,5	28,1	0,19	3,4	5,2	11	3,5	5600	6700	1212	0,900
	110	22	1,5	28,1	0,19	3,4	5,2	11	3,5	5600	6700	1212 K	0,900
	110	28	1,5	44,1	0,28	2,2	3,5	15,4	2,4	5300	6300	2212	1,10
	110	28	1,5	44,1	0,28	2,2	3,5	15,4	2,4	5300	6300	2212 K	1,10
	130	31	2,1	52,8	0,23	2,8	4,2	19,9	2,9	4500	5300	1312	1,96
	130	31	2,1	52,8	0,23	2,8	4,2	19,9	2,9	4500	5300	1312 K	1,96
	130	46	2,1	78,6	0,41	1,5	2,4	25,7	1,6	4300	5000	2312	2,60
	130	46	2,1	78,6	0,41	1,5	2,4	25,7	1,6	4300	5000	2312 K	2,60
65	120	23	1,5	31,6	0,17	3,7	5,7	12,6	3,9	5300	6300	1213	1,15
	120	23	1,5	31,6	0,17	3,7	5,7	12,6	3,9	5300	6300	1213 K	1,15
	120	31	1,5	51,6	0,28	2,2	3,5	18,1	2,4	5000	6000	2213	1,45
	120	31	1,5	51,6	0,28	2,2	3,5	18,1	2,4	5000	6000	2213 K	1,45
	140	33	2,1	58,7	0,23	2,8	4,2	23	2,8	4300	5000	1313	2,45

Self-aligning ball bearings



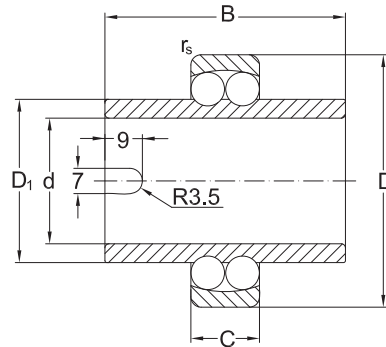
Dimensions				Basical		Factors				Speed limit		Designation	Weight
d	D	B	r _s min.	dyn.	e	Y ₁	Y ₂	stat.	Y ₀	grease	oil		
				C _r				C _{0r}					
mm				kN	-			kN	-	min ⁻¹		-	Kg
70	140	33	2,1	58,7	0,23	2,8	4,2	23	2,8	4300	5000	1313 K	2,45
	140	48	2,1	86,3	0,38	1,7	2,6	29,4	1,7	4000	4800	2313	3,25
	140	48	2,1	86,3	0,38	1,7	2,6	29,4	1,7	4000	4800	2313 K	3,25
	125	24	1,5	32,3	0,18	3,5	5,4	13,2	3,7	5000	6000	1214	1,25
	125	24	1,5	32,3	0,18	3,5	5,4	13,2	3,7	5000	6000	1214 K	1,25
	125	31	1,5	39,9	0,27	2,3	3,6	15,4	2,5	4800	5600	2214	1,50
	125	31	1,5	39,9	0,27	2,3	3,6	15,4	2,5	4800	5600	2214 K	1,50
	150	35	2,1	66,9	0,22	2,9	4,5	24,8	3	4000	4800	1314	3,00
	150	35	2,1	66,9	0,22	2,9	4,5	24,8	3	4000	4800	1314 K	3,00
	150	51	2,1	99,8	0,35	1,8	2,8	33,8	1,9	3600	4300	2314	3,90
150	51	2,1	99,8	0,35	1,8	2,8	33,8	1,9	3600	4300	2314 K	3,90	
75	130	25	1,5	35,2	0,18	3,5	5,4	14,1	3,7	4800	5600	1215	1,35
	130	25	1,5	35,2	0,18	3,5	5,4	14,1	3,7	4800	5600	1215 K	1,35
	130	31	1,5	52,8	0,25	2,5	3,9	19,9	2,7	4500	5300	2215	1,60
	130	31	1,5	52,8	0,25	2,5	3,9	19,9	2,7	4500	5300	2215 K	1,60
	160	37	2,1	71,5	0,22	2,9	4,5	27,1	3	3600	4300	1315	3,55
	160	37	2,1	71,5	0,22	2,9	4,5	27,1	3	3600	4300	1315 K	3,55
	160	55	2,1	112	0,38	1,7	2,6	38,9	1,7	3400	4000	2315	4,70
	160	55	2,1	112	0,38	1,7	2,6	38,9	1,7	3400	4000	2315 K	4,70
	160	55	2,1	112	0,38	1,7	2,6	38,9	1,7	3400	4000	2315 KM	4,70
	160	55	2,1	112	0,38	1,7	2,6	38,9	1,7	3400	4000	2315 KM	4,70
80	140	26	2	35,8	0,16	3,9	6,1	15,4	4,1	4300	5000	1216	1,65
	140	26	2	35,8	0,16	3,9	6,1	15,4	4,1	4300	5000	1216 K	1,65
	140	33	2	61,8	0,26	2,4	3,7	24,2	2,5	4000	4800	2216	2,00
	140	33	2	61,8	0,26	2,4	3,7	24,2	2,5	4000	4800	2216 K	2,00
	170	39	2,1	79,8	0,22	2,9	4,5	30,2	3	3400	4000	1316	4,20
	170	39	2,1	79,8	0,22	2,9	4,5	30,2	3	3400	4000	1316 K	4,20
	170	58	2,1	122	0,34	1,9	2,9	44,3	2	3200	3800	2316	6,10
	170	58	2,1	122	0,34	1,9	2,9	44,3	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
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3200	3800	2316 M	6,10
85	150	28	2	44,1	0,17	3,7	5,7	18,8	3,9	4000	4800	1217	2,05
	150	28	2	44,1	0,17	3,7	5,7	18,8	3,9	4000	4800	1217 K	2,05
	150	36	2	52,8	0,25	2,5	3,9	21,3	2,7	3800	4800	2217	2,50
	150	36	2	52,8	0,25	2,5	3,9	21,3	2,7	3800	4500	2217 K	2,50
	180	41	3	88	0,22	2,9	4,5	34,3	3	3200	4800	1317	5,00
	180	41	3	88	0,22	2,9	4,5	34,3	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	51,6	0,17	3,7	5,7	21,3	3,9	3800	4500	1218	2,50
	160	30	2	51,6	0,17	3,7	5,7	21,3	3,9	3800	4500	1218 K	2,50
	160	40	2	63,4	0,27	2,3	3,6	25,7	2,5	3600	4300	2218	3,40

Self-aligning ball bearings



Dimensions				Basical radial load		Factors				Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		-	Kg
90	160	40	2	63,4	0,27	2,3	3,6	25,7	2,5	3600	4300	2218 K	3,40
	190	43	3	105	0,22	2,9	4,5	39,7	3	3000	3600	1318	5,80
	190	43	3	105	0,22	2,9	4,5	39,7	3	3000	3600	1318 K	5,80
	190	64	3	138	0,38	1,7	2,6	51,5	1,7	2800	3400	2318	8,45
	190	64	3	138	0,38	1,7	2,6	51,5	1,7	2800	3400	2318 K	8,45
95	170	32	2,1	57,5	0,17	3,7	5,7	24,4	3,9	3400	4000	1219	3,10
	170	32	2,1	57,5	0,17	3,7	5,7	24,4	3,9	3400	4000	1219 K	3,10
	200	45	3	120	0,23	2,8	4,2	46,1	2,9	2800	3400	1319	6,70
	200	45	3	120	0,23	2,8	4,2	46,1	2,9	2800	3400	1319 K	6,70
100	180	34	2,1	62,2	0,17	3,7	5,7	27,1	3,9	3200	3800	1220	3,70
	180	34	2,1	62,2	0,17	3,7	5,7	27,1	3,9	3200	3800	1220 K	3,70
	180	46	2,1	88	0,24	2,6	4,1	36,6	2,8	3200	3800	2220	5,0
	180	46	2,1	88	0,24	2,6	4,1	36,6	2,8	3200	3800	2220 K	5,0
	215	47	3	129	0,24	2,6	4,1	51,5	2,8	2600	3200	1320	8,30
	215	47	3	129	0,24	2,6	4,1	51,5	2,8	2600	3200	1320 K	8,30
	215	73	3	181	0,34	1,9	2,9	76	2	2400	3000	2320	12,2
215	73	3	181	0,34	1,9	2,9	76	2	2400	3000	2320 K	12,2	
110	200	38	2,1	79,8	0,17	3,7	5,7	35,2	3,9	2800	3400	1222	5,15
	200	38	2,1	79,8	0,17	3,7	5,7	35,2	3,9	2800	3400	1222 K	5,15
	200	53	2,1	112	0,26	2,4	3,7	46,9	2,5	2800	3400	2222	7,10
	200	53	2,1	112	0,26	2,4	3,7	46,9	2,5	2800	3400	2222 K	7,10
	240	50	3	147	0,22	2,9	4,5	65	3	2400	3000	1322	12,0
	240	50	3	147	0,22	2,9	4,5	65	3	2400	3000	1322 K	12,0

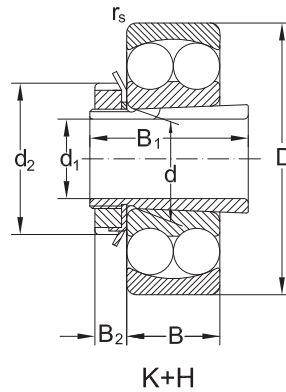
Self-aligning ball bearings with extended inner ring



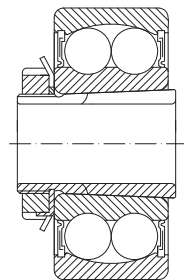
Dimensions						Basical radial load		Factors				Speed limit		Designation	Weight
d ¹⁾	D	C	B	D ₁	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm						kN	-			kN	-	min ⁻¹		-	Kg
20	47	14	40	29,2	1	12,1	0,28	2,2	3,5	3,2	2,4	7100	9000	11204	0,180
	52	15	44	31,5	1,1	12,4	0,3	2,1	3,3	3,35	2,2	8000	6300	11304	0,270
25	52	15	44	33,3	1	13,6	0,29	2,2	3,4	3,8	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	14,8	0,25	2,5	3,9	4,4	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	15,1	0,23	2,8	4,2	4,8	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	18,1	0,22	2,9	4,5	6,2	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	20,5	0,21	3	4,7	7	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	21,8	0,21	3	4,7	7,7	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
60	110	22	62	78	1,5	28,7	0,19	3,4	5,2	11	3,5	2500	3200	11212	1,50

1) Tolerance J7

Self-aligning ball bearings with adapter sleeve



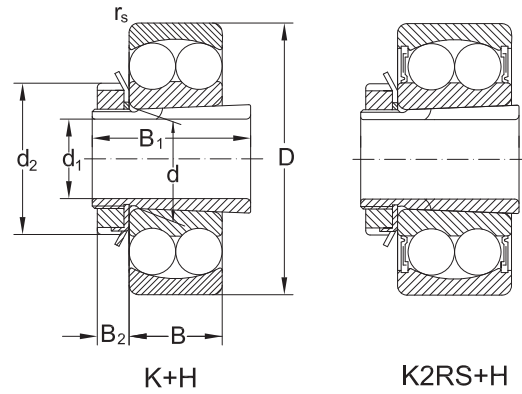
Dimensions								Designation		Weight
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂	bearing	adapter sleeve	
mm								-		Kg
17	20	47	14	1	32	24	7	1204 K	H204	0,167
	20	47	18	1	32	28	7	2204 K	H304	0,201
	20	52	15	1,1	32	28	7	1304 K	H304	0,221
	20	52	21	1,1	32	31	7	2304 K	H2304	0,281
20	25	52	15	1	38	26	8	1205 K	H205	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	30	72	27	1,1	45	38	8	2306 K	H2306	0,615
	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	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
	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	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
	45	85	19	1,1	65	33	11	1209 K	H209	0,686
45	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
	50	90	20	1,1	70	35	12	1210 K	H210	0,789
45	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



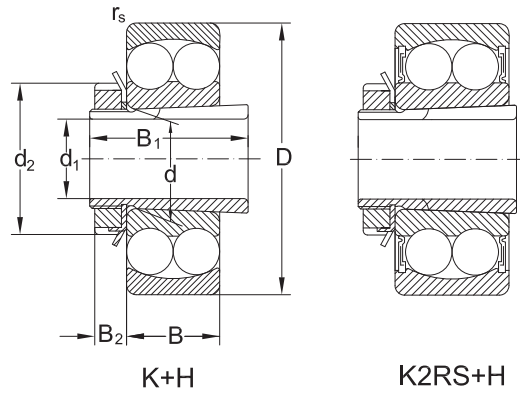
K2RS+H

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		Weight
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



Spherical roller bearings

Spherical roller bearings are self aligning and very sturdy. The bearings consist of two row spheric rollers because of these bearings can carry heavy radial and combined axial loads in both directions simultaneously. Due to their poor kinematic behaviours, spherical roller bearings are only suitable for operating at low to medium speeds. It's most suitable for applications where some misalignment is unavoidable. According your application, they are available either cylindrical and tapered bores.

Spherical Roller bearings are manufactured in the following constructive version, depending on bearing size and serie.

C CAGE DESIGN:

C cage consist of special pressed sheet cage. These bearings have a central guide rib floating on the inner ring, This design change eliminates the guide flanges on the bearing inner ring and uses symmetrical rollers with larger dimensions. So that the load carrying capacity increases. C cage mostly suitable for small and medium sizes spherical roller bearings.

MB CAGE DESIGN:

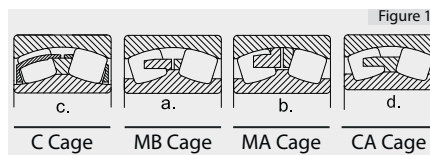
These bearings have a central fixed rib and two pieces machined brass cages guided on the inner ring rib.

MA CAGE DESIGN:

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

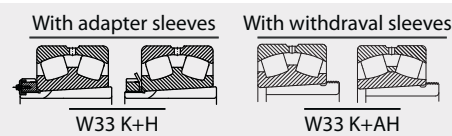
CA CAGE DESIGN:

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.



They are frequently used with tapered bores (i.e. taper 1:12) namely suffix x K or for series 240 and 241 the taper bore is (1:30) namely suffix K30, for ease of mounting. The facility of mounting these bearing types using adapter and withdrawal sleeves enables mounting directly onto drawn or fine turned seats of shaft for applications where high running accuracy is not necessary.

For some applications it remains necessary to mount tapered bore bearings directly onto a tapered seat of the shaft.



Suffixes

- C** Modified inner design, increased basic load, symmetrical rollers, pressed sheet cage
- CA** Modified inner design, increased basic load, symmetrical rollers, pressed sheet cage
- C3** Radial internal clearance greater than Normal
- C4** Radial internal clearance greater than C3
- C5** Radial internal clearance greater than C4
- F2, F3** Constructive modifications
- F80** Developed desing for vibratory applications
- K** Tapered bore bearings, taper 1:12
- K30** Tapered bore bearings, taper 1:30
- MA** Tachined brass cage guided on the outer ring
- MB** Machined brass cage guided on the inner ring
- P** Two-piece outer ring
- P5** Dimensional and running accuracy to ISO tolerance class 5
- P6** Dimensional and running accuracy to ISO tolerance class 6
- W20** Three lubrication holes in outer ring without groove
- 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)

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.

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

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

Radial clearance of spherical roller bearings with tapered bore

Table 2

Bore diameter	d over	Radial clearance									
		C2		Normal		C3		C4		C5	
	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

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.

Lubrication grooves and holes

Permissible angular misalignment

Table 3

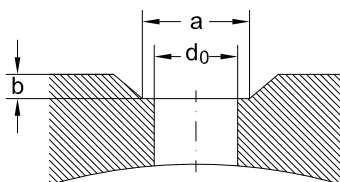
Bearing series	Permissible angular misalignment degrees
213	1
222	1.5
223	2
230	1.5
231	1.5
232	2.5
239	1.5
240	2
241	2.5

Cage design and some technical data

Table 4

Cage	Design	Application	Max. value	
			bearing	cage
			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

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

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

$$P_r = 0,67 F_r + Y_2 F_{a_r}, \text{ kN, for } F_a/F_r > e$$

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

Equivalent static radial load

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

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	7,21	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
480... 480	6	9,6	3	280... 290	7,5	12,1	2,5	240... 260	7,5	12,1	2,5
				310... 460	9	14,5	3	280... 480	9	14,5	3
				480... 540	12	19,7	3				

Series 23100				Series 24100				Series 22200			
Outer diameter range	Dimensions			Bore 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	85... 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... 500	12	19,7	3	500... 500	9	14,5	3	270... 290	7,5	12,1	2,5
								310... 400	9	14,5	3
								440... 500	12	19,7	3,5

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		
... 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				
				380... 420	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

The value of the factor Y_0 depending on the bearing type can be found in bearing tables.

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

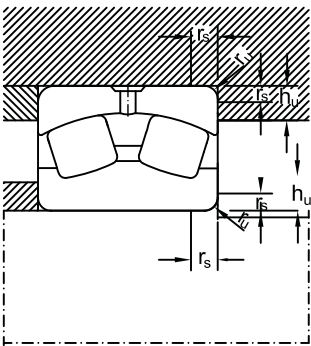
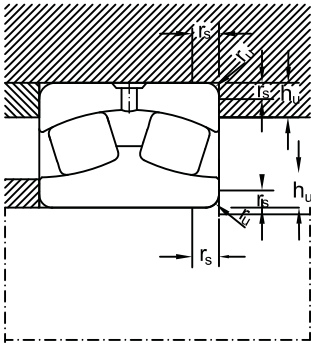
Abutment dimensions

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

Abutment Dimensions

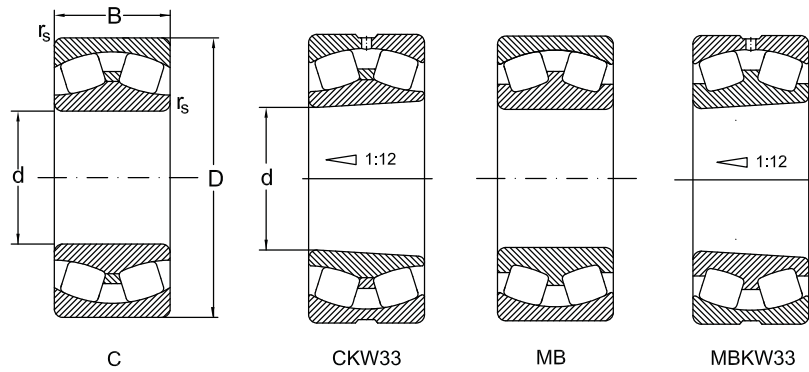
of Table 6

$r_{s\ min}$	$r_{u\ max}$	$h_{u\ min}$ Bearing series	
		230	231, 213
		239	241, 223
		240	222, 233
			232
mm			
1	1	2,3	2,8
1,1	1	3	3,5
1,5	1,5	3,5	4,5
2	2	4,4	5,5
2,1	2,1	5,1	6
3	2,5	6,2	7
4	3	7,3	8,5
5	4	9	10
6	5	11,5	13
7,5	6	14	16
9,5	8	17	20





Spherical Roller Bearings

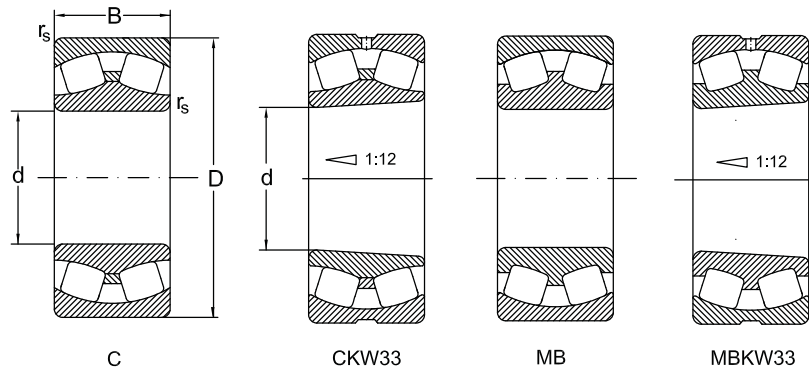


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
35	80	21	1,5	62,3	0,28	2,4	3,6	68,4
	80	21	1,5	62,3	0,28	2,4	3,6	68,4
40	80	23	1,1	91,7	0,31	2,2	3,2	85,5
	80	23	1,1	91,7	0,31	2,2	3,2	85,5
	80	23	1,1	91,7	0,31	2,2	3,2	85,5
	80	23	1,1	82,5	0,31	2,2	3,2	77
	80	23	1,1	82,5	0,31	2,2	3,2	77
	80	23	1,1	82,5	0,31	2,2	3,2	77
	80	23	1,1	82,5	0,31	2,2	3,2	77
	80	23	1,1	82,5	0,31	2,2	3,2	77
	80	23	1,1	82,5	0,31	2,2	3,2	77
	90	23	1,5	98,8	0,26	2,6	3,9	103
	90	23	1,5	98,8	0,26	2,6	3,9	103
	90	23	1,5	98,8	0,26	2,6	3,8	103
	90	33	1,5	143	0,4	1,6	2,5	133
	90	33	1,5	143	0,4	1,6	2,5	133
	90	33	1,5	143	0,4	2,6	2,5	133
	90	33	1,5	143	0,4	2,5	2,5	133
	90	33	1,5	143	0,4	1,6	2,5	133
	90	33	1,5	143	0,4	1,6	2,5	133
	90	33	1,5	143	0,4	1,6	2,5	133
	90	33	1,5	143	0,4	1,7	2,5	133
	90	33	1,5	128	0,4	1,7	2,5	120
	90	33	1,5	128	0,4	1,7	2,5	120
	90	33	1,5	128	0,4	1,7	2,5	120
	90	33	1,5	128	0,4	1,7	2,5	120
45	85	23	1,1	128	0,26	2,6	3,8	120
	85	23	1,1	96,9	0,26	2,6	3,4	93,1
	85	23	1,1	96,9	0,26	2,6	3,4	93,1

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
35	2,4	5000	6400	21307MBKW33	0,56
	2,4	5000	6400	21307MBW33	0,56
40	2,1	4800	6300	22208C	0,54
	2,1	4800	6300	22208CK	0,54
	2,1	4800	6300	22208CKW33	0,52
	2,1	4400	5800	22208MAC4F80W33	0,654
	2,1	4400	5800	22208MB	0,57
	2,1	4400	5800	22208MBK	0,57
	2,1	4400	5800	22208MBKW33	0,56
	2,1	4400	5800	22208MBW33	0,56
	2,6	4500	6000	21308C	0,710
	2,6	4500	6000	21308CK	0,700
	2,5	4900	6500	21308CKW33	0,700
	1,6	4300	5600	22308C	0,97
	1,6	4300	5600	22308CK	0,95
	1,6	4300	5600	22308CKW33	0,93
	1,6	4300	5600	22308CW33	0,96
	1,6	4300	5600	22308CY	0,98
	1,6	4300	5600	22308CYK	0,95
	1,6	4300	5600	22308CYKW33	0,94
	1,6	4300	5600	22308CYW33	0,972
	1,6	3800	5000	22308KMAC4F80W33	1,42
	1,6	3800	5000	22308MBK	1
	1,6	3800	5000	22308MBKW33	0,99
	1,6	3800	5000	22308MB	1,02
	1,6	3800	5000	22308MBW33	1,05
45	2,5	4500	6000	22209C	0,64
	2,5	4500	6000	22209CK	0,62
	2,5	4500	6000	22209CKW33	0,62

Spherical Roller Bearings

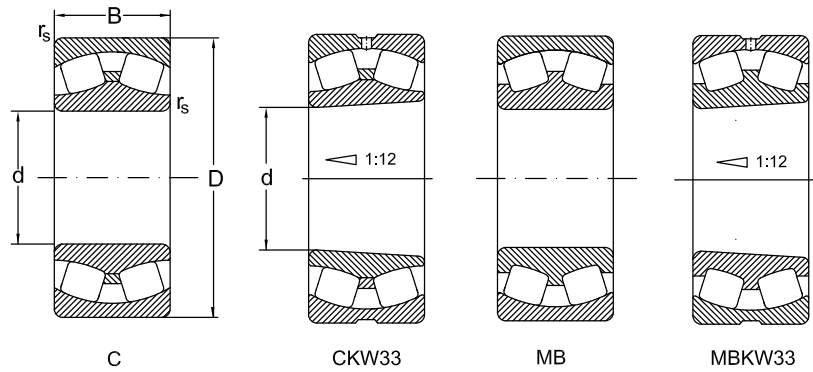


Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
45	85	23	1,1	96,9	0,26	2,6	2,4	93,1
	85	23	1,1	87,4	0,28	2,4	3,5	84,6
	85	23	1,1	87,4	0,28	2,4	3,5	84,6
	85	23	1,1	87,4	0,28	2,4	3,5	84,6
	85	23	1,1	87,4	0,28	2,4	3,5	84,6
	100	25	1,5	87,4	0,26	2,6	3,9	84,6
	100	25	1,5	119	0,26	2,6	3,9	121
	100	25	1,5	119	0,26	2,6	3,9	121
	100	25	1,5	119	0,28	2,4	3,6	121
	100	36	1,5	119	0,35	1,9	2,9	121
	100	36	1,5	174	0,35	1,9	2,9	183
	100	36	1,5	174	0,4	1,9	2,9	183
	100	36	1,5	174	0,4	1,9	2,9	183
	100	36	1,5	174	0,4	1,7	2,5	183
	100	36	1,5	174	0,4	1,7	2,5	183
	100	36	1,5	157	0,4	1,7	2,5	165
	100	36	1,5	157	0,4	1,7	2,5	165
50	90	23	1,1	157	0,24	2,9	4,2	165
	90	23	1,1	157	0,24	2,9	4,2	165
	90	23	1,1	98,8	0,24	2,9	4,2	103
	90	23	1,1	98,8	0,24	2,9	4,2	103
	90	23	1,1	98,8	0,26	2,6	3,8	103
	90	23	1,1	98,8	0,26	2,6	3,8	103
	90	23	1,1	88,4	0,26	2,6	3,8	96,9
	90	23	1,1	88,4	0,26	2,6	3,8	96,9
	110	27	2	88,4	0,24	2,8	4,1	96,9
	110	27	2	88,4	0,24	2,8	4,1	96,9
	110	27	2	88,4	0,24	2,8	4,1	96,9
	110	40	2	148	0,38	1,8	2,7	158

Spherical Roller Bearings

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

Spherical Roller Bearings

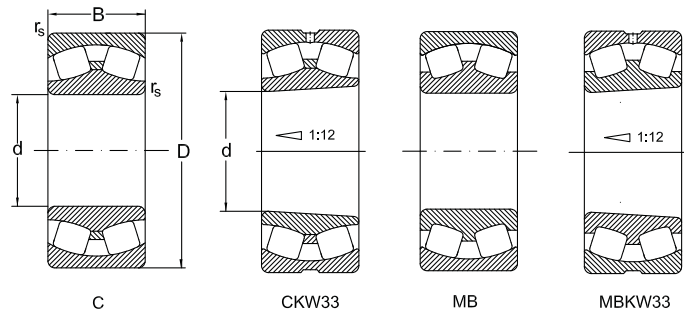


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
50	110	40	2	148	0,38	1,8	2,7	158
	110	40	2	148	0,4	1,8	2,7	158
	110	40	2	148	0,4	1,8	2,7	158
	110	40	2	148	0,4	1,8	2,7	158
	110	40	2	148	0,4	1,8	2,7	158
	110	40	2	148	0,4	1,8	2,7	158
	110	40	2	148	0,4	1,7	2,5	158
	110	40	2	134	0,4	1,7	2,5	143
	110	40	2	134	0,4	1,7	2,5	143
	110	40	2	134	0,4	1,7	2,5	143
	110	40	2	134	0,4	1,7	2,5	143
55	100	25	1,5	134	0,27	2,7	4,1	143
	100	25	1,5	134	0,27	2,7	4,1	143
	100	25	1,5	119	0,27	2,7	4,1	121
	100	25	1,5	119	0,27	2,7	4,1	121
	100	25	1,5	119	0,26	2,6	3,9	121
	100	25	1,5	106	0,26	2,6	3,9	108
	100	25	1,5	106	0,26	2,6	3,9	108
	100	25	1,5	106	0,26	2,6	3,9	108
	120	29	2	106	0,24	2,8	4,1	108
	120	29	2	148	0,24	2,8	4,1	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158

Spherical Roller Bearings

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

Spherical Roller Bearings

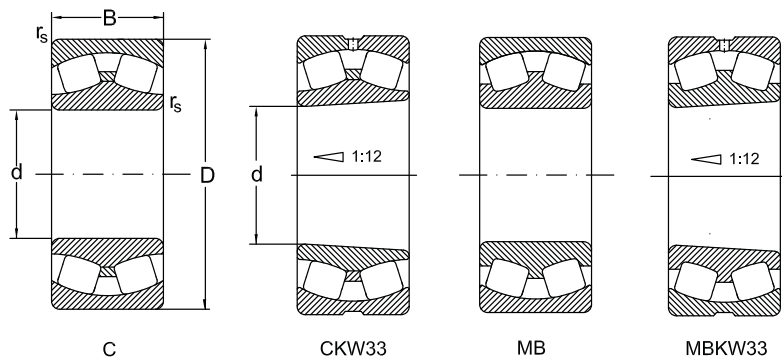


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
55	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	148	0,4	1,7	2,5	158
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
	120	43	2	134	0,4	1,7	2,5	144
60	110	28	1,5	148	0,27	2,7	4	158
	110	28	1,5	148	0,27	2,7	4	158
	110	28	1,5	148	0,27	2,7	4	158
	110	28	1,5	135	0,27	2,6	3,8	145
	110	28	1,5	135	0,27	2,6	3,8	145
	110	28	1,5	135	0,27	2,6	3,8	145
	110	28	1,5	135	0,27	2,6	3,8	145
	130	31	2,1	201	0,24	2,9	4,3	228
	130	31	2,1	201	0,24	2,9	4,3	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	201	0,4	1,7	2,5	228
	130	46	2,1	183	0,4	1,7	2,5	204
	130	46	2,1	183	0,4	1,7	2,5	204

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
55	1,6	3000	4000	22311CYKW33	2,26
	1,6	3000	4000	22311CYW33	2,32
	1,6	2800	3600	22311MBK	2,1
	1,6	2800	3600	22311MAKW33	2,44
	1,6	2800	3600	22311MA	2,49
	1,6	2800	3600	22311MAC4F00W33	2,42
	1,6	2800	3600	22311MAC4W502	2,44
	1,6	2800	3600	22311MAW502	2,44
	1,6	2800	3600	22311MB	2,43
	1,6	2800	3600	22311MBW33	2,42
60	2,7	3400	4500	22212C	1,32
	2,7	3400	4500	22212CK	1,29
	2,7	3400	4500	22212CKW33	1,25
	2,5	3200	4100	22212MBK	1,19
	2,5	3200	4100	22212MBKW33	1,17
	2,5	3200	4100	22212MB	1,17
	2,5	3200	4100	22212MBW33	1,2
	2,8	3000	4000	21312C	1,95
	2,8	3000	4000	21312CK	1,90
	1,7	2800	3800	22312C	2,91
	1,7	2800	3800	22312CK	2,84
	1,7	2800	3800	22312CKW33	2,8
	1,7	2800	3800	22312CW33	2,87
	1,7	2800	3800	22312CY	2,93
	1,7	2800	3800	22312CYK	2,86
	1,7	2800	3800	22312CYKW33	2,82
	1,7	2800	3800	22312CYW33	2,89
	1,7	2600	3400	22312MBK	3,04
	1,7	2600	3400	22312MBKW33	3

Spherical Roller Bearings

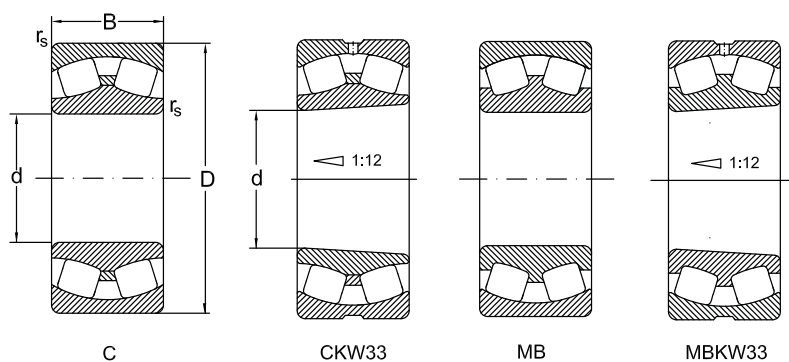


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
60	130	46	2,1	183	0,4	1,7	2,5	204
	130	46	2,1	183	0,4	1,7	2,5	204
	130	46	2,1	183	0,4	1,7	2,5	204
	130	31	2,1	183	0,24	2,9	4,3	204
65	120	31	1,5	295	0,28	2,4	3,6	318
	120	31	1,5	295	0,28	2,4	3,6	318
	120	31	1,5	295	0,28	2,4	3,6	318
	120	31	1,5	295	0,28	2,4	3,6	318
	120	31	1,5	264	0,28	2,4	3,6	288
	120	31	1,5	264	0,28	2,4	3,6	288
	120	31	1,5	264	0,28	2,4	3,6	288
	120	31	1,5	264	0,28	2,4	3,6	288
	140	33	2,1	224	0,24	2,8	4,2	257
	140	33	2,1	224	0,24	2,8	4,2	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	224	0,39	1,7	2,6	257
	140	48	2,1	204	0,39	1,7	2,6	232
	140	48	2,1	204				232
	140	48	2,1	204	0,39	1,7	2,6	232
	140	48	2,1	204	0,39	1,7	2,6	232
	140	48	2,1	204	0,39	1,7	2,6	232
	140	48	2,1	204	0,39	1,7	2,6	232
	140	48	1,5	204	0,38	1,8	2,6	232

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
60	1,7	2600	3400	22312MAC4F80W33	3,07
	1,7	2600	3400	22312MB	3,04
	1,7	2600	3400	22312MBW33	3
	2,8	2800	3800	21312KMB	2,13
65	2,4	3000	4000	22213C	1,73
	2,4	3000	4000	22213CK	1,51
	2,4	3000	4000	22213CKW33	1,65
	2,4	3000	4000	22213CW33	1,68
	2,4	2800	3600	22213MBK	1,59
	2,4	2800	3600	22213MBKW33	1,57
	2,4	2800	3600	22213MB	1,62
	2,4	2800	3600	22213MBW33	1,6
	2,8	2800	3800	21313C	2,45
	2,8	2800	3800	21313CK	2,40
	1,7	2800	3600	22313C	3,57
	1,7	2800	3600	22313CK	3,44
	1,7	2800	3600	22313CKW33	3,49
	1,7	2800	3600	22313CW33	3,51
	1,7	2800	3600	22313CY	3,54
	1,7	2800	3600	22313CYK	3,44
	1,7	2800	3600	22313CYKW33	3,43
	1,7	2800	3600	22313CYW33	3,53
	1,7	2400	3200	22313MBK	3,71
		2400	3200	22323MBKW33	3,71
	1,7	2400	3200	22313MA	3,56
	1,7	2400	3200	22313MAC4F80W33	3,77
	1,7	2400	3200	22313MAC4W502	3,51
	1,7	2400	3200	22313MAW502	3,51
	1,7	2400	3200	22313MB	3,51

A vertical bar chart consisting of two bars. The bottom bar is red and extends almost to the top of the frame. The top bar is grey and is much shorter, positioned at the very top of the chart area.

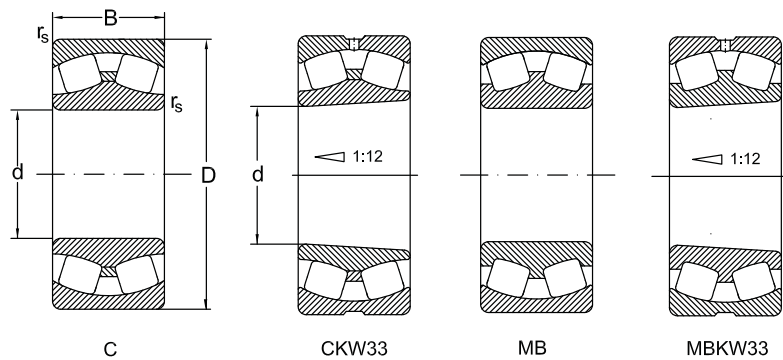


Dimensions				Basic radial load				stat. C _{0r}
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	
mm				kN				
65	140	48	1,5	204	0,39	1,7	2,6	232
70	125	31	1,5	198	0,26	2,6	3,9	217
	125	31	1,5	198	0,26	2,6	3,9	217
	125	31	1,5	198	0,26	2,6	3,9	217
	125	31	1,5	198	0,26	2,6	3,9	217
	150	35	2,1	178	0,26	2,6	4	198
	150	35	2,1	178	0,26	2,6	4	198
	150	35	2,1	178	0,26	2,6	4	198
	150	51	2,1	380	0,38	1,9	2,9	409
	150	51	2,1	380	0,38	1,9	2,9	409
	150	51	2,1	380	0,38	1,9	2,9	409
	150	51	2,1	380	0,38	1,9	2,9	409
	150	51	2,1	347	0,37	1,8	2,7	375
	150	51	2,1	347	0,37	1,8	2,7	375
	150	51	2,1	347	0,37	1,8	2,7	375
	150	51	2,1	347	0,37	1,8	2,7	375
	150	51	2,1	347	0,37	1,8	2,7	375
75	130	31	1,5	201	0,23	2,9	4,4	228
	130	31	1,5	201	0,23	2,9	4,4	228
	130	31	1,5	201	0,24	2,9	4,4	228
	130	31	1,5	201	0,24	2,9	4,4	228
	130	31	1,5	183	0,24	2,8	4,1	201
	130	31	1,5	183	0,24	2,8	4,1	201
	130	31	1,5	183	0,24	2,8	4,1	201
	130	31	1,5	183	0,24	2,8	4,1	201
	160	55	2,1	380	0,34	2,9		413
	160	37	2,1	271	0,23	2,9		309
	160	37	2,1	271	0,23	2,9		309

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
65	1,7	2400	3200	22313M8W33	3,7
70	2,6	2800	3800	22214C	1,82
	2,6	2800	3800	22214CK	1,82
	2,6	2800	3800	22214CKW33	1,8
	2,6	2800	3800	22214CW33	1,82
	2,6	2600	3400	21314MBKW33	3,12
	2,6	2600	3400	21314MB	3,2
	2,6	2600	3400	21314MBW33	3,16
	1,9	2400	3200	22314C	4,32
	1,9	2400	3200	22314CK	4,32
	1,9	2400	3200	22314CKW33	4,21
	1,9	2400	3200	22314CW33	4,3
	1,7	2200	2800	22314MBK	4,43
	1,7	2200	2800	22314MBKW33	4,42
	1,7	2200	2800	22314MAC4F80W33	4,58
	1,8	2200	2800	22314MB	4,31
	1,7	2200	2800	22314MBW33	4,61
	1,7	2200	2800	22314MBW7	1,90
75	2,9	2800	3800	22215C	1,91
	2,9	2800	3800	22215CK	1,88
	2,9	2800	3800	22215CW33	1,86
	2,9	2800	3800	22215CKW33	1,86
	2,7	2600	3400	22215MBK	1,75
	2,7	2600	3400	22215MBKW33	1,73
	2,7	2600	3400	22215MB	1,79
	2,7	2600	3400	22215MBW33	1,77
	2,9	2400	3000	22315KMBW33	1,73
	2,9	2400	3200	21315CW33	3,50
	2,9	2400	3200	21315CKW33	5,28

Spherical Roller Bearings

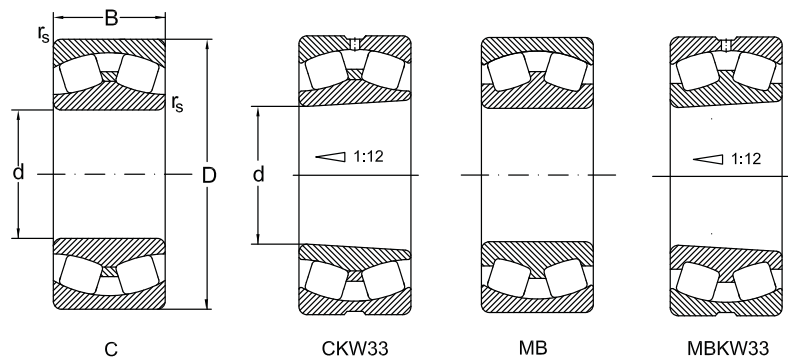


d	Dimensions			Basic radial load				
	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
75	160	55	2,1	418	0,38	1,8	2,6	451
	160	55	2,1	418	0,38	1,8	2,6	451
	160	55	2,1	418	0,38	1,8	2,6	451
	160	55	2,1	418	0,38	1,8	2,6	451
	160	55	2,1	380	0,34	1,9	2,9	413
	160	55	2,1	380	0,34	1,9	2,9	413
	160	55	2,1	380	0,34	1,9	2,9	413
	160	55	2,1	380	0,34	1,9	2,9	413
	160	55	2,1	380	0,34	1,9	2,9	413
80	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	224	0,25	2,6	4	257
	140	33	2	204	0,24	2,8	4,1	231
	140	33	2	204	0,24	2,8	4,1	231
	140	33	2	204	0,24	2,8	4,1	231
	140	33	2	204	0,24	2,8	4,1	231
	170	39	2,1	309	0,23	2,9	4,2	356
	170	39	2,1	309	0,23	2,9	4,2	356
	170	58	2,1	309	0,35	1,9	2,9	356
	170	58	2,1	309	0,35	1,9	2,9	356
	170	58	2,1	309	0,35	1,9	2,9	356
	170	58	2,1	309	0,35	1,9	2,9	356
	170	58	2,1	280	0,25	2,6	4	321
	170	58	2,1	280	0,25	2,6	4	321

Spherical Roller Bearings

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

Spherical Roller Bearings

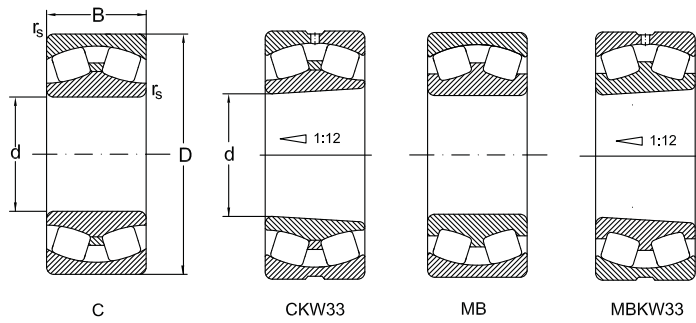


d	Dimensions			Basic radial load				
	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
80	170	58	2,1	280	0,25	2,6	4	321
	170	58	2,1	280	0,25	2,6	4	321
	170	58	2,1	280	0,25	2,6	4	321
85	150	36	2	271	0,26	2,6	3,9	309
	150	36	2	271	0,26	2,6	3,9	309
	150	36	2	271	0,26	2,6	3,9	309
	150	36	2	271	0,26	2,6	3,9	309
	150	36	2	271	0,26	2,6	3,9	309
	150	36	2	242	0,25	2,7	4	280
	150	36	2	242	0,25	2,7	4	280
	150	36	2	242	0,25	2,7	4	280
	150	36	2	242	0,25	2,7	4	280
	150	36	2	242	0,25	2,7	4	280
	180	41	3	242	0,22	3	4,5	280
	180	41	3	309	0,22	3	4,5	356
	180	41	3	309	0,22	3	4,5	356
	180	60	3	309	0,33	2	3	356
	180	60	3	309	0,33	2	3	356
	180	60	3	309	0,33	2	3	356
	180	60	3	282	0,22	3	4,5	323
	180	60	3	282	0,37	1,8	2,7	323
	180	60	3	282	0,37	1,8	2,7	323
	180	60	3	282	0,37	1,8	2,7	323
	180	60	3	282	0,37	1,8	2,7	323
	180	60	3	282	0,37	1,8	2,7	323
	180	41	3	282	0,22	3	4,5	323
	180	60	3	282	0,22	3	4,5	323
	180	60	3	282	0,37	1,8	2,7	323
	180	60	3	282	0,37	1,8	2,7	323

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
80	2,6	1800	2400	22316MB	6,25
	2,6	1800	2400	22316MBW33	6,23
	2,6	1800	2400	22316MBKW33	6,09
85	2,6	2400	3200	22217C	2,57
	2,6	2400	3200	22217CK	2,52
	2,6	2400	3200	22217CW33	2,56
	2,6	2400	3200	22217CK	2,52
	2,6	2400	3200	22217CKW33	2,50
	2,6	2200	2800	22217MB	2,76
	2,6	2200	2800	22217MBK	2,7
	2,6	2200	2800	22217MBKW33	2,69
	2,6	2200	2800	22217MBW7	2,76
	2,6	2200	2800	22217MBW33	2,75
	2,9	2100	2600	21317KMBW33	5,78
	2,9	2200	2800	21317C	5,10
	2,9	2200	2800	21317CK	5,00
	2	1800	2400	22317C	7,68
	2	1800	2400	22317CK	7,52
	2	1800	2400	22317CKW33	7,47
	2,9	2200	2800	22317CA	7,64
	1,8	1800	2400	22317MBW33	7,27
	1,8	1700	2200	22317MBK	7,07
	1,8	1700	2200	22317MAC4F80W33	7,88
	1,8	1700	2200	22317MB	7,23
	1,8	1700	2200	22317MBW20	7,23
	22,9	2100	2600	21317KMBW33	5,78
	22,9	2200	2800	22317CA	7,64
	1,8	1700	2200	22317MBW33	7,27
	1,8	1700	2200	22317MBKW33	7,01

Spherical Roller Bearings

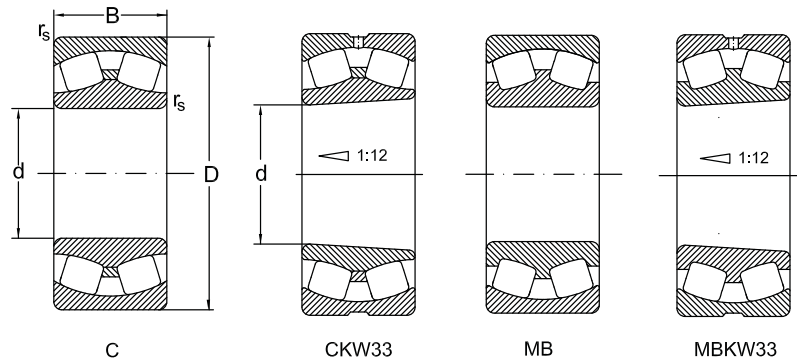


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
90	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	309	0,27	2,5	3,8	356
	160	40	2	282	0,26	2,6	3,8	323
	160	40	2	282	0,26	2,6	3,8	323
	160	40	2	282	0,26	2,6	3,8	323
	160	40	2	282	0,26	2,6	3,8	323
	160	52,4	2	282	0,34	2	3	323
	160	52,4	2	282	0,34	2	3	323
	160	52,4	2	282	0,34	2	3	323
	160	52,4	2	282	0,34	2	3	323
	190	43	3	361	0,22	3	4,5	428
	190	43	3	361	0,22	3	4,5	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	361	0,36	1,9	2,8	428
	190	64	3	332	0,37	1,8	2,7	389
	190	64	3	332	0,37	1,8	2,7	389
	190	64	3	332	0,37	1,8	2,7	389

Spherical Roller Bearings

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

Spherical Roller Bearings

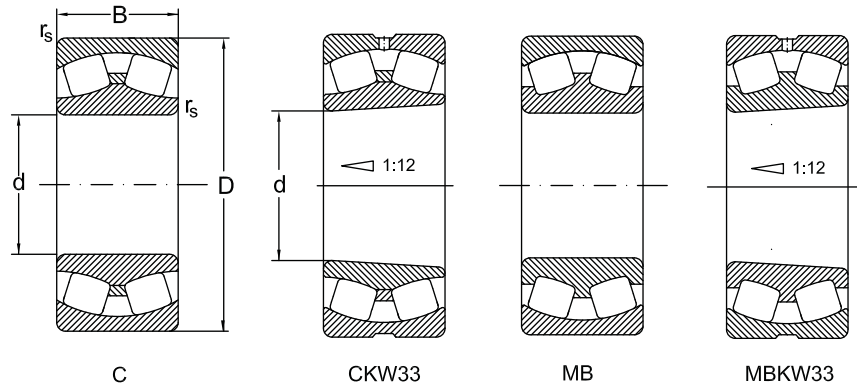


d	Dimensions			Basical radial load				
	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
90	190	64	3	332	0,37	1,8	2,7	389
	190	64	3	332	0,37	1,8	2,7	389
	190	64	3	332	0,37	1,8	2,7	389
95	170	43	2,1	361	0,24	2,8	4,2	428
	170	43	2,1	361	0,24	2,8	4,2	428
	170	43	2,1	361	0,24	2,8	4,2	428
	170	43	2,1	361	0,24	2,8	4,2	428
	170	43	2,1	361	0,24	2,8	4,2	428
	170	43	2,1	231	0,26	2,6	3,8	388
	170	43	2,1	231	0,26	2,6	3,8	388
	170	43	2,1	231	0,26	2,6	3,8	388
	170	43	2,1	231	0,26	2,6	3,8	388
	170	43	2,1	231	0,26	2,6	3,8	388
	170	43	2,1	231	0,26	2,6	3,8	388
	200	45	3	231	0,22	3	4,5	388
	200	45	3	356	0,22	3,1	4,6	418
	200	45	3	356	0,22	3,1	4,6	418
	200	67	3	356	0,35	1,9	2,9	418
	200	67	3	637	0,35	1,9	2,9	727
	200	67	3	637	0,35	1,9	2,9	727
	200	67	3	637	0,35	1,9	2,9	727
	200	67	3	637	0,35	1,9	2,9	727
	200	67	3	637	0,35	1,9	2,7	727
	200	67	3	570	0,38	1,8	2,7	656
	200	67	3	570	0,38	1,8	2,7	656
	200	67	3	570	0,38	1,8	2,7	656
	200	67	3	570	0,38	1,8	2,7	656
	200	67	3	570	0,38	1,8	2,7	656
100	165	52	2	570	0,28	2,4	3,5	656

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
90	1,8	1700	2200	22318MAC4F80W33	9,2
	1,8	1700	2200	22318MB	8,69
	1,8	1700	2200	22318MBW33	8,68
95	2,8	2200	2800	22219C	4,26
	2,8	2200	2800	22219CK	4,17
	2,8	2200	2800	22219CKW33	4,15
	2,8	2200	2800	22219CW25	4,24
	2,8	2200	2800	22219CW33	4,24
	2,5	2000	2600	22219MBK	4,3
	2,5	2000	2600	22219MBKW33	4,28
	2,5	2000	2600	22219MB	4,32
	2,5	2000	2600	22219MBW25	4,32
	2,5	2000	2600	22219M2W33	4,10
	2,5	2600	2600	22219MBKW33	4,28
	3	2600	2600	21319CA	7,43
	3	2400	2400	21319MB	7,38
	3	2400	2400	21319MBK	7,28
	1,8	2200	2200	22319C	8,83
	1,8	2200	2200	22319CK	8,61
	1,8	2200	2200	22319CKW33	8,5
	1,8	2200	2200	22319CW25	8,71
	1,8	2200	2200	22319CW33	8,72
	1,7	2000	2000	22319MBK	9,88
	1,7	2000	2000	22319MAC4F80W33	10,7
	1,7	2000	2000	22319MB	10,1
	1,7	2000	2000	22319MBW25	9,97
	1,7	2000	2000	22319MBW33	9,97
	1,7	2000	2000	22319MBKW33	9,97
100	2,3	2200	3000	23120CW33	5

Spherical Roller Bearings

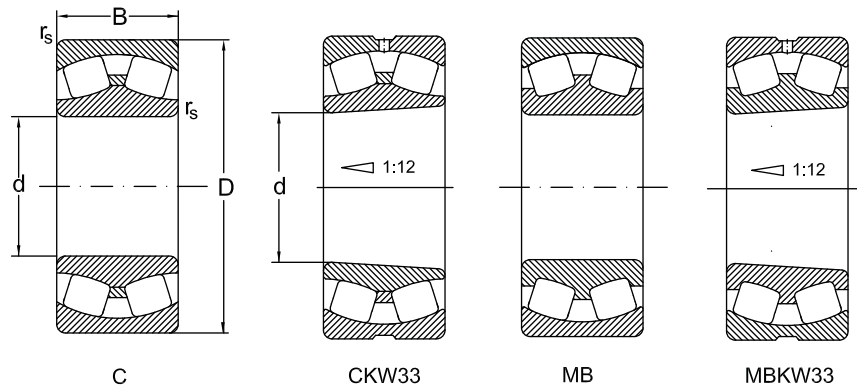


Dimensions				Basic radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
100	165	52	2	323	0,31	2,2	3,2	422
	165	52	2	323	0,31	2,2	3,2	422
	165	52	2	323	0,31	2,2	3,2	422
	165	52	2	323	0,31	2,2	3,2	422
	180	46	2,1	404	0,24	2,8	4,2	466
	180	46	2,1	404	0,24	2,8	4,2	466
	180	46	2,1	404	0,24	2,8	4,2	466
	180	46	2,1	404	0,24	2,8	4,2	466
	180	46	2,1	367	0,27	2,5	3,7	428
	180	46	2,1	367	0,27	2,5	3,7	428
	180	46	2,1	367	0,27	2,5	3,7	428
	180	46	2,1	367	0,27	2,5	3,7	428
	180	60,3	2,1	451	0,33	2	3	570
	180	60,3	2,1	451	0,33	2	3	570
	180	60,3	2,1	451	0,33	2	3	570
	180	60,3	2,1	451	0,33	2	3	570
	180	60,3	2,1	409	0,33	2	3	513
	180	60,3	2,1	409	0,33	2	3	513
	180	60,3	2,1	409	0,33	2	3	513
	180	60,3	2,1	409	0,33	2	3	513
	180	60,3	2,1	409	0,33	2	3	513
	180	60,3	2,1	409	0,33	2	3	513
	180	60,3	2,1	409	0,33	2	3	513
	215	47	3	447	0,22	3,1	4,7	561
	215	47	3	404	0,24	2,8	4,2	513
	215	47	3	404	0,22	3,1	4,7	513
	215	73	3	774	0,35	1,9	2,9	903
	215	73	3	774	0,35	1,9	2,9	903
	215	73	3	774	0,35	1,9	2,9	903

Spherical Roller Bearings

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

Spherical Roller Bearings

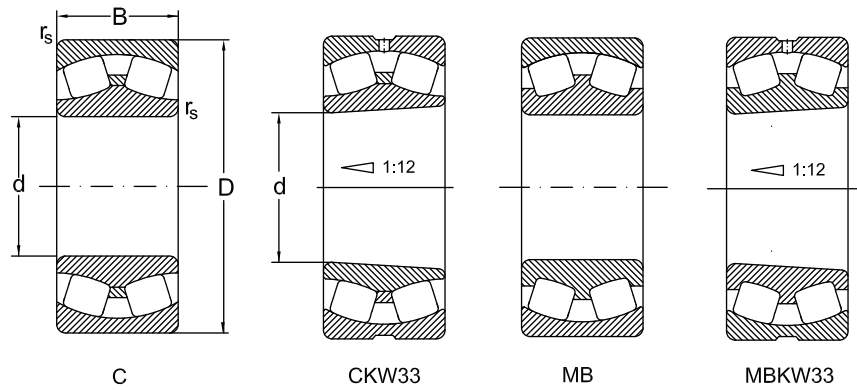


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
100	215	73	3	774	0,35	1,9	2,9	903
	215	73	3	774	0,35	1,9	2,9	903
	215	73	3	694	0,37	1,8	2,9	811
	215	73	3	694	0,37	1,8	2,9	811
	215	73	3	694	0,37	1,8	2,9	811
	215	73	3	694	0,37	1,8	2,9	811
	215	73	3	694	0,37	1,8	2,7	811
	215	73	3	694	0,37	1,8	2,7	811
110	170	45	2	266	0,24	2,8	4,2	380
	170	45	2	266	0,24	2,8	4,2	380
	170	45	2	266	0,24	2,8	4,2	380
	170	45	2	266	0,24	2,8	4,2	380
	180	56	2	409	0,3	2,3	3,4	556
	180	56	2	371	0,3	2,3	3,3	499
	180	56	2	371	0,3	2,3	3,3	499
	180	56	2	371	0,3	2,3	3,3	499
	180	56	2	371	0,3	2,3	3,3	499
	180	69	2	494	0,39	1,7	2,6	713
	180	69	2	494	0,39	1,7	2,6	713
	180	69	2	494	0,39	1,7	2,6	713
	180	69	2	494	0,39	1,7	2,6	713
	200	53	2,1	532	0,25	2,7	4	608
	200	53	2,1	532	0,25	2,7	4	608
	200	53	2,1	532	0,25	2,7	4	608
	200	53	2,1	532	0,25	2,7	4	608
	200	53	2,1	475	0,28	2,4	3,5	547
	200	53	2,1	475	0,28	2,4	3,5	547
	200	53	2,1	475	0,28	2,4	3,5	547
	200	53	2,1	475	0,28	2,4	3,5	547

Spherical Roller Bearings

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

Spherical Roller Bearings

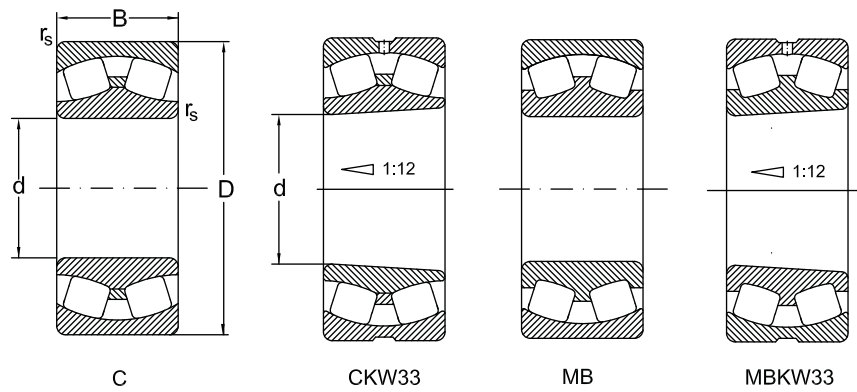


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
110	200	69,8	2,1	570	0,33	2	3	727
	200	69,8	2,1	513	0,37	1,8	2,7	656
	200	69,8	2,1	513	0,37	1,8	2,7	656
	200	69,8	2,1	513	0,37	1,8	2,7	656
	200	69,8	2,1	513	0,37	1,8	2,7	656
	200	69,8	2,1	513	0,37	1,8	2,7	656
	240	50	3	0	0,21	3,2	4,8	0
	240	50	3	0	0,21	3,2	4,8	0
	240	80	3	570	0,34	1,2	2,3	727
	240	80	3	570	0,34	1,2	2,3	727
	240	80	3	570	0,34	1,2	2,3	727
	240	80	3	570	0,34	1,2	2,3	727
	240	80	3	570	0,34	2	3	727
	240	80	3	570	0,34	2	3	727
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
	240	80	3	513	0,37	1,8	2,7	656
120	180	46	2	337	0,22	3	4,6	485
	180	46	2	337	0,22	3	4,6	485
	180	46	2	337	0,22	3	4,6	485
	180	46	2	337	0,22	3	4,6	485
	180	46	2	290	0,24	2,8	4,2	437
	180	46	2	290	0,24	2,8	4,2	437
	180	46	2	290	0,24	2,8	4,2	437
	180	46	2	335	0,24	2,8	4,2	560

Spherical Roller Bearings

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

Spherical Roller Bearings

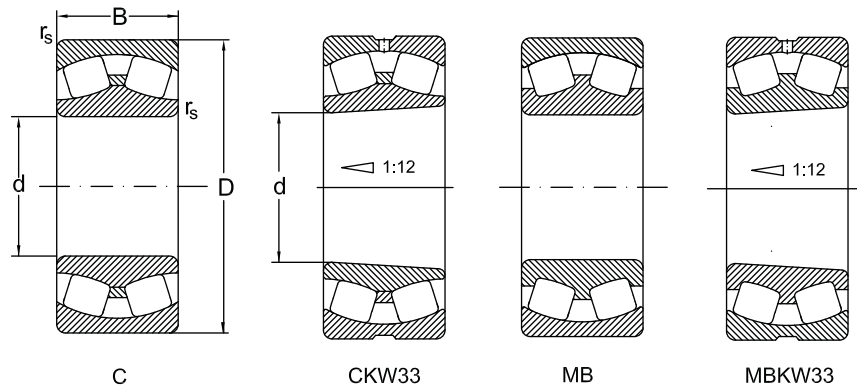


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
120	180	60	2	409	0,32	2,1	3,1	637
	180	60	2	409	0,32	2,1	3,1	637
	180	60	2	371	0,32	2,1	3,1	599
	180	60	2	371	0,32	2,1	3,1	599
	180	60	2	371	0,32	2,1	3,1	599
	200	62	2	437	0,31	2,2	3,3	603
	200	62	2	437	0,31	2,2	3,3	603
	200	62	2	437	0,31	2,2	3,3	603
	200	62	2	437	0,31	2,2	3,3	603
	200	80	2	565	0,4	1,7	2,5	811
	200	80	2	565	0,4	1,7	2,5	811
	200	80	2	565	0,4	1,7	2,5	811
	215	58	2,1	599	0,27	2,6	3,8	727
	215	58	2,1	599	0,27	2,6	3,8	727
	215	58	2,1	599	0,27	2,6	3,8	727
	215	58	2,1	599	0,27	2,6	3,8	727
	215	58	2,1	542	0,29	2,3	3,5	565
	215	58	2,1	542	0,29	2,3	3,5	565
	215	58	2,1	542	0,29	2,3	3,5	565
	215	58	2,1	542	0,29	2,3	3,5	565
	215	76	2,1	660	0,35	1,9	2,9	884
	215	76	2,1	603	0,37	1,8	2,7	798
	215	76	2,1	603	0,37	1,8	2,7	798
	215	76	2,1	603	0,37	1,8	2,7	798
	215	76	2,1	603	0,37	1,8	2,7	798
	260	86	3	917	0,35	1,9	2,9	1064
	260	86	3	917	0,35	1,9	2,9	1064
	260	86	3	917	0,35	1,9	2,9	1064
	260	86	3	917	0,35	1,9	2,9	1064

Spherical Roller Bearings

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

Spherical Roller Bearings

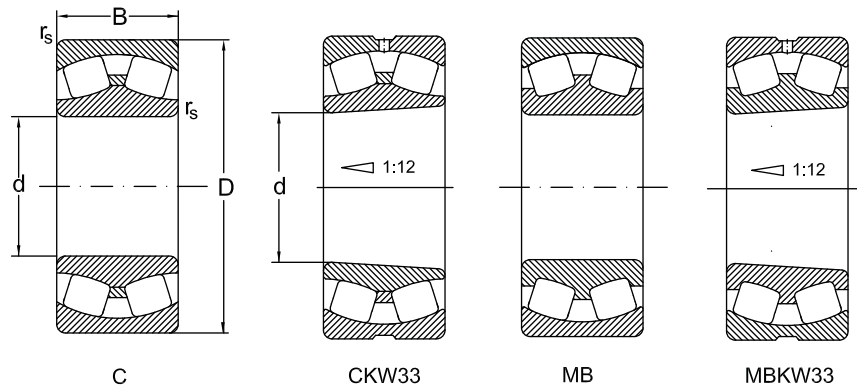


d	Dimensions			Basic radial load				
	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
120	260	86	3	827	0,36	1,8	2,7	960
	260	86	3	827	0,36	1,8	2,7	960
	260	86	3	827	0,36	1,8	2,7	960
	260	86	3	827	0,36	1,8	2,7	960
	260	86	3	827	0,36	1,8	2,7	960
130	200	52	2	409	0,23	2,9	4,4	580
	200	52	2	409	0,23	2,9	4,4	580
	200	52	2	409	0,23	2,9	4,4	580
	200	52	2	409	0,23	2,9	4,4	580
	200	52	2	371	0,23	2,9	4,4	532
	200	52	2	371	0,23	2,9	4,4	532
	200	52	2	371	0,23	2,9	4,4	532
	200	52	2	371	0,23	2,9	4,4	532
	200	69	2	371	0,34	2	3	532
	200	69	2	371	0,34	2	3	532
	200	69	2	371	0,34	2	3	532
	210	64	2	371	0,28	2,4	3,6	532
	210	64	2	532	0,3	2,3	3,3	741
	210	64	2	475	0,3	2,3	3,3	665
	210	64	2	475	0,3	2,3	3,3	665
	210	64	2	475	0,3	2,3	3,3	665
	210	80	2	475	0,37	1,8	2,7	665
	210	80	2	475	0,37	1,8	2,7	665
	210	80	2	475	0,37	1,8	2,7	665
	230	64	3	475	0,29	2,3	3,5	665
	230	64	3	698	0,29	2,3	3,5	884
	230	64	3	698	0,29	2,3	3,5	884
	230	64	3	698	0,29	2,3	3,5	884

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
120	1,8	1100	1500	22324MAKC4F80W33	23,93
	1,8	1100	1500	22324MBK	22,93
	1,8	1100	1500	22324MAC4F80W33	23,93
	1,8	1100	1500	22324MB	23,39
	1,8	1100	1500	22324MBW33	23,18
	1,8	1100	1500	22324MBKW33	22,71
130	2,8	1800	2400	23026C	4,59
	2,8	1800	2400	23026CK	5,99
	2,8	1800	2400	23026CKW33	5,94
	2,8	1800	2400	23026CW33	6,09
	2,8	1700	2200	23026MBK	5,61
	2,8	1700	2200	23026MB	5,78
	2,8	1700	2200	23026MBW33	5,73
	2,8	1700	2200	23026MBKW33	5,56
	1,9	1200	1600	24026MB	7,98
	1,9	1200	1600	24026MBW33	7,79
	1,9	1200	1600	24026MBK30W33	7,78
	2,5	1700	2200	23126C	9,70
	2,2	1500	2000	23126MBK	8,36
	2,2	1500	2000	23126MB	8,66
	2,2	1500	2000	23126MBW33	8,62
	2,2	1500	2000	23126MBKW33	8,32
	1,8	900	1200	24126MB	11,09
	1,8	900	1200	24126MBW33	11,06
	1,8	900	1200	24126MBK30W33	11,09
	2,3	1700	2200	22226C	11,14
	2,3	1700	2200	22226CW33	10,01
	2,3	1700	2200	22226CK	10,87
	2,3	1700	2200	22226CKW33	10,7

Spherical Roller Bearings

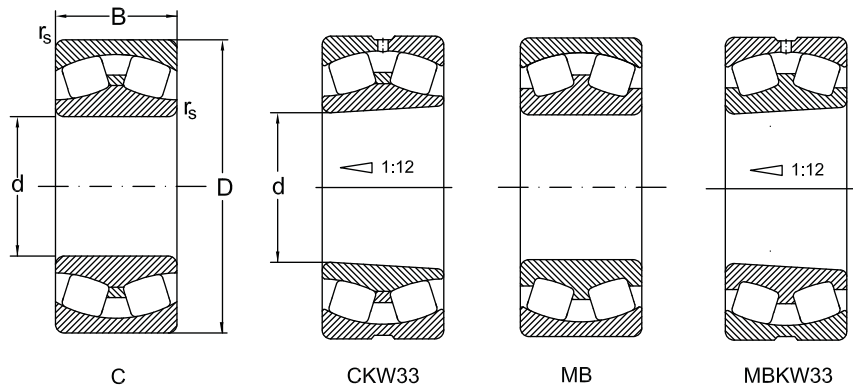


d	Dimensions			Basic radial load				
	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
130	230	64	3	698	0,29	2,3	3,5	884
	230	64	3	698	0,29	2,3	3,5	884
	230	64	3	698	0,29	2,3	3,5	884
	230	64	3	641	0,29	2,3	3,4	789
	230	64	3	641	0,29	2,3	3,4	789
	230	64	3	641	0,29	2,3	3,4	789
	230	64	3	641	0,29	2,3	3,4	789
	230	80	3	741	0,33	2	3	1007
	230	80	3	675	0,35	1,9	2,8	906
	230	80	3	675	0,35	1,9	2,8	906
	230	80	3	675	0,35	1,9	2,8	906
	230	80	3	675	0,35	1,9	2,8	906
	280	93	4	1064	0,35	1,9	2,9	1254
	280	93	4	1064	0,35	1,9	2,9	1254
	280	93	4	1064	0,35	1,9	2,9	1254
	280	93	4	1064	0,35	1,9	2,9	1254
	280	93	4	1064	0,35	1,9	2,9	1254
	280	93	4	969	0,37	1,8	2,7	1131
	280	93	4	969	0,37	1,8	2,7	1131
	280	93	4	969	0,37	1,8	2,7	1131
	280	93	4	969	0,37	1,8	2,7	1131
140	210	53	2	442	0,22	3	4,6	646
	210	53	2	442	0,22	3	4,6	646
	210	53	2	442	0,22	3	4,6	646
	210	53	2	442	0,22	3	4,6	646
	210	53	2	394	0,22	3	4,6	580
	210	53	2	394	0,22	3	4,6	580
	210	53	2	394	0,22	3	4,6	580

Spherical Roller Bearings

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

Spherical Roller Bearings

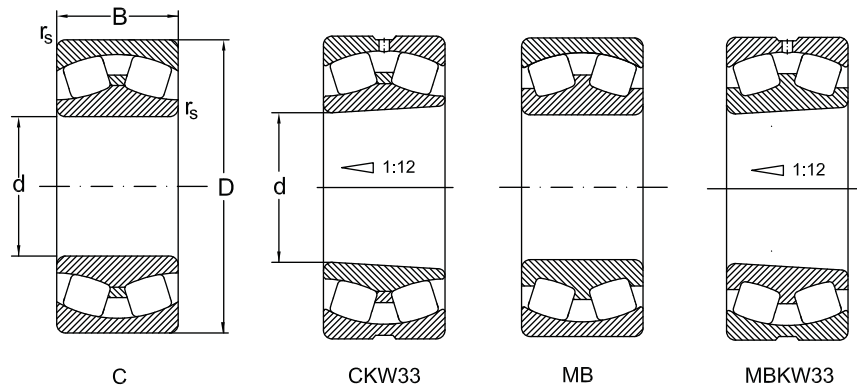


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
140	210	53	2	394	0,22	3	4,6	580
	210	69	2	485	0,32	2,1	3,1	770
	210	69	2	485	0,32	2,1	3,1	770
	225	68	2,1	599	0,28	2,4	3,6	855
	225	68	2,1	542	0,3	2,3	3,3	770
	225	68	2,1	542	0,3	2,3	3,3	770
	225	68	2,1	542	0,3	2,3	3,3	770
	225	68	2,1	542	0,3	2,3	3,3	770
	225	85	2,1	542	0,37	1,8	2,7	770
	225	85	2,1	542	0,37	1,8	2,7	770
	225	85	2,1	542	0,37	1,8	2,7	770
	250	68	3	675	0,26	2,6	3,9	855
	250	68	3	675	0,26	2,6	3,9	855
	250	68	3	675	0,26	2,6	3,9	855
	250	68	3	675	0,26	2,6	3,9	855
	250	68	3	608	0,29	2,3	3,5	770
	250	68	3	608	0,29	2,3	3,5	770
	250	68	3	608	0,29	2,3	3,5	770
	250	68	3	608	0,29	2,3	3,5	770
	250	68	3	608	0,29	2,3	3,5	770
	250	68	3	608	0,29	2,3	3,5	770
	250	88	3	869	0,33	2	3	1188
	250	88	3	784	0,37	1,8	2,7	1055
	250	88	3	784	0,37	1,8	2,7	1055
	250	88	3	784	0,37	1,8	2,7	1055
	250	88	3	784	0,37	1,8	2,7	1055
	300	102	4	1226	0,35	1,9	2,9	1482
	300	102	4	1226	0,35	1,9	2,9	1482
	300	102	4	1226	0,35	1,9	2,9	1482

Spherical Roller Bearings

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

Spherical Roller Bearings

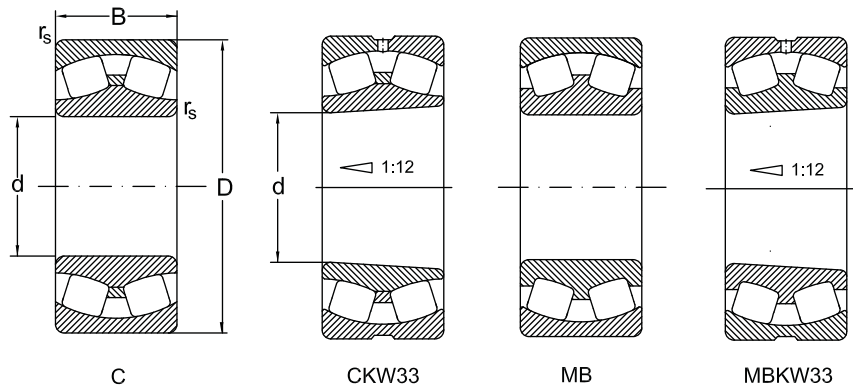


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
140	300	102	4	1226	0,35	1,19	2,9	1482
	300	102	4	1102	0,38	1,7	2,6	1330
	300	102	4	1102	0,38	1,7	2,6	1330
	300	102	4	1102	0,38	1,7	2,6	1330
	300	102	4	1102	0,38	1,7	2,6	1330
	300	102	4	1102	0,38	1,7	2,6	1330
	300	118	4	1102	0,43	1,6	2,3	1330
150	225	56	2,1	485	0,22	3	4,6	713
	225	56	2,1	485	0,22	3	4,6	713
	225	56	2,1	485	0,22	3	4,6	713
	225	56	2,1	485	0,22	3	4,6	713
	225	56	2,1	437	0,22	3	4,6	637
	225	56	2,1	437	0,22	3	4,6	637
	225	56	2,1	437	0,22	3	4,6	637
	225	56	2,1	437	0,22	3	4,6	637
	225	75	2,1	561	0,33	2,1	3,1	889
	225	75	2,1	561	0,33	2,1	3,1	889
	225	75	2,1	561	0,33	2,1	3,1	889
	225	75	2,1	561	0,33	2,1	3,1	889
	250	100	2,1	969	0,37	1,8	2,7	1454
	250	100	2,1	969	0,4	1,7	2,5	1454
	250	100	2,1	874	0,4	1,7	2,5	1330
	250	100	2,1	874	0,4	1,7	2,5	1330
	250	100	2,1	874	0,4	1,7	2,5	1330
	250	100	2,1	760	0,4	2,1	2,5	1140
	250	80	2,1	703	0,32	2,1	3,2	1026
	250	80	2,1	703	0,32	2,1	3,2	1026
	250	80	2,1	703	0,32	2,1	3,2	1026

Spherical Roller Bearings

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

Spherical Roller Bearings

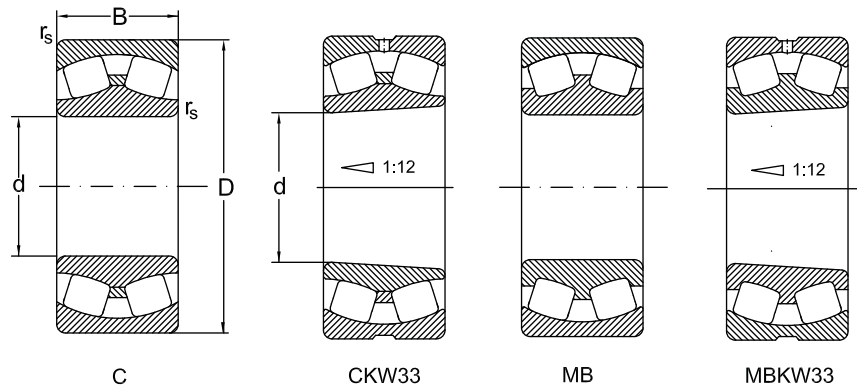


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
150	250	80	2,1	703	0,32	2,1	3,2	1026
	270	73	3	808	0,26	2,6	3,9	1026
	270	73	3	808	0,26	2,6	3,9	1026
	270	73	3	808	0,26	2,6	3,9	1026
	270	73	3	808	0,26	2,6	3,9	1026
	270	73	3	736	0,29	2,3	3,5	931
	270	73	3	736	0,29	2,3	3,5	931
	270	73	3	736	0,29	2,3	3,5	931
	270	73	3	736	0,29	2,3	3,5	931
	270	96	3	1235	0,38	1,8	2,7	1520
	270	96	3	1235	0,38	1,8	2,7	1520
	270	96	3	1235	0,38	1,8	2,7	1520
	270	96	3	1235	0,38	1,8	2,7	1520
	320	108	4	1387	0,35	1,9	2,9	1672
	320	108	4	1387	0,35	1,9	2,9	1672
	320	108	4	1387	0,35	1,9	2,9	1672
	320	108	4	1254	0,38	1,7	2,6	1511
	320	108	4	1254	0,38	1,7	2,6	1511
	320	108	4	1254	0,38	1,7	2,6	1511
	320	108	4	1254	0,38	1,7	2,6	1511
160	240	60	2,1	556	0,22	3	4,6	836
	240	60	2,1	556	0,22	3	4,6	836
	240	60	2,1	556	0,22	3	4,6	836
	240	60	2,1	556	0,22	3	4,6	836
	240	60	2,1	508	0,22	3	4,6	760

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
150	2,1	1300	1700	23130MBKW33	16,0
	2,5	1400	1800	22230C	18,81
	2,5	1400	1800	22230CK	18,43
	2,5	1400	1800	22230CKW33	18,2
	2,5	1400	1800	22230CW33	18,59
	2,3	1200	1600	22230MBK	19,3
	2,3	1200	1600	22230MB	17,79
	2,3	1200	1600	22230MBW33	18,0
	2,3	1200	1600	22230MBKW33	17,95
	1,7	1000	1300	23230MBK	24,13
	1,7	1000	1300	23230MB	24,58
	1,7	1000	1300	23230MBW33	24,39
	1,7	1000	1300	23230M6KW33	24,0
	1,8	1100	1400	22330C	44,62
	1,8	1100	1400	22330CK	43,87
	1,8	1100	1400	22330CKW33	43,47
	1,8	1100	1400	22330CW33	44,6
	1,7	1000	1300	22330KMAC4F80W33	44,3
	1,7	1000	1300	22330MBK	41,35
	1,7	1000	1300	22330MAC4F80W33	44,4
	1,7	1000	1300	22330MB	42,25
	1,7	1000	1300	22330MBW33	41,85
	1,7	1000	1300	22330MBKW33	40,95
160	2,8	1400	1900	23032C	9,97
	2,8	1400	1900	23032CK	9,71
	2,8	1400	1900	23032CKW33	9,56
	2,8	1400	1900	23032CW33	9,79
	2,8	1300	1700	23032MBK	10,45

Spherical Roller Bearings

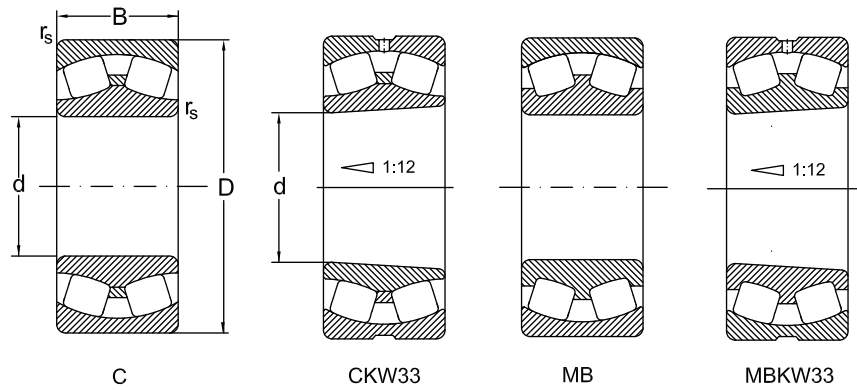


Dimensions				Basic radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
160	240	60	2,1	508	0,22	3	4,6	760
	240	60	2,1	508	0,22	3	4,6	760
	240	60	2,1	508	0,22	3	4,6	760
	240	60	2,1	641	0,32	2,1	3,1	1026
	240	80	2,1	641	0,32	2,1	3,1	1026
	240	80	2,1	641	0,32	2,1	3,1	1026
	270	109	2,1	1121	0,39	1,7	2,5	1672
	270	109	2,1	1121	0,39	1,7	2,5	1672
	270	109	2,1	1121	0,39	1,7	2,5	1672
	270	109	2,1	1121	0,39	1,7	2,5	1672
	270	109	2,1	1121	0,39	1,7	2,5	1672
	270	109	2,1	1121	0,39	1,7	2,5	1672
	270	109	2,1	1017	0,41	1,6	2,4	1511
	270	86	2,1	931	0,3	2,3	3,4	1302
	270	86	2,1	846	0,32	2,1	3,2	1178
	270	86	2,1	846	0,32	2,1	3,2	1178
	270	86	2,1	846	0,32	2,1	3,2	1178
	270	86	2,1	846	0,32	2,1	3,2	1178
	290	104	3	1045	0,38	1,8	2,7	1435
	290	104	3	1045	0,38	1,8	2,7	1435
	290	104	3	1045	0,38	1,8	2,7	1435
	290	104	3	1045	0,38	1,8	2,7	1435
	290	80	3	1159	0,26	2,6	3,9	1577
	290	80	3	950	0,26	2,6	3,9	1226
	290	80	3	950	0,26	2,6	3,9	1226
	290	80	3	950	0,26	2,6	3,9	1226
	290	80	3	855	0,29	2,3	3,4	1102
	290	80	3	855	0,29	2,3	3,4	1102

Spherical Roller Bearings

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

Spherical Roller Bearings

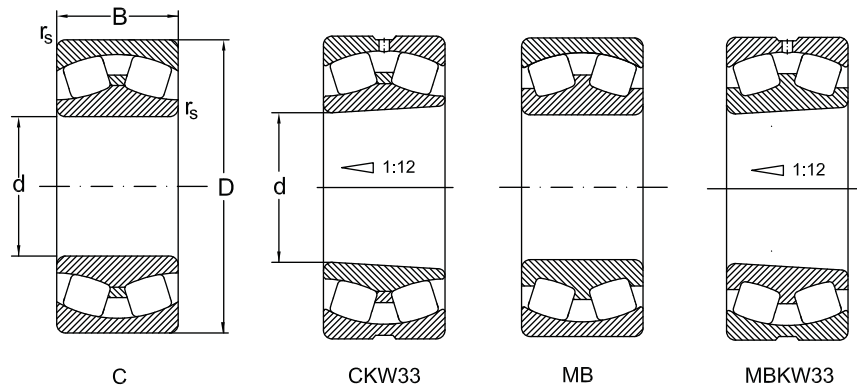


d	Dimensions			Basical radial load				
	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
160	290	80	3	855	0,29	2,3	3,4	1102
	290	80	3	855	0,29	2,3	3,4	1102
	340	114	4	1520	0,35	1,9	2,9	1862
	340	114	4	1520	0,35	1,9	2,9	1862
	340	114	4	1520	0,35	1,9	2,9	1862
	340	114	4	1520	0,35	1,9	2,9	1862
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	114	4	1368	0,37	1,8	2,7	1691
	340	136	4	0	0,44	1,5	2,3	0
170	260	67	2,1	675	0,23	2,9	4,4	1007
	260	67	2,1	675	0,23	2,9	4,4	1007
	260	67	2,1	675	0,23	2,9	4,4	1007
	260	67	2,1	675	0,23	2,9	4,4	1007
	260	67	2,1	608	0,23	2,9	4,4	912
	260	67	2,1	608	0,23	2,9	4,4	912
	260	67	2,1	608	0,23	2,9	4,4	912
	260	67	2,1	608	0,23	2,9	4,4	912
	260	90	2,1	789	0,34	2	3	1254
	260	90	2,1	789	0,34	2	3	1254
	260	90	2,1	789	0,34	2	3	1254
	260	90	2,1	789	0,34	2	3	1254
	260	90	2,1	789	0,34	2	3	1254
	280	109	2,1	1159	0,37	1,8	2,7	1767

Spherical Roller Bearings

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

Spherical Roller Bearings

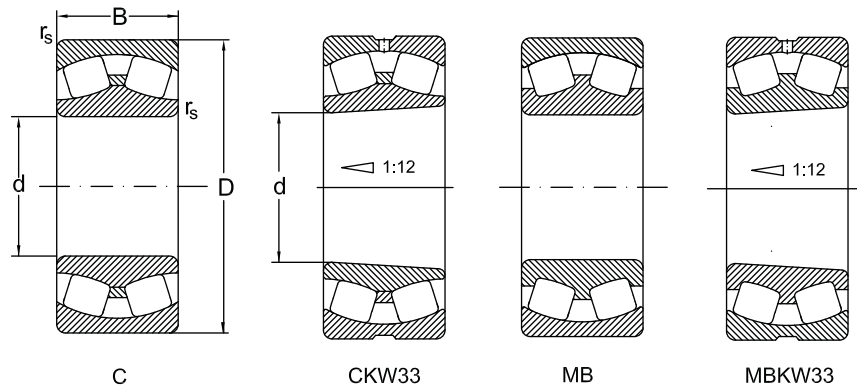


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
170	280	109	2,1	1121	0,39	1,7	2,6	1672
	280	109	2,1	1121	0,39	1,7	2,6	1672
	280	109	2,1	1121	0,39	1,7	2,6	1672
	280	109	2,1	1121	0,39	1,7	2,6	1672
	280	109	2,1	1045	0,37	1,8	2,7	1596
	280	109	2,1	1045	0,37	1,8	2,7	1596
	280	88	2,1	988	0,37	1,8	2,7	1425
	280	88	2,1	893	0,31	2,2	3,2	1283
	280	88	2,1	893	0,31	2,2	3,2	1283
	280	88	2,1	893	0,31	2,2	3,2	1283
	280	88	2,1	893	0,31	2,2	3,2	1283
	310	110	4	1330	0,35	1,9	2,9	1834
	310	110	4	1264	0,35	1,9	2,9	1710
	310	110	4	1264	0,35	1,9	2,9	1710
	310	110	4	1264	0,35	1,9	2,9	1710
	310	110	4	1264	0,35	1,9	2,9	1710
	310	110	4	1330	0,35	1,9	2,9	1834
	310	110	4	1330	0,35	1,9	2,9	1834
	310	110	4	1330	0,35	1,9	2,9	1834
	310	110	4	1197	0,36	1,9	2,8	1644
	310	110	4	1197	0,36	1,9	2,8	1644
	310	86	4	1672	0,27	2,5	3,7	2052
	310	86	4	1672	0,27	2,5	3,7	2052
	310	86	4	1672	0,27	2,5	3,7	2052
	310	86	4	1672	0,27	2,5	3,7	2052
	310	86	4	1501	0,3	2,3	3,4	1862
	310	86	4	1501	0,3	2,3	3,4	1862
	310	86	4	1501	0,3	2,3	3,4	1862

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
170	1,7	750	1000	24134CA	27,46
	1,7	750	1000	24134CAW33	27,41
	1,7	750	1000	24134CAK30	27,41
	1,7	750	1000	24134CAK30W33	27,3
	1,8	650	800	24134K30MBW33	27,94
	1,8	650	800	24134MBW33	28,4
	1,8	1300	1700	23134C	27,3
	2,1	1100	1500	23134MBK	21,4
	2,1	1100	1500	23134MB	21,46
	2,1	1100	1500	23134MBW33	21,41
	2,1	1100	1500	23134MBKW33	21,31
	1,8	900	1200	23234C	35,82
	1,8	900	1200	23234CA	37,47
	1,8	900	1200	23234CAK	36,38
	1,8	900	1200	23234CAKW33	36,41
	1,8	900	1200	23234CAW33	37,17
	1,8	900	1200	23234CK	34,75
	1,8	900	1200	23234CKW33	34,55
	1,8	900	1200	23234CW33	35,67
	1,8	850	1100	23234MBW33	37,8
	1,8	850	1100	23234MBKW33	35,68
	2,5	1200	1600	22234C	31,7
	2,5	1200	1600	22234CK	31,7
	2,5	1200	1600	22234CKW33	31,28
	2,5	1200	1600	22234CW33	31,29
	2,2	1300	1100	22234MBK	27,89
	2,2	1100	1400	22234MB	28,5
	2,2	1100	1400	22234MBW33	28,2

Spherical Roller Bearings

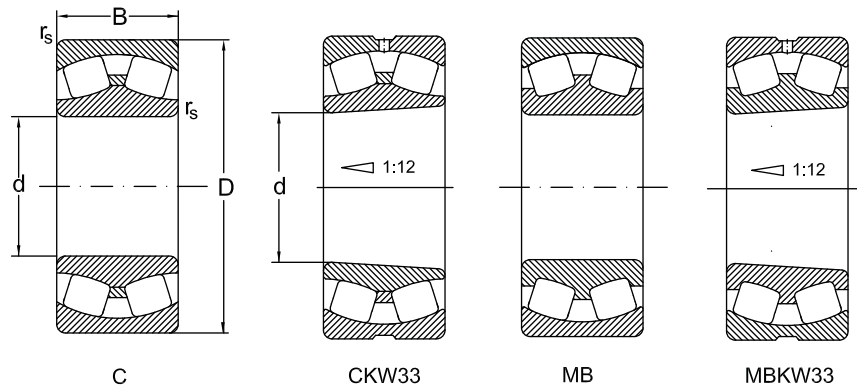


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
170	310	86	4	1501	0,3	2,3	3,4	1862
	360	120	4	1672	0,33	2	3	2052
	360	120	4	1672	0,33	2	3	2052
	360	12	4	1672	0,33	2	3	2052
	360	120	4	1672	0,33	2	3	2052
	360	120	4	1511	0,37	1,8	2,7	1853
	360	120	4	1511	0,37	1,8	2,7	1853
	360	120	4	1511	0,37	1,8	2,7	1853
	360	120	4	1511	0,37	1,8	2,7	1853
	360	120	4	1511	0,37	1,8	2,7	1853
180	250	52	2	380	0,2	3,5	5,2	751
	280	100	2,1	931	0,36	1,9	2,8	1549
	280	100	2,1	931	0,36	1,9	2,8	1549
	280	100	2,1	931	0,36	1,9	2,8	1549
	280	74	2,1	789	0,24	2,8	4,2	1188
	280	74	2,1	789	0,24	2,8	4,2	1188
	280	74	2,1	789	0,24	2,8	4,2	1188
	280	74	2,1	789	0,24	2,8	4,2	1188
	280	74	2,1	694	0,24	2,8	4,2	1093
	280	74	2,1	694	0,24	2,8	4,2	1093
	280	74	2,1	694	0,24	2,8	4,2	1093
	280	74	2,1	694	0,24	2,8	4,2	1093
	300	118	3	694	0,4	1,7	2,5	1093
	300	118	3	1330	0,4	1,7	2,5	2052
	300	118	3	1264	0,4	1,7	2,5	1986
	300	118	3	1264	0,4	1,7	2,5	1986
	300	118	3	1226	0,4	1,7	2,5	1900
	300	118	3	1226	0,4	1,7	2,5	1900

Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
170	2,2	1100	1400	22234MBKW33	27,51
	2	900	1200	22334C	65,3
	2	900	1200	22334CK	63,99
	2	900	1200	22334CKW33	63,59
	2	900	1200	22334CW33	64,88
	1,8	850	1100	22334MBK	57,53
	1,8	850	1100	22334MAC4F80W33	60,01
	1,8	850	1100	22334MB	58,83
	1,8	850	1100	22334MBW33	58,41
	1,8	850	1100	22334M6KW33	60,2
180	3,4	1300	1700	23936MBW33	7,79
	1,9	900	1200	24036MB	22,9
	1,9	900	1200	24036MBW33	22,79
	1,9	900	1200	24036MBK30W33	22,42
	2,8	1300	1700	23036C	18,76
	2,8	1300	1700	23036CK	18,36
	2,8	1300	1700	23036CKW33	18,13
	2,8	1300	1700	23036CW33	18,53
		1100	1500	23036MBK	17,5
	2,8	1100	1500	23036MB	17,26
	2,8	1100	1500	23036MBW33	17,03
	2,8	1100	1500	23036MBKW33	17,0
	1,6	700	950	24136C	33,52
	1,6	700	950	24136CAK30W33	33,0
	1,6	700	950	24136CAW33	33,0
	1,6	700	950	24136CW33	33,42
	1,6	700	950	24136CK30	33,32
	1,6	700	950	24136CK30W33	33,2

Spherical Roller Bearings

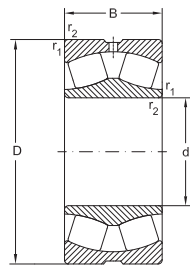


Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
180	300	118	3	1226	0,4	1,7	2,5	1900
	300	96	3	1140	0,3	2,3	3,4	1672
	300	96	3	1140	0,3	2,3	3,4	1672
	300	96	3	1140	0,3	2,3	3,4	1672
	300	96	3	1026	0,32	2,1	3,1	1520
	300	96	3	1026	0,32	2,1	3,1	1520
	300	96	3	1026	0,32	2,1	3,1	1520
	300	96	3	1026	0,32	2,1	3,1	1520
	300	118	3	1216	0,4	1,7	2,5	1881
	320	86	4	1121	0,25	2,7	4	1482
	320	112	4	1017	0,36	1,9	2,8	1330
	320	112	4	1017	0,36	1,9	2,8	1330
	320	112	4	1017	0,36	1,9	2,8	1330
	320	86	4	1121	0,26	2,6	3,9	1482
	320	86	4	1121	0,26	2,6	3,9	1482
	320	86	4	1121	0,26	2,6	3,9	1482
	320	86	4	1121	0,26	2,6	3,9	1482
	320	86	4	1017	0,29	2,3	3,5	1330
	320	86	4	1017	0,29	2,3	3,5	1330
	320	86	4	1017	0,29	2,3	3,5	1330
	320	86	4	1017	0,29	2,3	3,5	1330
	380	126	4	1017	0,37	1,8	2,7	1330
	380	126	4	1017	0,37	1,8	2,7	1330
	380	126	4	1017	0,37	1,8	2,7	1330
	380	126	4	1017	0,37	1,8	2,7	1330
	380	126	4	1017	0,37	1,8	2,7	1330
	380	126	4	1017	0,37	1,8	2,7	1330

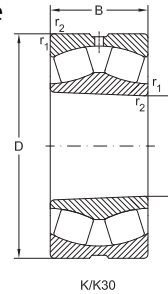
Spherical Roller Bearings

d	Y ₀	Speed limit		Designation	Weight
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
180	1,6	700	950	24136CYW33	33,0
	2,2	1200	1600	23136C	30,6
	2,2	1200	1600	23136CKW33	29,38
	2,2	1200	1600	23136CW33	30,25
	2,1	1100	1400	23136MBK	28,34
	2,1	1100	1400	23136MB	28,4
	2,1	1100	1400	23136MBW33	28,09
	2,1	1100	1400	23136MBKW33	28,0
	1,6	600	750	24136K30MBW33	33,32
	2,7	1200	1600	22236CKC3W33	32,11
	1,8	750	1000	23236MBK	38,5
	1,8	750	1000	23236MBW33	39,81
	1,8	750	1000	23236MBKW33	40,1
	2,5	1100	1500	22236C	33,13
	2,5	1100	1500	22236CK	32,58
	2,5	1100	1500	22236CKW33	32,11
	2,5	1100	1500	22236CW33	32,66
	2,3	1100	1400	22236MBK	28,99
	2,3	1100	1400	22236MB	29,69
	2,3	1100	1400	22236MBW33	29,54
	2,3	1100	1400	22236MBKW33	28,84
	1,8	850	1100	22336MBK	67,18
	1,8	850	1100	22336MAC4F80W33	71,8
	1,8	850	1100	22336MB	68,68
	1,8	850	1100	22336MBW33	71,8
	1,8	850	1100	22336MBKW33	71,8

Spherical Roller Bearings



Tapered Bore

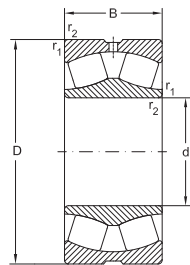


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease min^{-1}	oil min^{-1}	
mm				kN				
190	260	52	2	393	760	1100	1500	23938 M
	260	52	2	393	760	1100	1500	23938 K.MB
	290	75	2.1	822	1273	1300	1700	23038 C
	290	75	2.1	822	1273	1300	1700	23038 CK
	290	100	2.1	950	1549	850	1100	24038 MB
	290	100	2.1	950	1549	850	1100	24038 K30.MB
	320	104	3	1178	1786	1100	1400	23138 MB
	320	104	3	1178	1786	1100	1400	23138 K.MB
	320	128	3	1520	2375	670	900	24138 C
	320	128	3	1520	2375	670	900	24138 CK30
	340	92	4	1207	1615	1100	1400	22238 C
	340	92	4	1207	1615	1100	1400	22238 CK
	340	120	4	1577	2280	850	1100	23238 C
	340	120	4	1577	2280	850	1100	23238 CK
	400	132	5	1093	1454	750	1000	22238 M
	400	132	5	1093	1454	750	1000	22238 K.MB
200	280	60	2.1	475	893	1100	1400	23940 MB
	280	60	2.1	475	893	1100	1400	23940 K.MB
	310	82	2.1	950	1454	1300	1700	23040 C
	310	82	2.1	950	1454	1300	1700	23040 CK
	310	109	2.1	855	1311	850	1100	24040 MB

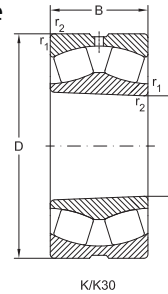
Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
190	0,18	3,7	5,5	3,6	8,46
	0,18	3,7	5,5	3,6	8,46
	0,23	3	4,4	2,9	16,08
	0,23	3	4,4	2,9	16,08
	0,34	2	3	2	24,50
	0,34	2	3	2	24,50
	0,33	2	3	2	35,60
	0,33	2	3	2	35,60
	0,41	1,7	2,5	1,6	41,90
	0,41	1,7	2,5	1,6	41,90
	0,26	2,6	3,9	2,5	37,20
	0,26	2,6	3,9	2,5	37,20
	0,35	1,9	2,9	1,8	52,40
	0,35	1,9	2,9	1,8	52,40
	0,37	1,8	2,7	1,8	81,20
	0,37	1,8	2,7	1,8	81,20
200	0,2	3,4	5,1	3,3	11,50
	0,2	3,4	5,1	3,3	11,50
	0,23	2,9	4,3	2,8	21,50
	0,23	2,9	4,3	2,8	21,50
	0,35	1,9	2,9	1,9	30,50

Spherical Roller Bearings



Tapered Bore

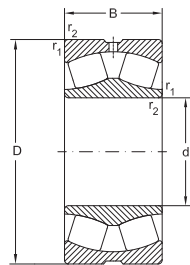


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
200	310	109	2,1	855	1311	850	1100	24040 K30.MB
	340	112	3	855	1311	1100	1400	23140 MB
	340	112	3	855	1311	1100	1400	23140 K.MB
	340	140	3	1710	2660	800	1000	24140 C
	340	140	3	1710	2660	800	1000	24140 CK30
	360	98	4	1387	1834	1100	1400	22240 C
	360	98	4	1387	1834	1100	1400	22240 CK
	360	128	4	1767	2565	750	1000	23240 C
	360	128	4	1767	2565	750	1000	23240 CK
	420	138	5	1986	2480	670	900	22340 M
	420	138	5	1986	2480	670	900	22340 K.MB
220	300	60	2,1	475	931	1100	1500	23944 MB
	300	60	2,1	475	931	1100	1500	23944 K.MB
	340	90	3	1064	1577	900	1200	23044 MB
	340	90	3	1064	1577	900	1200	23044 K.MB
	340	118	3	1064	1577	750	1000	24044 MB
	340	118	3	1064	1577	750	1000	24044 K30.MB
	340	140	4	1815	2864	700	900	24144 MB
	340	140	4	1815	2864	700	900	24144 K30.MB
	370	120	4	1539	2351	1000	1300	23144 K.MB
	370	120	4	1539	2351	1000	1300	23144 MB
	400	108	4	1672	2242	900	1200	22244 C
	400	108	4	1672	2242	900	1200	22244 CK
	400	144	4	1672	2242	670	900	23244 C

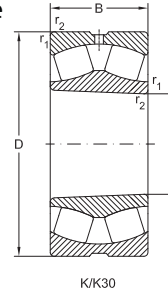
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
200	0,35	1,9	2,9	1,9	30,50
	0,35	1,9	2,9	1,9	43,50
	0,35	1,9	2,9	1,9	43,50
	0,35	2	2,9	1,9	52,50
	0,35	2	2,9	1,9	52,50
	0,29	2,3	3,9	2,3	44,40
	0,29	2,3	3,9	2,3	44,40
	0,35	1,9	2,9	1,8	58,40
	0,35	1,9	2,9	1,8	58,40
	0,36	1,8	2,8	1,8	91,80
	0,36	1,8	2,8	1,8	91,80
220	0,18	3,8	5,6	3,7	13
	0,18	3,8	5,6	3,7	13
	0,26	2,6	3,8	2,5	31
	0,26	2,6	3,8	2,5	31
	0,34	2	2,9	1,9	39,50
	0,34	2	2,9	1,9	39,50
	0,41	1,6	2,4	1,6	65,50
	0,41	1,6	2,4	1,6	65,50
	0,3	2,3	3,4	2,2	52
	0,3	2,3	3,4	2,2	52
	0,29	2,3	3,4	2,3	61,40
	0,29	2,3	3,4	2,3	61,40
	0,35	1,9	2,9	1,8	79,50

Spherical Roller Bearings



Tapered Bore

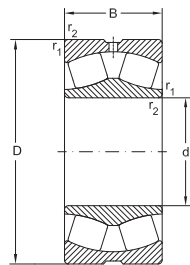


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
220	400	144	4	1672	2242	670	900	23244 CK
	460	145	5	2565	3278	700	950	22344 C
	460	145	5	2565	3278	700	950	22344 CK
240	320	60	2,1	494	1045	1000	1300	23948 K.MB
	320	60	2,1	494	1045	1000	1300	23948 MB
	360	92	3	1140	1881	800	1000	23048 K.MB
	360	92	3	1140	1881	800	1000	23048 MB
	360	118	3	1473	2518	750	1000	24048 K30.MB
	360	118	3	1473	2518	750	1000	24048 MB
	400	160	4	1473	2518	530	700	24148 MB
	400	160	4	1473	2518	530	700	24148 K30.MB
	400	128	4	1473	2518	900	1200	23148 K.MB
	400	128	4	1473	2518	900	1200	23148 MB
	440	120	4	2755	4085	850	1100	22248 C
	440	120	4	2755	4085	850	1100	22248 CK
	440	160	4	2755	4085	630	850	23248 C
	440	160	4	2755	4085	630	850	23248 CK
	500	155	5	333	3753	560	750	22348 M
	500	155	5	333	3753	560	750	22348 K.MB
260	360	75	2,1	798	1663	850	1100	23952 K.MB
	360	75	2,1	798	1663	850	1100	23952 MB
	400	104	4	1473	2366	750	950	23052 K.MB
	400	104	4	1473	2366	750	950	23052 MB

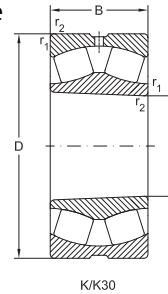
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
220	0,35	1,9	2,9	1,8	79,50
	0,36	1,8	2,8	1,8	120
	0,36	1,8	2,8	1,8	120
240	0,17	4,1	6	4	14
	0,17	4,1	6	4	14
	0,25	2,7	4,1	2,7	33,90
	0,25	2,7	4,1	2,7	33,90
	0,32	2,1	3,1	2,1	42,50
	0,32	2,1	3,1	2,1	42,50
	0,41	1,7	2,5	1,6	79,50
	0,41	1,7	2,5	1,6	79,50
	0,3	2,3	3,4	2,2	66
	0,3	2,3	3,4	2,2	66
	0,29	2,3	3,4	2,3	83,20
	0,29	2,3	3,4	2,3	83,20
	0,35	1,9	2,9	1,8	109
	0,35	1,9	2,9	1,8	109
	0,31	2,2	3,3	2,2	151
	0,31	2,2	3,3	2,2	151
260	0,19	3,5	5,3	3,5	24
	0,19	3,5	5,3	3,5	24
	0,26	2,6	3,9	2,6	49
	0,26	2,6	3,9	2,6	49

Spherical Roller Bearings



Tapered Bore

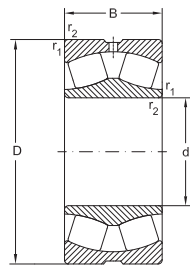


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
260	400	140	4	1900	3230	600	800	24052 K30.MB
	400	140	4	1900	3230	600	800	24052 MB
	440	180	4	2803	4513	480	630	24152 MB
	440	180	4	2803	4513	480	630	24152 K30.MB
	440	144	4	2375	3658	850	1100	23152 K.MB
	440	144	4	2375	3658	850	1100	23152 MB
	480	130	5	2470	3325	750	1000	22252 MB
	480	130	5	2470	3325	750	1000	22252 K.MB
	540	165	6	3325	4275	600	800	22352 C
	540	165	6	3325	4275	600	800	22352 CK
280	380	75	2,1	760	1615	900	1200	23956 K.MB
	380	75	2,1	760	1615	900	1200	23956 MB
	420	106	4	1596	2660	700	900	23056 K.MB
	420	106	4	1596	2660	700	900	23056 MB
	420	140	4	1995	3563	560	750	24056 K30.MB
	420	140	4	1995	3563	560	750	24056 MB
	460	146	5	2470	3990	750	1000	23156 K.MB
	460	146	5	2470	3990	750	1000	23156 MB
	460	180	5	2898	4798	400	530	24156 MB
	460	180	5	2898	4798	400	530	24156 K30.MB
	500	130	5	2518	3515	700	950	22256 MB
	500	130	5	2518	3515	700	950	22256 K.MB
	500	176	5	3040	4608	480	630	23256 MB
	500	176	5	3040	4608	480	630	23256 K.MB

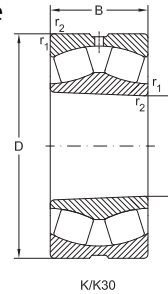
Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
260	0,35	1,9	2,9	1,9	66
	0,35	1,9	2,9	1,9	66
	0,42	1,6	2,4	1,6	110
	0,42	1,6	2,4	1,6	110
	0,31	2,2	3,3	2,2	92,50
	0,31	2,2	3,3	2,2	92,50
	0,29	2,3	3,4	2,3	107
	0,29	2,3	3,4	2,3	107
	0,36	1,8	2,8	1,8	187
	0,36	1,8	2,8	1,8	187
280	0,18	3,8	5,6	3,7	26
	0,18	3,8	5,6	3,7	26
	0,25	2,7	4,1	2,7	52,50
	0,25	2,7	4,1	2,7	52,50
	0,33	2	3	2	68,50
	0,33	2	3	2	68,50
	0,3	2,3	3,4	2,2	98,50
	0,3	2,3	3,4	2,2	98,50
	0,39	1,7	2,5	1,7	118
	0,39	1,7	2,5	1,7	118
	0,29	2,3	3,4	2,3	113
	0,29	2,3	3,4	2,3	113
	0,35	1,9	2,9	1,8	153
	0,35	1,9	2,9	1,8	153

Spherical Roller Bearings



Tapered Bore

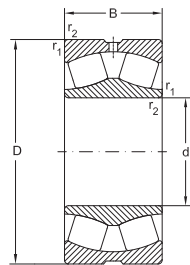


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
280	580	175	6	3800	4940	560	750	22356 C
	580	175	6	3800	4940	560	750	22356 CK
300	420	90	3	1093	2328	750	1000	23960 K.MB
	420	90	3	1093	2328	750	1000	23960 MB
	460	118	4	1976	3230	630	800	23060 K.MB
	460	118	4	1976	3230	630	800	23060 MB
	460	160	4	1976	3230	560	759	24060 K30.MB
	460	160	4	1976	3230	560	759	24060 MB
	500	160	5	2993	4798	700	950	23160 K.MB
	500	160	5	2993	4798	700	950	23160 MB
	500	200	5	3515	5938	430	560	24160 MB
	500	200	5	3515	5938	430	560	24160 K30.MB
	540	140	5	2945	3990	670	900	22260 MB
	540	140	5	2945	3990	670	900	22260 K.MB
320	440	90	3	1311	2518	670	900	23964 K.MB
	440	90	3	1311	2518	670	900	23964 MB
	480	121	4	2081	3563	600	750	23064 K.MB
	480	121	4	2081	3563	600	750	23064 MB
	480	160	4	2081	3563	530	700	24064 K30.MB
	480	160	4	2081	3563	530	700	24064 MB
	540	176	5	3515	5653	530	670	23164 MB
	540	176	5	3515	5653	530	670	23164 K.MB
	540	218	5	3990	6698	400	530	24164 MB

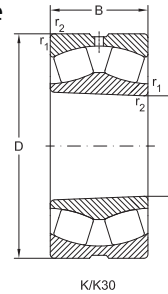
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
280	0,36	1,8	2,8	1,8	235
	0,36	1,8	2,8	1,8	235
300	0,2	3,4	5,1	3,3	40
	0,2	3,4	5,1	3,3	40
	0,25	2,7	4	2,6	73,60
	0,25	2,7	4	2,6	73,60
	0,35	2	2,9	1,9	97
	0,35	2	2,9	1,9	97
	0,3	2,3	3,4	2,2	129
	0,3	2,3	3,4	2,2	129
	0,4	1,7	2,5	1,6	159
	0,4	1,7	2,5	1,6	159
	0,29	2,3	3,4	2,3	142
	0,29	2,3	3,4	2,3	142
320	0,19	3,6	5,4	3,5	42
	0,19	3,6	5,4	3,5	42
	0,25	2,7	4,1	2,7	79,50
	0,25	2,7	4,1	2,7	79,50
	0,33	2,1	3,1	2	106
	0,33	2,1	3,1	2	106
	0,34	2	3	1,9	165
	0,34	2	3	1,9	165
	0,41	1,7	2,5	1,6	215

Spherical Roller Bearings



Tapered Bore

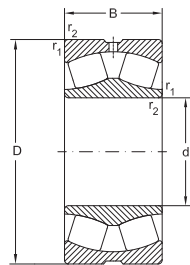


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
320	540	218	5	3990	6698	400	530	24164 K30.MB
	580	150	5	3373	4608	630	580	22264 MB
	580	150	5	3373	4608	630	580	22264 K.MB
	580	208	5	4133	6318	430	560	23264 MB
	580	208	5	4133	6318	430	560	23264 K.MB
340	440	90	3	1330	2613	630	850	23968 K.MB
	440	90	3	1330	2613	630	850	23698 MB
	520	133	5	2518	4275	560	700	23068 K.MB
	520	133	5	2518	4275	560	700	23068 MB
	520	180	5	3230	5843	480	600	24068 K30.MB
	520	180	5	3230	5843	480	600	24068 MB
	580	190	5	3990	6413	630	850	23168 K.MB
	580	190	5	3990	6413	630	850	23168 MB
	580	243	5	4988	8170	450	560	24168 MB
	580	243	5	4988	8170	450	560	24168 K30.MB
360	480	90	3	1283	2565	560	700	23972 K.MB
	480	90	3	1283	2565	560	700	23972 MB
	540	134	5	2565	4513	530	670	23072 K.MB
	540	134	5	2565	4513	530	670	23072 MB
	540	180	5	3325	6175	480	630	24072 K30.MB
	540	180	5	3325	6175	480	630	24072 MB
	600	192	5	4038	6555	600	800	23172 K.MB
	600	192	5	4038	6555	600	800	23172 MB

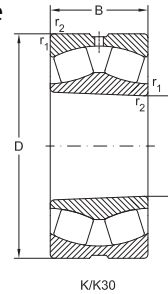
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
320	0,41	1,7	2,5	1,6	215
	0,29	2,5	3,7	2,5	180
	0,29	2,5	3,7	2,5	180
	0,35	1,9	2,9	1,8	247
	0,35	1,9	2,9	1,8	247
340	0,189	3,8	5,7	3,8	45
	0,189	3,8	5,7	3,8	45
	0,25	2,7	4	2,6	105
	0,25	2,7	4	2,6	105
	0,34	2	2,9	1,9	143
	0,34	2	2,9	1,9	143
	0,31	2,2	3,2	2,2	212
	0,31	2,2	3,2	2,2	212
	0,43	1,6	2,3	1,5	266
	0,43	1,6	2,3	1,5	266
360	0,17	4,1	6	4	47
	0,17	4,1	6	4	47
	0,25	2,7	4,1	2,7	111
	0,25	2,7	4,1	2,7	111
	0,33	2,1	3,1	2	145
	0,33	2,1	3,1	2	145
	0,33	2,3	3,4	2,2	220
	0,33	2,3	3,4	2,2	220

Spherical Roller Bearings



Tapered Bore

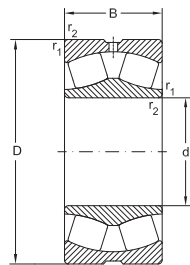


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
360	600	243	5	5273	8788	430	530	24172 MB
	600	243	5	5273	8788	430	530	24172 K30.MB
	650	232	6	3990	5795	430	560	23272 MB
	650	232	6	3990	5795	430	560	23272 K.MB
380	520	106	4	1805	3563	630	850	23976 K.MB
	520	106	4	1805	3563	630	850	23976 MB
	560	135	5	2708	4703	500	630	23076 K.MB
	560	135	5	2708	4703	500	630	23076 MB
	560	180	5	3373	6413	450	600	24076 K30.MB
	560	180	5	3373	6413	450	600	24076 MB
	620	194	5	4085	6650	560	750	23176 K.MB
	620	194	5	4085	6650	560	750	23176 MB
	620	243	5	5368	9263	400	500	24176 MB
	620	243	5	5368	9263	400	500	24176 K30.MB
	680	240	6	5415	8598	400	530	23276 MB
	680	240	6	5415	8598	400	530	23276 K.MB
400	540	106	4	1853	3658	600	800	23980 MB
	540	106	4	1853	3658	600	800	23980 K.MB
	600	148	5	3040	5368	450	560	23080 K.MB
	600	148	5	3040	5368	450	560	23080 MB
	600	200	5	4038	7553	430	460	24080 MB
	600	200	5	4038	7553	430	460	24080 K30.MB
	650	200	6	4323	7173	530	700	23180 K.MB

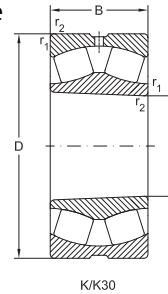
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
360	0,41	1,6	2,4	1,6	278
	0,41	1,6	2,4	1,6	278
	0,35	1,9	2,9	1,8	344
	0,35	1,9	2,9	1,8	344
380	0,19	3,6	5,3	3,5	70
	0,19	3,6	5,3	3,5	70
	0,25	2,8	4,2	2,8	117
	0,25	2,8	4,2	2,8	117
	0,31	2,2	3,2	2,1	152
	0,31	2,2	3,2	2,1	152
	0,3	2,3	3,4	2,2	240
	0,3	2,3	3,4	2,2	240
	0,39	1,7	2,5	1,7	290
	0,39	1,7	2,5	1,7	290
	0,35	1,9	2,9	1,8	375
	0,35	1,9	2,9	1,8	375
400	0,18	3,7	5,5	3,6	72
	0,18	3,7	5,5	3,6	72
	0,24	2,8	4,1	2,7	152
	0,24	2,8	4,1	2,7	152
	0,33	2,1	3,1	2	205
	0,33	2,1	3,1	2	205
	0,28	2,4	3,6	2,5	265

Spherical Roller Bearings



Tapered Bore

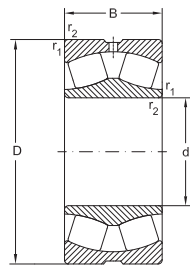


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
400	650	200	6	4323	7173	530	700	23180 MB
	650	250	6	5795	9975	380	480	24180 MB
	650	250	6	5795	9975	380	480	24180 K30.MB
	720	256	6	6175	9833	380	500	23280 MB
	720	256	6	6175	9833	380	500	23280 K.MB
420	560	106	4	1900	3895	600	800	23984 K.MB
	560	106	4	1900	3895	600	800	23984 MB
	620	150	5	3135	5605	450	560	23084 K.MB
	620	150	5	3135	5605	450	560	23084 MB
	620	200	5	4085	7790	380	480	24084 K30.MB
	620	200	5	4085	7790	380	480	24084 MB
	700	224	6	5320	8835	500	670	23184 C
	700	224	6	5320	8835	500	670	23184 CK
	700	224	6	6983	11875	400	500	24184 MB
	700	224	6	6983	11875	400	500	24184 K30.MB
	760	272	7,5	6888	10925	360	480	23284 MB
	760	272	7,5	6888	10925	360	480	23284 K.MB
440	600	118	4	2233	4560	560	750	23988 K.MB
	600	118	4	2233	4560	560	750	23988 MB
	650	157	6	3373	6128	430	530	23088 K.MB
	650	157	6	3373	6128	430	530	23088 MB
	650	212	6	4465	8598	360	450	24088 K30.MB
	650	212	6	4465	8598	360	450	24088 MB

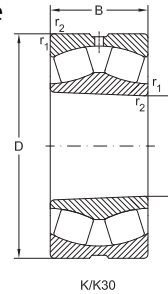
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	F _a /F _r ≤e Y ₁	F _a /F _r >e Y ₂	Y ₀	
mm					[kg]
400	0,28	2,4	3,6	2,5	265
	0,39	1,7	2,6	1,7	326
	0,39	1,7	2,6	1,7	326
	0,35	1,9	2,9	1,8	450
	0,35	1,9	2,9	1,8	450
420	0,18	3,8	5,7	3,8	75
	0,18	3,8	5,7	3,8	75
	0,24	2,8	4,2	2,8	160
	0,24	2,8	4,2	2,8	160
	0,32	2,1	3,2	2,1	214
	0,32	2,1	3,2	2,1	214
	0,33	2	3	2	363
	0,33	2	3	2	363
	0,33	2	3	2	443
	0,33	2	3	2	443
	0,35	1,9	2,9	1,8	540
	0,35	1,9	2,9	1,8	540
440	0,18	3,7	5,5	3,6	102
	0,18	3,7	5,5	3,6	102
	0,24	2,8	4,2	2,8	184
	0,24	2,8	4,2	2,8	184
	0,32	2,1	3,2	2,1	249
	0,32	2,1	3,2	2,1	249

Spherical Roller Bearings



Tapered Bore

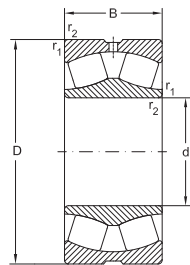


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
440	720	226	6	5605	9405	500	670	23188 C
	720	226	6	5605	9405	500	670	23188 CK
	720	280	6	7030	12350	340	430	24188 MB
	720	280	6	7030	12350	340	430	24188 K30.MB
	790	280	7,5	7315	11495	360	480	23288 MB
	790	280	7,5	7315	11495	360	480	23288 K.MB
460	620	118	4	2280	4655	530	700	23992 K.MB
	620	118	4	2280	4655	530	700	23992 MB
	680	163	6	3610	6508	400	500	23092 K.MB
	680	163	6	3610	6508	400	500	23092 MB
	680	218	6	4845	9405	380	500	24092 K30.MB
	680	218	6	4845	9405	380	500	24092 MB
	760	240	7,5	6080	10260	480	630	23192 C
	760	240	7,5	6080	10260	480	630	23192 CK
	760	300	7,5	7790	13680	320	400	24192 MB
	760	300	7,5	7790	13680	320	400	24192 K30.MB
	830	296	7,5	7980	12825	340	450	23292 MB
	830	296	7,5	7980	12825	340	450	23292 K.MB
480	560	128	5	2660	5225	450	600	23996 K.MB
	560	128	5	2660	5225	450	600	23996 MB
	700	165	6	3610	6270	380	480	23096 K.MB
	700	165	6	3610	6270	380	480	23096 MB
	700	218	6	4940	9690	340	430	24096 K30.MB

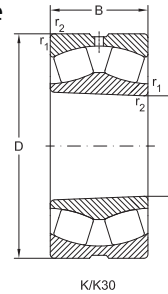
Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
440	0,3	2,3	3,4	2,2	360
	0,3	2,3	3,4	2,2	360
	0,38	1,8	2,6	1,7	454
	0,38	1,8	2,6	1,7	454
	0,35	1,9	2,9	1,8	595
	0,35	1,9	2,9	1,8	595
460	0,18	3,8	5,7	3,8	105
	0,18	3,8	5,7	3,8	105
	0,24	2,8	4,2	2,8	210
	0,24	2,8	4,2	2,8	210
	0,31	2,2	3,2	2,1	280
	0,31	2,2	3,2	2,1	280
	0,3	2,3	3,4	2,2	441
	0,3	2,3	3,4	2,2	441
	0,39	1,7	2,6	1,7	578
	0,39	1,7	2,6	1,7	578
	0,35	1,9	2,9	1,9	695
	0,35	1,9	2,9	1,9	695
480	0,18	3,8	5,6	3,7	128
	0,18	3,8	5,6	3,7	128
	0,23	2,9	4,3	2,8	220
	0,23	2,9	4,3	2,8	220
	0,3	2,3	3,3	2,2	288

Spherical Roller Bearings



Tapered Bore

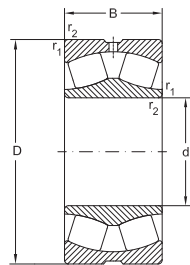


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
480	700	218	6	4940	9690	340	430	24096 MB
	790	248	7,5	6603	11400	450	600	23196 C
	790	248	7,5	6603	11400	450	600	23196 CK
	790	308	7,5	8455	14630	320	400	24196 MB
	790	308	7,5	8455	14630	320	400	24196 K30.MB
	870	310	7,5	8740	14155	340	430	23296 MB
	870	310	7,5	8740	14155	340	430	23296 K.MB
500	670	128	5	2660	5605	480	630	239/500 K.MB
	670	128	5	2660	5605	480	630	239/500 MB
	720	167	6	3800	7315	380	480	230/500 K.MB
	720	167	6	3800	7315	380	480	230/500 MB
	720	218	6	5130	10355	320	400	240/500 K30.MB
	720	218	6	5130	10355	320	400	240/500 MB
	830	264	7,5	7173	12065	430	560	231/500 K.MB
	830	264	7,5	7173	12065	430	560	231/500 MB
	830	325	7,5	9215	15960	300	380	241/500 MB
	830	325	7,5	9215	15960	300	380	241/500 K30.MB
	920	336	7,5	9880	16150	320	400	232/500 MB
	920	336	7,5	9880	16150	320	400	232/500 K.MB
530	710	136	5	2850	6175	450	600	239/530 MB
	710	136	5	2850	6175	450	600	239/530 K.MB
	780	185	6	4750	8740	340	430	230/530 MB
	780	185	6	4750	8740	340	430	230/530 K.MB

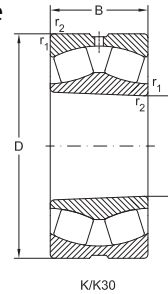
Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
480	0,3	2,3	3,3	2,2	288
	0,3	2,3	3,4	2,2	485
	0,3	2,3	3,4	2,2	485
	0,39	1,8	2,6	1,7	639
	0,39	1,8	2,6	1,7	639
	0,37	1,8	2,7	1,8	835
	0,37	1,8	2,7	1,8	835
500	0,17	3,9	5,8	3,8	130
	0,17	3,9	5,8	3,8	130
	0,22	3	4,5	2,9	229
	0,22	3	4,5	2,9	229
	0,29	2,3	3,5	2,3	297
	0,29	2,3	3,5	2,3	297
	0,3	2,3	3,4	2,2	580
	0,3	2,3	3,4	2,2	580
	0,39	1,7	2,6	1,7	753
	0,39	1,7	2,6	1,7	753
	0,38	1,8	2,7	1,7	1010
	0,38	1,8	2,7	1,7	1010
530	0,18	3,8	5,7	3,8	150
	0,18	3,8	5,7	3,8	150
	0,22	3	4,5	3	310
	0,22	3	4,5	3	310

Spherical Roller Bearings



Tapered Bore

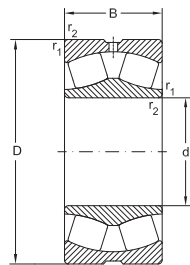


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
530	780	250	6	6365	12540	340	450	240/530 MB
	780	250	6	6365	12540	340	450	240/530 K30.MB
	870	335	7,5	10070	18050	280	360	241/530 MB
	870	335	7,5	10070	18050	280	360	241/530 K30.MB
	870	272	7,5	7743	13300	400	530	231/530 K.MB
	870	272	7,5	7743	13300	400	530	231/530 MB
560	750	140	5	3278	6840	340	430	239/560 K.MB
	750	140	5	3278	6840	340	430	239/560 MB
	820	195	6	5320	9690	320	400	230/560 K.MB
	820	195	6	5320	9690	320	400	230/560 MB
	820	258	6	6983	13870	280	360	240/560 K30.MB
	820	258	6	6983	13870	280	360	240/560 MB
	920	280	7,5	8693	15200	380	500	231/560 K.MB
	920	280	7,5	8693	15200	380	500	231/560 MB
	920	355	7,5	11400	20520	260	340	241/560 MB
	920	355	7,5	11400	20520	260	340	241/560 K30.MB
600	800	150	5	3705	7885	320	400	239/600 K.MB
	800	150	5	3705	7885	320	400	239/600 MB
	870	200	6	5700	10830	300	380	230/600 K.MB
	870	200	6	5700	10830	300	380	230/600 MB
	870	272	6	7743	16150	260	340	240/600 K30.MB
	870	272	6	7743	16150	260	340	240/600 MB
	980	300	7,5	9690	17100	280	360	231/600 MB

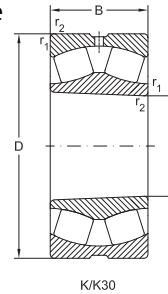
Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
530	0,31	2,2	3,2	2,1	410
	0,31	2,2	3,2	2,1	410
	0,38	1,8	2,6	1,7	838
	0,38	1,8	2,6	1,7	838
	0,3	2,3	3,4	2,2	645
	0,3	2,3	3,4	2,2	645
560	0,17	4	5,9	3,9	183
	0,17	4	5,9	3,9	183
	0,23	2,9	4,4	2,9	358
	0,23	2,9	4,4	2,9	358
	0,31	2,2	3,3	2,2	469
	0,31	2,2	3,3	2,2	469
	0,3	2,3	3,4	2,2	740
	0,3	2,3	3,4	2,2	740
	0,38	1,8	2,6	1,7	979
	0,38	1,8	2,6	1,7	979
600	0,17	4	5,9	3,9	221
	0,17	4	5,9	3,9	221
	0,22	3,1	4,6	3	406
	0,22	3,1	4,6	3	406
	0,31	2,2	3,3	2,2	550
	0,31	2,2	3,3	2,2	550
	0,31	1,8	2,7	2,2	933

Spherical Roller Bearings



Tapered Bore

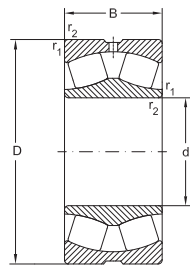


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min ⁻¹	min ⁻¹	
600	980	300	7,5	9690	17100	280	360	231/600 K.MB
	980	375	7,5	10925	22420	240	320	241/600 MB
	980	375	7,5	10925	22420	240	320	241/600 K30.MB
630	850	165	6	4418	9310	380	500	239/630 K.MB
	850	165	6	4418	9310	380	500	239/630 MB
	920	212	7,5	6365	11875	260	340	230/630 K.MB
	920	212	7,5	6365	11875	260	340	230/630 MB
	920	290	7,5	8360	17100	260	340	240/630 K30.MB
	920	290	7,5	8360	17100	260	340	240/630 MB
	1030	400	7,5	12065	25650	240	320	241/630 MB
	1030	400	7,5	12065	25650	240	320	241/630 K30.MB
670	900	170	6	4750	10260	280	360	239/670 K.MB
	900	170	6	4750	10260	280	360	239/670 MB
	980	230	7,5	7268	13870	260	340	230/670 K.MB
	980	230	7,5	7268	13870	260	340	230/670 MB
	980	308	7,5	9500	19380	240	320	240/670 K30.MB
	980	308	7,5	9500	19380	240	320	240/670 MB
	1090	412	7,5	13110	27550	220	300	241/670 MB
	1090	412	7,5	13110	27550	220	300	241/670 K30.MB
710	950	180	6	5320	11400	260	340	239/710 K.MB
	950	180	6	5320	11400	260	340	239/710 MB
	1030	236	7,5	7885	15485	260	340	230/710 K.MB
	1030	236	7,5	7885	15485	260	340	230/710 MB

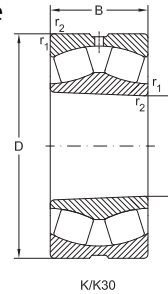
Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
600	0,31	1,8	2,7	2,2	933
	0,38	1,8	2,7	1,8	1180
	0,38	1,8	2,7	1,8	1180
630	0,18	3,8	5,7	3,7	280
	0,18	3,8	5,7	3,7	280
	0,31	2,2	3,3	2,2	661
	0,31	2,2	3,3	2,2	661
	0,31	2,2	3,3	2,2	661
	0,31	2,2	3,3	2,2	661
	0,38	1,8	2,7	1,7	1410
	0,38	1,8	2,7	1,7	1410
670	0,17	4	5,9	3,9	326
	0,17	4	5,9	3,9	326
	0,22	3	4,5	2,9	602
	0,22	3	4,5	2,9	602
	0,31	2,2	3,3	2,2	802
	0,31	2,2	3,3	2,2	802
	0,37	1,8	2,7	1,8	1610
	0,37	1,8	2,7	1,8	1610
710	0,18	3,8	5,7	3,8	386
	0,18	3,8	5,7	3,8	386
	0,22	3,1	4,6	3	670
	0,22	3,1	4,6	3	670

Spherical Roller Bearings



Tapered Bore

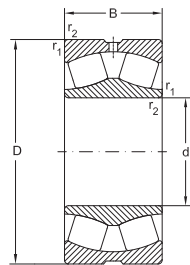


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}	min^{-1}	
710	1030	315	7,5	10070	21660	220	300	240/710 K30.MB
	1030	315	7,5	10070	21660	220	300	240/710 MB
	1150	438	9,5	14440	30875	200	280	241/710 MB
	1150	438	9,5	14440	30875	200	280	241/710 K30.MB
750	1000	185	6	5700	12540	260	340	239/750 K.MB
	1000	185	6	5700	12540	260	340	239/750 MB
	1090	250	7,5	9168	17670	240	320	230/750 K.MB
	1090	250	7,5	9168	17670	240	320	230/750 MB
	1090	335	7,5	11210	23750	220	300	240/750 K30.MB
	1090	335	7,5	11210	23750	220	300	240/750 MB
800	1060	195	6	6080	13585	240	320	239/800 K.MB
	1060	195	6	6080	13585	240	320	239/800 MB
	1150	258	7,5	6080	13585	220	300	230/800 K.MB
	1150	258	7,5	6080	13585	220	300	230/800 MB
	1150	345	7,5	12255	27075	190	260	240/800 K30.MB
	1150	345	7,5	12255	27075	190	260	240/800 MB
900	1180	200	6	7125	16150	280	360	239/900 K.MB
	1180	200	6	16150	969	280	360	239/900 MB
	1280	280	7,5	9595	22040	200	280	230/900 MBKMB
	1280	280	7,5	9595	22040	200	280	230/900 MBKMB
	1280	375	7,5	12920	32775	170	220	240/900 MB
	1280	375	7,5	12920	32775	170	220	240/900 K30.MB

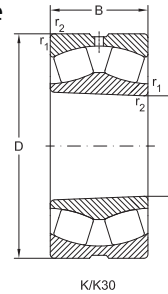
Spherical Roller Bearings

Bearing dimensions					Weight
d	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
710	0,3	2,3	3,4	2,2	889
	0,3	2,3	3,4	2,2	889
	0,38	1,8	2,7	1,8	1910
	0,38	1,8	2,7	1,8	1910
750	0,17	4	5,9	3,9	437
	0,17	4	5,9	3,9	437
	0,22	3	4,5	2,9	806
	0,22	3	4,5	2,9	806
	0,29	2,3	3,5	2,3	1065
	0,29	2,3	3,5	2,3	1065
800	0,17	4,1	6	4	506
	0,17	4,1	6	4	506
	0,22	3,1	4,6	3	906
	0,22	3,1	4,6	3	906
	0,29	2,3	3,5	2,3	1200
	0,29	2,3	3,5	2,3	1200
900	0,16	4,3	6,4	4,2	605
	016	4,3	6,4	4,2	605
	0,22	3,1	4,7	3,1	1210
	0,22	3,1	4,7	3,1	1210
	0,28	2,4	3,6	2,4	1600
	0,28	2,4	3,6	2,4	1600

Spherical Roller Bearings



Tapered Bore

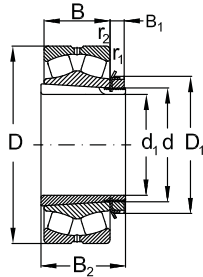


Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min ⁻¹	min ⁻¹	
950	1250	224	7,5	7600	18620	190	260	239/950 MB
	1250	224	7,5	7600	18620	190	260	239/950K.MB
	1360	412	7,5	14060	37050	160	200	240/950 MB
	1360	412	7,5	14060	37050	160	200	240/950 K30.MB
1000	1320	236	7,5	8075	19950	180	240	239/1000 MB
	1320	236	7,5	8075	19950	180	240	239/1000 K.MB
	1420	412	7,5	14630	38475	150	190	240/1000 MB
	1420	412	7,5	14630	38475	150	190	240/1000 K30.MB
1060	1400	250	7,5	9073	24700	170	220	239/1060 MB
	1400	250	7,5	9073	24700	170	220	239/1060 K.MB
	1500	438	9,5	16435	43225	140	180	240/1060 MB
	1500	438	9,5	16435	43225	140	180	240/1060 K30.MB
1120	1460	250	7,5	11875	28500	160	200	239/1120 MB
	1460	250	7,5	11875	28500	160	200	239/1120 K.MB
	1580	462	9,5	17765	47500	140	180	240/1120 MB
	1580	462	9,5	17765	47500	140	180	240/1120 K.30 MB
1180	1540	272	7,5	10545	29450	150	190	239/1180 MB
	1540	272	7,5	10545	29450	150	190	239/1180 K.MB

Spherical Roller Bearings

d	e	Bearing dimensions			Weight
		$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	
mm					[kg]
950	0,16	4,2	6,3	4,1	776
	0,16	4,2	6,3	4,1	776
	0,29	2,3	3,5	2,3	2010
	0,29	2,3	3,5	2,3	2010
1000	0,16	4,2	6,3	4,1	921
	0,16	4,2	6,3	4,1	921
	0,28	2,4	3,6	2,3	2150
	0,28	2,4	3,6	2,3	2150
1060	0,17	4,1	6	4	1110
	0,17	4,1	6	4	1110
	0,27	2,5	3,7	2,4	2530
	0,27	2,5	3,7	2,4	2530
1120	0,16	4,3	6,4	4,2	1150
	0,16	4,3	6,4	4,2	1150
	0,28	2,4	3,6	2,4	2910
	0,28	2,4	3,6	2,4	2910
1180	0,17	4,1	6	4	1410
	0,17	4,1	6	4	1410

Spherical Roller Bearings with Adapter Sleeve

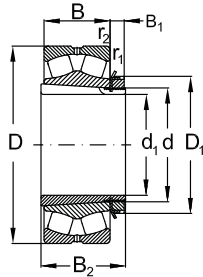


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease min^{-1}	oil min^{-1}
	mm							kN		min^{-1}	min^{-1}
20	25	52	18	1		22205 CK	H 305	43	46	7500	10000
25	30	62	20	1		22206 CK	H 306	59	62	6300	8500
30	35	72	23	1,1		22207 CK	H 307	81	88	5300	7000
	35	80	21	1,5		22307 CK	H 307	71	73,5	5300	6700
35	40	80	23	1,1		22208 CK	H 308	88	98	4800	6300
	40	90	23	1,5		21308 CK	H 308	99	120	4500	6000
	40	90	33	1,5		22308 CK	H 2308	140	145	4300	5600
40	45	85	23	1,1		22209 CK	H 309	93	105	4500	6000
	45	100	25	1,5		21309 CK	H 309	120	135	4000	5300
	45	100	36	1,5		22309 CK	H 2309	165	190	3800	5000
45	50	90	23	1,1		22210 CK	H 310	100	120	4000	5300
	50	110	27	2		21310 CK	H 310	120	130	3600	4800
	50	110	40	2		22310 CK	H 2310	190	220	3400	4500
50	55	100	25	1,5		22211 CK	H 311	120	140	3800	5000
	55	120	29	2		21311 CK	H 311	135	155	3200	4300
	55	120	43	2		22311 CK	H 2311	230	265	3000	4000
55	60	110	28	1,5		22212 CK	H 312	145	175	3400	4500
	60	130	31	2,1		21312 CK	H 312	150	180	3000	4000

Spherical Roller Bearings with Adapter Sleeve

Shaft	Dimensions				Calculation factor			Weight	
	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]	
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

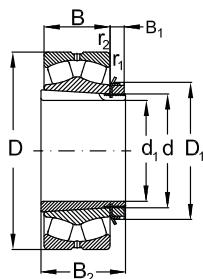


Shaft		Dimensions				Designation		Basical radial load		Speed limit	
Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve		dyn. C_r	stat. C_{0r}	grease	oil
mm								kN		min ⁻¹	min ⁻¹
55	60	130	46	2,1	22312 CK	H 2312		270	320	2800	3800
60	65	120	31	1,5	22213 CK	H 313		180	220	3000	4000
	65	140	33	2,1	21313 CK	H 313		196	228	2800	3800
	65	140	48	2,1	22313 CK	H 2313		305	360	2800	3600
	70	125	31	1,5	22214 CK	H 314		180	225	2800	3800
	70	150	35	2,1	21314 CK	H 314		250	310	2600	3400
	70	150	51	2,1	22314 CK	H 2314		325	375	2400	3200
65	75	130	31	1,5	22215 CK	H 315		190	250	2800	3800
	75	160	37	2,1	21315 CK	H 315		280	360	2400	3200
	75	160	55	2,1	22315 CK	H 2315		375	440	2200	3000
70	80	140	33	2	22216 CK	H 316		210	275	2600	3400
	80	170	39	2,1	21316 CK	H 316		275	340	2200	3000
	80	170	58	2,1	22316 CK	H 2316		410	500	1800	2400
75	85	150	36	2	22217 CK	H 317		250	325	2400	3200
	85	180	41	3	21317 CK	H 317		350	450	2200	2800
	85	180	60	3	22317 CK	H 2317		500	620	1800	2400
80	90	160	40	2	22218 CK	H 318		305	410	2200	3000
	90	160	52	2	23218 CK	H 2318		340	485	1500	2000
	90	190	43	3	21318 CK	H 318		335	415	2200	2800

Spherical Roller Bearings with Adapter Sleeve

Shaft		Dimensions			Calculation factor			Weight	
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

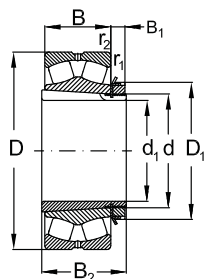


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
80	90	190	64	3		22318 CK	H 2318	510	620	1800	2400
85	95	170	43	2,1		22219 CK	H 319	340	450	2200	2800
	95	200	45	3		21319 CK	H 319	360	450	2000	2600
	95	200	67	3		22319 CK	H 2319	580	700	1700	2200
90	100	165	52	2		23120 K.MB	H 3120	355	540	2000	3000
	100	180	46	2,1		22220 CK	H 320	375	500	2200	2800
	100	180	60,3	2,1		23220 CK	H 2320	495	720	1700	2200
	100	215	73	3		22320 CK	H 2320	730	960	1500	2000
100	110	170	45	2		23022 CK	H 322	335	510	2200	3000
	110	180	56	2		23122 K.MB	H 3122	410	640	1800	2400
	110	200	53	2,1		22222 CK	H 322	455	585	2000	2800
	110	200	69,8	2,1		23222 CK	H 2322	620	850	1400	1800
	110	240	80	3		22322 K.MB	H 2322	800	1060	1400	1900
110	120	180	46	2		23024 CK	H 3024	360	570	2200	3000
	120	200	62	2		23124 K.MB	H 3124	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 K.MB	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

Shaft	Dimensions				Calculation factor			Weight	
	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

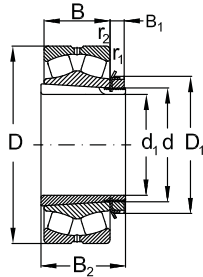


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease min^{-1}	oil min^{-1}
	mm							kN		min^{-1}	min^{-1}
115	130	210	64	2		23126 K.MB	H 3126	540	860	1500	2000
	130	230	64	3		22226 CK	H 3126	660	960	1700	2200
	130	230	80	3		23226 CK	H 2326	830	1270	1300	1700
	130	280	93	4		22326 K.MB	H 2326	1040	1340	1200	1600
125	140	210	53	2		23028 CK	H 3028	480	780	1900	2600
	140	225	68	2,1		23128 K.MB	H 3128	600	990	1400	1800
	140	250	68	3		22228 CK	H 3128	730	1080	1400	1900
	140	250	88	3		23228 CK	H 2328	915	1370	1250	1400
	140	300	102	4		22328 K.MB	H 2328	1220	1600	1100	1400
135	150	225	56	2,1		23030 CK	H 3030	530	865	1800	2400
	150	250	80	2,1		23130 K.MB	H 3130	800	1320	1300	1700
	150	270	73	3		22230 CK	H 3130	880	1300	1400	1800
	150	270	96	3		23230 CK	H 2330	1030	1610	1000	1300
	150	320	108	4		22330 K.MB	H 2330	1370	1830	1100	1500
140	160	240	60	2,1		23032 CK	H 3032	600	1000	1600	2000
	160	270	86	2,1		23132 K.MB	H 3132	930	1510	1200	1600
	160	290	80	3		22232 CK	H 3132	965	1370	1300	1700
	160	290	104	3		23232 CK	H 2332	1180	1830	1200	1600
	160	340	114	4		22332 K.MB	H 2332	1430	1900	1000	1300

Spherical Roller Bearings with Adapter Sleeve

Shaft	Dimensions				Calculation factor			Weight	
	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

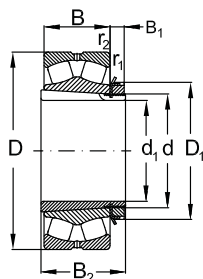


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm							kN		min^{-1}	min^{-1}
150	170	260	67	2,1		23034 CK	H 3034	735	1200	1500	1900
	170	280	88	2,1		23134 K.MB	H 3134	990	1650	1100	1500
	170	310	86	4		22234 CK	H 3134	1170	1750	1200	1600
	170	310	110	4		23234 CK	H 2334	1370	2120	900	1200
	170	360	120	4		22334 K.MB	H 2334	1600	2120	900	1200
160	180	280	74	2,1		23036 CK	H 3036	865	1430	1400	1800
	180	300	96	3		23136 CK	H 3136	1160	1940	1100	1400
	180	320	86	4		22236 CK	H 3136	1210	1870	1100	1500
	180	320	112	4		23236 CK	H 2336	1420	2330	1000	1400
	180	380	126	4		22336 K.MB	H 2336	1760	2360	850	1100
170	190	290	75	2,1		23038 CK	H 3038	915	1530	1300	1700
	190	320	104	3		23138 K.MB	H 3138	1320	2290	1100	1400
	190	340	92	4		22238 CK	H 3138	1200	1830	1100	1400
	190	340	120	4		23238 CK	H 2338	1750	2880	850	1100
	190	400	132	5		22338 K.MB	H 2338	1860	2500	750	1000
180	200	310	82	2,1		23040 CK	H 3040	1060	1760	1300	1700
	200	340	112	3		23140 K.MB	H 3140	1370	2460	1100	1400
	200	360	98	4		22240 CK	H 3140	1250	2020	1100	1400
	200	360	128	4		23240 CK	H 2340	1620	2590	750	1000
	200	420	138	5		22340 K.MB	H 2340	1910	2750	670	900

Spherical Roller Bearings with Adapter Sleeve

Shaft	Dimensions				Calculation factor			Weight	
	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

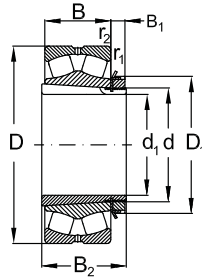


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm							kN		min ⁻¹	min ⁻¹
200	220	340	90	3		23044 K.MB	OH 3044 H	1100	2000	900	1200
	220	370	120	4		23144 K.MB	OH 3144 H	1515	2509	1000	1300
	220	400	108	4		22244 CK	OH 3144 H	1545	2300	900	1200
	220	400	144	4		23244 CK	OH 2344 H	2065	3380	670	900
	220	460	145	5		22344 CK	OH 2344 H	2380	3407	700	950
220	240	360	92	3		23048 K.MB	OH 3048 H	1160	2200	800	1000
	240	400	128	4		23148 K.MB	OH 3148 H	1705	2863	900	1200
	240	440	120	4		22248 CK	OH 3148 H	1845	2763	850	1100
	240	440	160	4		23248 CK	OH 2348 H	2530	4600	630	850
	240	500	155	5		22348 K.MB	OH 2348 H	2650	4000	560	750
240	260	400	104	4		23052 K.MB	OH 3052 H	1500	2800	750	950
	260	440	144	4		23152 K.MB	OH 3152	2153	3673	700	850
	260	480	130	5		22252 K.MB	OH 3152 H	2190	3300	750	1000
	260	540	165	6		22352 CK	OH 2352 H	3125	4560	600	800
260	280	420	106	4		23056 K.MB	OH 3056 H	1560	3000	700	900
	280	460	146	5		23156 K.MB	OH 3156 H	2295	4050	750	1000
	280	500	130	5		22256 K.MB	OH 3156 H	2330	3600	700	950
	280	500	176	5		23256 K.MB	OH 2356 H	2806	4645	480	630
	280	580	175	6		22356 CK	OH 2356 H	3530	5208	560	750

Spherical Roller Bearings with Adapter Sleeve

Shaft	Dimensions				Calculation factor			Weight	
	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
					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

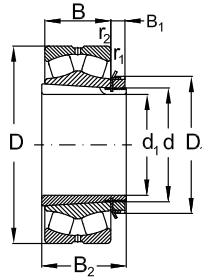


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm							kN		min ⁻¹	min ⁻¹
280	300	460	118	4		23060 K.MB	OH 3060 H	1960	3650	630	800
	300	500	160	5		23160 K.MB	OH 3160 H	2635	4485	700	950
	300	540	140	5		22260 K.MB	OH 3160 H	2670	4176	670	900
300	320	480	121	4		23064 K.MB	OH 3064 H	2040	4000	600	750
	320	540	176	5		23164 K.MB	OH 3164 H	3115	6000	530	670
	320	580	150	5		22264 K.MB	OH 3164 H	3150	5100	630	580
	320	580	208	5		23264 K.MB	OH 3264 H	4130	7026	430	560
320	340	520	133	5		23068 K.MB	OH 3068 H	2360	4500	560	700
	340	580	190	5		23168 K.MB	OH 3168 H	3605	6409	630	850
340	360	540	134	5		23072 K.MB	OH 3072 H	2450	4800	530	670
	360	600	192	5		23172 K.MB	OH 3172 H	3740	7010	600	800
	360	650	232	6		23272 K.MB	OH 3272 H	4880	8490	430	560
360	380	560	135	5		23076 K.MB	OH 3076 H	2550	5300	500	630
	380	620	194	5		23176 K.MB	OH 3176 H	3740	7540	560	750
	380	680	240	6		23276 K.MB	OH 3276 H	5050	9660	400	530
380	400	600	148	5		23080 K.MB	OH 3080 H	3050	6200	450	560
	400	650	200	6		23180 K.MB	OH 3180 H	4100	7730	530	700
	400	720	256	6		23280 K.MB	OH 3280 H	5950	10807	380	500
400	420	620	150	5		23084 K.MB	OH 3084 H	3150	6550	450	560

Spherical Roller Bearings with Adapter Sleeve

Shaft	Dimensions				Calculation factor			Weight	
	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
					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

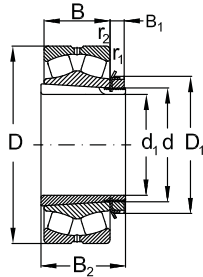


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
400	420	700	224	6		23184 CK	OH 3184 H	4600	9000	500	670
	420	760	272	7,5		23284 K.MB	OH 3284 H	6575	11717	360	480
410	440	650	157	6		23088 K.MB	OH 3088 H	3400	7100	430	530
	440	720	226	6		23188 CK	OH 3188 H	5250	10000	500	670
	440	790	280	7,5		23288 K.MB	OH 3288 H	7100	13400	360	480
430	460	680	163	6		23092 K.MB	OH 3092 H	3650	7650	400	500
	460	760	240	7,5		23192 CK	OH 3192 H	5760	11025	480	630
	460	830	296	7,5		23292 K.MB	OH 3292 H	7560	13970	340	450
450	480	700	165	6		23096 K.MB	OH 3096 H	3800	8150	380	480
	480	790	248	7,5		23196 CK	OH 3196 H	5800	11800	450	600
	480	870	310	7,5		23296 K.MB	OH 3296 H	8800	17000	340	430
470	500	670	128	5		239/500 K.MB	H 39/500	2500	6090	480	630
	500	720	167	6		230/500 K.MB	OH 30/500 H	3900	8500	380	480
	500	830	264	7,5		231/500 K.MB	OH 31/500 H	6550	13200	430	560
	500	920	336	7,5		232/500 K.MB	OH 32/500 H	9650	18300	320	400
500	530	710	136	5		239/530 K.MB	H 39/530	2980	6755	450	600
	530	780	185	6		230/530 K.MB	OH 30/530 H	4400	9500	340	430
530	560	750	140	5		239/560 K.MB	OH 39/560 H	3100	7650	340	430
	560	820	195	6		230/560 K.MB	OH 30/560 H	5100	11000	320	400

Spherical Roller Bearings with Adapter Sleeve

Shaft	Dimensions				Calculation factor			Weight	
	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]	
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

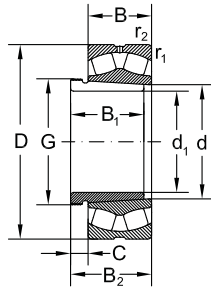


Shaft		Dimensions				Designation		Basical radial load		Speed limit	
Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve		dyn. C_r	stat. C_{0r}	grease	oil
mm								kN		min^{-1}	min^{-1}
560	600	800	150	5	239/600 K.MB	OH 39/600 H		3450	8650	320	400
	600	870	200	6	230/600 K.MB	OH 30/600 H		5700	12500	300	380
600	630	850	165	6	239/630 K.MB	OH 39/630 H		4290	9910	380	500
	630	920	212	7,5	230/630 K.MB	OH 30/630 H		6300	14000	260	340
630	670	900	170	6	239/670 K.MB	OH 39/670 H		4300	10600	280	360
	670	980	230	7,5	230/670 K.MB	OH 30/670 H		7200	16000	260	340
670	710	950	180	6	239/710 K.MB	OH 39/710 H		4800	12000	260	340
	710	1030	236	7,5	230/710 K.MB	OH 30/710 H		7650	17000	260	340
710	750	1000	185	6	239/750 K.MB	OH 39/750 H		5200	12900	260	340
750	800	1060	195	6	239/800 K.MB	OH 39/800 H		5850	15000	240	320
	800	1150	258	7,5	230/800 K.MB	OH 30/800 H		9300	21200	220	300

Spherical Roller Bearings with Adapter Sleeve

Shaft		Dimensions			Calculation factor			Weight	
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

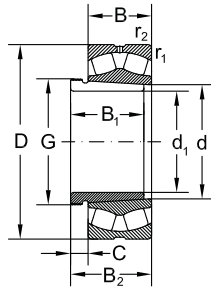


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
35	40	80	23	1,1		22208 CK	AH 308	88	98	6000	7500
	40	90	23	1,5		21308 CK	AH 308	91,5	100	4500	5600
	40	90	23	1,5		22308 CK	AH 2308	129	143	4300	5300
40	45	85	23	1,1		22209 CK	AH 309	93	105	5600	7000
	45	100	25	1,5		21309 CK	AH 309	108	120	4000	5300
	45	100	36	1,5		22309 CK	AH 2309	156	176	3800	4800
45	50	90	23	1,1		22210 CK	AHX 310	98	114	4000	5300
	50	110	27	2		21310 CK	AHX 310	120	130	3600	4800
	50	110	40	2		22310 CK	AHX 2310	190	216	3400	4300
50	55	100	25	1,5		22211 CK	AHX 311	120	140	3800	5000
	55	120	29	2		21311 CK	AHX 311	135	155	3200	4300
	55	120	43	2		22311 CK	AHX 2311	224	255	3000	4000
55	60	110	28	1,5		22212 CK	AHX 312	145	175	3400	4500
	60	130	31	2,1		21312 CK	AHX 312	150	180	3000	4000
	60	130	46	2,1		22312 CK	AHX 2312	260	300	2800	3600
60	65	120	31	1,5		22213 CK	AH 313	170	204	3000	4000
	65	140	33	2,1		21313 CK	AH 313	196	228	2800	3800
	65	140	48	2,1		22313 CK	AH 2313	290	355	2600	3400

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

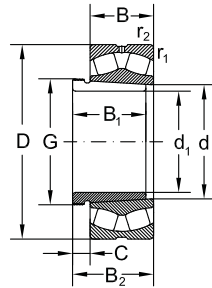


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
65	70	125	31	1,5		22214 CK	AH 314	179	225	3600	4500
	70	150	35	2,1		21314 CK	AH 314	207	360	2600	3400
	70	150	51	2,1		22314 CK	AHX 2314	325	375	2200	3000
70	75	130	31	1,5		22215 CK	AH 315	183	236	2800	3800
	75	160	37	2,1		21315 CK	AH 315	250	305	2400	3200
	75	160	55	2,1		22315 CK	AHX 2315	375	440	2200	3000
75	80	140	33	2		22216 CK	AH 316	208	260	2600	3400
	80	170	39	2,1		21316 CK	AH 316	275	340	2200	3000
	80	170	58	2,1		22316 CK	AHX 2316	410	500	1800	2400
80	85	150	36	2		22217 CK	AHX 317	250	325	2400	3200
	85	180	41	3		21317 CK	AHX 317	305	375	2200	2800
	85	180	60	3		22317 CK	AHX 2317	455	540	1800	2400
85	90	160	40	2		22218 CK	AHX 318	285	360	2200	3000
	90	160	52,4	2		23218 CK	AHX 2318	340	485	2200	3000
	90	190	43	3		21318 CK	AHX 318	335	415	2200	2800
	90	190	64	3		22318 CK	AH 2318	510	620	1800	2400
90	95	170	43	2,1		22219 CK	AHX 319	315	400	2200	2800
	95	200	45	3		21319 CK	AHX 319	360	450	2000	2600

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

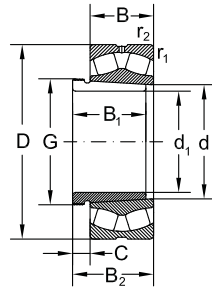


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
90	95	200	67	3		22319 CK	AHX 2319	580	700	1700	2200
95	100	165	52	2		23120 K.MB	AHX 3120	355	540	2000	3000
	100	180	46	2,1		22220 CK	AHX 320	360	465	2200	2800
	100	180	60,3	2,1		23220 CK	AHX 2320	465	655	1700	2200
	100	215	73	3		22320 CK	AHX 2320	655	815	1500	2000
105	110	180	56	2		23122 K.MB	AHX 3122	410	640	1800	2400
	110	180	69	2		24122 CK30	AH 24122	520	880	1200	1600
	110	200	53	2,1		22222 CK	AHX 3122	455	585	2000	2800
	110	200	69,8	2,1		23222 CK	AHX 3222	620	850	1400	1800
	110	240	80	3		22322 K.MB	AHX 2322	800	1060	1400	1900
115	120	180	46	2		23024 CK	AHX 3024	360	570	2200	3000
	120	180	60	2		24024 CK30	AH 24024	455	800	1500	2000
	120	200	62	2		23124 K.MB	AHX 3124	495	770	1700	2200
	120	200	80	2		24124 CK30	AH 24124	630	1050	1000	1300
	120	215	58	2,1		22224 CK	AHX 3124	540	720	1700	2200
	120	215	76	2,1		23224 CK	AHX 3224	680	1000	1300	1700
	120	260	86	3		22324 K.MB	AHX 2324	900	1400	1300	1700
125	130	200	52	2		23026 CK	AHX 3026	455	720	1900	2600
	130	200	69	2		24026 CK30	AH 24026	530	900	1200	1600

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

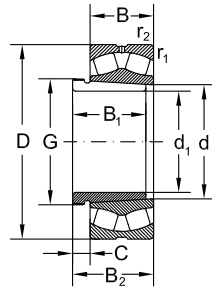


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
125	130	210	64	2		23126 K.MB	AHX 3126	540	860	1500	2000
	130	210	80	2		24126 CK30	AH 24126	650	1100	900	1200
	130	230	64	3		22226 CK	AHX 3126	630	880	1700	2200
	130	230	80	3		23226 CK	AHX 3226	765	1140	1300	1700
	130	280	93	4		22326 K.MB	AHX 2326	1040	1340	1200	1600
135	140	210	53	2		23028 CK	AHX 3028	480	780	1900	2600
	140	210	69	2		24028 CK30	AH 24028	550	990	1100	1500
	140	225	68	2,1		23128 K.MB	AHX 3128	600	990	1400	1800
	140	225	85	2,1		24128 CK30	AH 24128	740	1380	1100	1500
	140	250	68	3		22228 CK	AHX 3128	730	1080	1400	1900
	140	250	88	3		23228 CK	AHX 3228	915	1370	1100	1400
	140	300	102	4		22328 K.MB	AHX 2328	1220	1600	1100	1400
145	150	225	56	2,1		23030 CK	AHX 3030	530	865	1800	2400
	150	225	75	2,1		24030 CK30	AH 24030	620	1140	1300	1700
	150	250	80	2,1		23130 K.MB	AHX 3130	800	1320	1300	1700
	150	250	100	2,1		24130 CK30	AH 24130	915	1560	1100	1500
	150	270	73	3		22230 CK	AHX 3130	850	1200	1400	1800
	150	270	96	3		23230 CK	AHX 3230	1030	1610	1000	1300
	150	320	108	4		22330 K.MB	AHX 2330	1370	1830	1100	1500

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

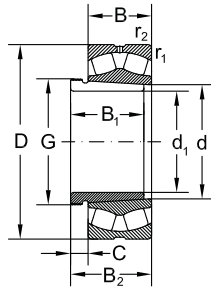


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm							kN		min ⁻¹	min ⁻¹
150	160	240	60	2,1	2,1	23032 CK	AH 3032	600	1000	1600	2000
	160	240	80	2,1	2,1	24032 CK30	AH 24032	720	1320	1000	1300
	160	270	86	2,1	2,1	23132 K.MB	AH 3132	930	1510	1200	1600
	160	270	109	2,1	2,1	24132 CK30	AH 24132	1060	1800	1000	1400
	160	290	80	3	3	22232 CK	AH 3132	965	1370	1300	1700
	160	290	104	3	3	23232 CK	AH 3232	1180	1830	1200	1600
	160	340	114	4	4	22332 K.MB	AH 2332	1430	1900	1000	1300
160	170	260	67	2,1	2,1	23034 CK	AH 3034	735	1200	1500	1900
	170	260	90	2,1	2,1	24034 K30.MB	AH 24034	850	1560	1000	1300
	170	280	88	2,1	2,1	23134 K.MB	AH 3134	990	1650	1100	1500
	170	280	109	2,1	2,1	24134 CK30	AH 24134	1060	1830	750	1000
	170	310	86	4	4	22234 CK	AH 334	1100	1530	1200	1600
	170	310	110	4	4	23234 CK	AH 2334	1370	2120	1100	1500
	170	360	120	4	4	22334 K.MB	AH 2334	1600	2120	900	1200
170	180	280	74	2,1	2,1	23036 CK	AH 3036	865	1430	1400	1800
	180	280	100	2,1	2,1	24036 K30.MB	AH 24036	1000	1830	900	1200
	180	300	96	3	3	23136 CK	AH 3136	1160	1930	1100	1400
	180	300	118	3	3	24136 CK30	AH 24136	1250	2200	700	950
	180	320	86	4	4	22236 CK	AH 2236	1010	1560	1100	1500

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

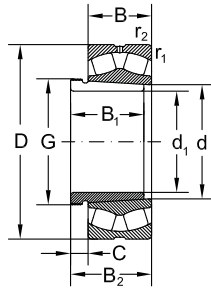


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
170	180	320	112	4		23236 CK	AH 3236	1420	2320	1100	1500
	180	380	126	4		22336 K.MB	AH 2336	1760	2360	850	1100
180	190	290	75	2,1		23038 CK	AH 3038	915	1530	1300	1700
	190	290	100	2,1		24038 K30.MB	AH 24038	1040	1960	850	1100
	190	320	104	3		23138 K.MB	AH 3138	1320	2200	1100	1400
	190	320	128	3		24138 CK30	AH 24138	1400	2500	670	900
	190	340	92	4		22238 CK	AH 2238	1200	1830	1100	1400
	190	340	120	4		23238 CK	AH 3238	1750	2880	850	1100
	190	400	132	5		22338 K.MB	AH 2338	1860	2500	750	1000
190	200	310	82	2,1		23040 CK	AH 3040	1060	1760	1300	1700
	200	310	109	2,1		24040 K30	AH 24040	1140	2280	850	1100
	200	340	112	3		23140 K.MB	AH 3140	1320	2280	900	1400
	200	340	140	3		24140 CK30	AH 24140	1700	3000	800	1000
	200	360	98	4		22240 CK	AH 2240	1250	1930	1100	1400
	200	360	128	4		23240 CK	AH 3240	1620	2590	750	1000
	200	420	138	5		22340 K.MB	AH 2340	1910	2750	670	900
200	220	340	90	3		23044 K.MB	AH 3044	1100	2000	900	1200
	220	340	118	3		24044 K30	AH 24044	1370	2600	750	950
	220	370	150	4		24144 K30	AH 24144	1800	3300	700	900

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

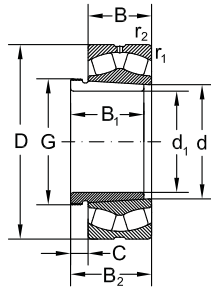


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
200	220	370	120	4		23144 K.MB	AH 3144	1515	2509	800	1000
	220	400	108	4		22244 CK	AH 3144	1520	2300	900	1200
	220	400	144	4		23244 CK	AH 2344	2040	3380	670	900
	220	460	145	5		22344 CK	AH 2344	2320	3350	700	900
220	240	360	92	3		23048 K.MB	AH 3048	1160	2200	800	1000
	240	360	118	3		24048 K30	AH 24048	1460	2841	700	900
	240	400	160	4		24148 K30	AH 24148	1780	3109	530	700
	240	400	128	4		23148 K.MB	AH 3148	1705	2863	750	950
	240	440	120	4		22248 CK	AH 3148	1845	2763	850	1100
	240	440	160	4		23248 CK	AH 2348	2450	4250	630	850
	240	500	155	5		22348 K.MB	AH 2348	2650	3900	560	750
240	260	400	104	4		23052 K.MB	AH 3052	1500	2800	750	950
	260	400	140	4		24052 K30	AH 24052	1775	3494	600	800
	260	440	180	4		24152 K30	AH 24152	2500	5000	480	630
	260	440	144	4		23152 K.MB	AH 3152	2153	3673	670	850
	260	480	130	5		22252 K.MB	AH 2252	2190	3300	750	1000
	260	540	165	6		22352 CK	AH 2352	3000	4400	600	750
260	280	420	106	4		23056 K.MB	AH 3056	1560	3000	700	900
	280	420	140	4		24056 K30	AH 24056	2000	4000	560	750

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

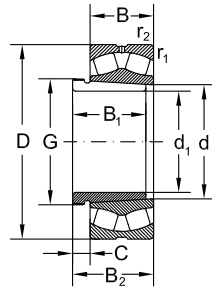


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
260	280	460	146	5		23156 K.MB	AH 3156	2295	4050	630	800
	280	460	180	5		24156 K30	AH 24156	2635	4848	400	530
	280	500	176	5		23256 K.MB	AH 2356	2806	4645	480	630
	280	580	175	6		22356 CK	AH 2356	3530	5208	530	670
280	300	460	118	4		23060 K.MB	AH 3060	1960	3650	630	800
	300	460	160	4		24060 K30	AH 24060	2385	4702	560	700
	300	500	160	5		23160 K.MB	AH 3160	2635	4485	600	750
	300	500	200	5		24160 K30	AH 24160	3213	6011	430	560
300	320	480	121	4		23064 K.MB	AH 3064	2040	4000	600	750
	320	480	160	4		24064 K30	AH 24064	2500	5240	530	670
	320	540	176	5		23164 K.MB	AH 3164	3115	6000	530	670
	320	540	218	5		24164 K30	AH 24164	3750	7300	400	530
	320	580	208	5		23264 K.MB	AH 3264	3900	6950	430	560
320	340	520	133	5		23068 K.MB	AH 3068	2360	4500	560	700
	340	520	180	5		24068 K30	AH 24068	3100	6550	480	600
	340	580	190	5		23168 K.MB	AH 3168	3605	6409	500	630
	340	580	243	5		24168 K30	AH 24168	4400	8500	450	560
340	360	540	134	5		23072 K.MB	AH 3072	2450	4800	530	670
	360	540	180	5		24072 K30	AH 24072	3110	6530	480	630

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

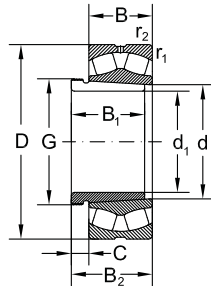


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
340	360	600	192	5		23172 K.MB	AH 3172	3740	7010	480	600
	360	600	243	5		24172 K30	AH 24172	4500	9000	430	530
	360	650	232	6		23272 K.MB	AH 3272	4880	8490	430	560
360	380	560	135	5		23076 K.MB	AH 3076	2550	5300	500	630
	380	560	180	5		24076 K30	AH 24076	3150	6710	450	600
	380	620	194	5		23176 K.MB	AH 3176	3740	7540	450	560
	380	620	243	5		24176 K30	AH 24176	4650	9500	400	500
	380	680	240	6		23276 K.MB	AH 3276	5050	9660	400	530
380	400	600	148	5		23080 K.MB	AH 3080	3050	6200	450	560
	400	600	200	5		24080	AH 24080	3610	7545	430	460
	400	650	200	6		23180 K.MB	AH 3180	4100	7730	430	530
	400	650	250	6		24180 K30	AH 24180	5100	10400	380	480
	400	720	256	6		23280 K.MB	AH 3280	5700	10800	380	500
400	420	620	150	5		23084 K.MB	AH 3084	3150	6550	450	560
	420	620	200	5		24084 K30	AH 24084	3740	8800	380	480
	420	700	224	6		23184 CK	AH 3184	4600	9000	400	500
	420	700	280	6		24184 K30	AH 24184	6100	12500	360	450
	420	760	272	7,5		23284 K.MB	AH 3284	6550	11717	360	480

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

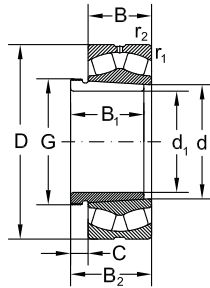


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
420	440	650	157	6		23088 K.MB	AHX 3088	3400	7100	430	530
	440	650	212	6		24088 K30	AHX 24088	4080	8800	360	450
	440	720	226	6		23188 CK	AHX 3188	5000	10000	400	500
	440	720	280	6		24188 K30	AHX 24188	6400	13200	340	430
	440	790	280	7,5		23288 K.MB	AHX 3288	7100	13400	360	450
440	460	680	163	6		23092 K.MB	AHX 3092	3650	7650	400	500
	460	760	240	7,5		23192 CK	AHX 3192	5760	11025	360	450
	460	760	300	7,5		24192 K30	AH 24192	7250	14600	280	380
	460	830	296	7,5		23292 K.MB	AHX 3292	7560	13970	340	430
460	480	700	165	6		23096 K.MB	AHX 3096	3800	8150	380	480
	480	790	248	7,5		23196 CK	AHX 3196	5800	11800	360	450
	480	790	308	7,5		24196 K30	AH 24196	7250	15000	280	360
	480	870	310	7,5		23296 K.MB	AHX 3296	8800	17000	340	430
480	500	670	128	5		239/500 K.MB	AH 39/500	2500	6090	380	480
	500	720	167	6		230/500 K.MB	AHX 30/500	3900	8500	380	480
	500	830	264	7,5		231/500 K.MB	AHX 31/500	6550	13200	340	430
	500	830	325	7,5		241/500 K30	AH 241/500	8630	17000	268	340
	500	920	336	7,5		232/500 K.MB	AHX 32/500	9650	18300	320	400
500	530	710	136	5		239/530 K.MB	AH 39/530	2850	6755	360	450

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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

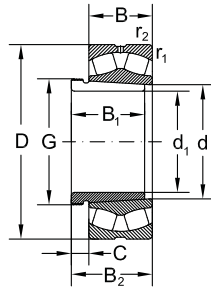


Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
500	530	780	185	6		230/530 K.MB	AH 30/530	4400	9500	340	430
	530	870	335	7,5		241/530 K30	AH 241/530	8650	18400	240	320
530	560	750	140	5		239/560 K.MB	AH 39/560	3100	7350	340	430
	560	820	195	6		230/560 K.MB	AH 30/560	5100	11000	320	400
	560	920	355	7,5		241/560 K30	AH 241/560	10500	21600	120	160
560	600	800	150	5		239/600 K.MB	AH 39/600	3450	8650	320	400
	600	870	200	6		230/600 K.MB	AH 30/600	5700	12500	300	380
	600	980	375	7,5		241/600 K30	AH 241/600	10700	22800	220	280
600	630	580	165	6		239/630 K.MB	AH 39/630	4050	9800	300	380
	630	920	212	7,5		230/630 K.MB	AH 30/630	6300	14000	260	340
	630	1030	400	7,5		241/630 K30	AH 241/630	12700	27000	100	140
630	670	900	170	6		239/670 K.MB	AH 39/670	4300	10600	280	360
	670	980	230	7,5		230/670 K.MB	AH 30/670	7200	16000	260	340
670	710	950	180	6		239/710 K.MB	AH 39/710	4800	12000	260	340
	710	1030	236	7,5		230/710 K.MB	AH 30/710	7650	17000	260	340
710	750	1000	185	6		239/750 K.MB	AH 39/750	5200	12900	260	340
750	800	1060	195	6		239/800 K.MB	AH 39/800	5850	15000	240	320
	800	1150	258	7,5		230/800 K.MB	AH 30/800	9300	21200	240	300

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 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
	440	466	40	Tr 650x6	0,37	1,8	2,7	1,8	138-0	130
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
	286	302	50	Tr 750x7	0,22	3,1	4,6	3	803	135
710	234	246	44	Tr 780x7	0,17	4	5,9	3,9	548	111
750	245	257	45	Tr 830x7	0,17	4,1	6	4	653	147
	308	326	50	Tr 850x7	0,22	3,1	4,6	3	1106	200

Spherical Roller Bearings with Withdrawal Sleeve



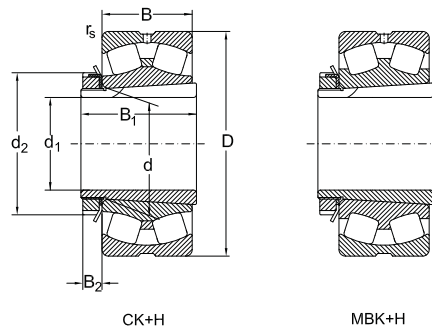
Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease $\min^{-1}$	oil $\min^{-1}$
	mm							kN			
850	900	1180	206	6		239/900 K.MB	AH 39/900	6550	17120	200	280
	900	1280	280	7,5		230/900 K.MB	AH 30/900	11000	26500	200	280
900	950	1250	224	7,5		239/950 K.MB	AH 39/950	7500	20000	190	260

Spherical Roller Bearings with Withdrawal Sleeve

Shaft	Dimensions					Calculation factor			Weight	
	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 Sleeve
	mm									[kg]
850	265	277	51	Tr 930x8	0,16	4,3	6,4	4,2	605	182
	335	355	55	Tr 950x8	0,22	3,1	4,7	3,1	1210	248
900	282	297	50	Tr 980x8	0,16	4,2	6,3	4,1	776	206

Spherical Roller Bearings with withdrawal sleeve

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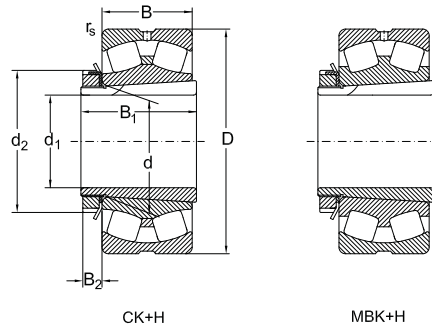
Dimensions								Designation	Withdrawal sleeve
d_1	d	D	B	r_s min.	d_2	B_1	B_2	Bearing	
mm									
35	40	80	23	1,1	58	36	10	22208CK	H308
	40	90	23	1,5	58	36	10	21308CK	H308
	40	90	33	1,5	58	46	10	22308CK	H2308
40	45	85	23	1,1	65	39	11	22209CK	H309
	45	100	25	1,5	65	39	11	21309CK	H309
	45	100	36	1,5	65	50	11	22309CK	H2309
45	50	90	23	1,1	70	42	12	22210CK	H310
	50	110	27	2	70	42	12	21310CK	H310
	50	110	40	2	70	55	12	22310CK	H2310
50	55	100	25	1,5	75	45	12	22211CK	H311
	55	120	29	2	75	45	12	21311CK	H311
	55	120	43	2	75	59	12	22311CK	H2311
55	60	110	28	1,5	80	47	13	22212CK	H312
	60	130	31	2,1	80	47	13	21312CK	H312
	60	130	46	2,1	80	62	13	22312CK	H2312
60	65	120	31	1,5	85	50	14	22213CK	H313
	65	140	33	2,1	85	50	14	21313CK	H313
	65	140	48	2,1	85	65	14	22313CK	H2313
	70	125	31	2,1	92	52	14	22214CK	H314
	70	150	51	2,1	92	68	14	22314CK	H2314
65	75	130	31	1,5	98	55	15	22215CKW33	H315
	75	160	37	2,1	98	55	15	21315CKW33	H315
	75	160	55	2,1	98	73	15	22315CKW33	H2315
70	80	140	33	2	105	59	17	22216CKW33	H316
	80	170	39	2,1	105	59	17	21316CKW33	H316
	80	170	58	2,1	105	78	17	22316MBKW33	H2316
75	85	150	36	2	110	63	18	22217CKW33	H317
	85	180	41	3	110	63	18	21317CK	H317
	85	180	60	3	110	82	18	22317MBKW33	H2317
80	90	160	40	2	120	65	18	22218CKW33	H318
	90	160	52,4	2	120	86	18	23218MBK	H2318
	90	190	43	3	120	56	18	21318CK	H318

Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Weight
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	-		-	kN	-	min ⁻¹	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

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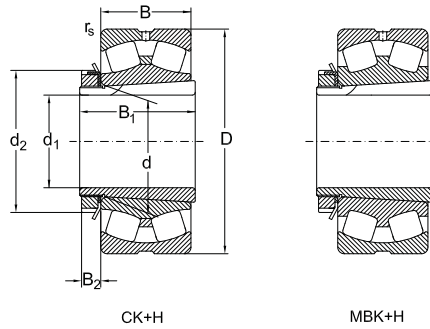
Dimensions								Designation	Withdrawal sleeve
d_1	d	D	B	r_s min.	d_2	B_1	B_2	Bearing	
mm									
80	90	190	64	3	120	86	18	22318CKW33	H2318
85	95	170	43	2,1	125	68	19	22219MBKW33	H319
	95	200	45	3	125	68	19	21319MBK	H319
	95	200	67	3	125	90	19	22319MBKW33	H2319
90	100	180	46	2,1	130	71	20	22220MBKW33	H320
	100	180	60,3	2,1	130	97	20	23220MAKW33	H2320
	100	215	47	3	130	71	20	21320MBK	H320
	100	215	73	3	130	97	20	22320CKW33	H2320
100	110	180	56	2	145	81	21	23122MBKW33	H3122
	110	200	53	2,1	145	77	21	22222MBKW33	H322
	110	200	69,8	2,1	145	105	21	23222MBKW33	H2322
	110	240	50	3	145	77	21	21322MBK	H322
	110	240	80	3	145	105	21	22322CKW33	H2322
110	120	180	46	2	145	72	22	23024MBK33	H3024
	120	200	62	2	155	88	22	23124MBKW33	H3124
	120	215	58	2,1	155	88	22	22224CKW33	H3124
	120	215	76	2,1	155	112	22	23224MBKW33	H2324
	120	260	86	3	155	112	22	22324MBKW33	H2324
115	130	200	52	2	155	80	23	23026MBKW33	H3026
	130	210	64	2	165	92	23	23126MBKW33	H3126
	130	230	64	3	165	92	23	22226CKW33	H3126
	130	230	80	3	165	121	23	23226MBKW33	H2326
	130	280	93	4	165	121	23	22326MBKW33	H2326
125	140	210	53	2	165	82	24	23028MBKW33	H3028
	140	225	68	2,1	180	97	24	23128MBKW33	H3128
	140	250	68	3	180	97	24	22228MBKW33	H3128
	140	250	88	3	180	131	24	23228MBKW33	H2328
	140	300	102	4	180	131	24	22328MBKW33	H2328
135	150	225	56	2,1	180	87	26	23030MBKW33	H3030
	150	250	80	2,1	195	111	26	23130MBKW33	H3130
	150	270	73	3	195	111	26	22230MBKW33	H3130
	150	270	96	3	195	139	26	23230MBKW33	H2330

Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Weight
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	-		-	kN	-	min ⁻¹	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

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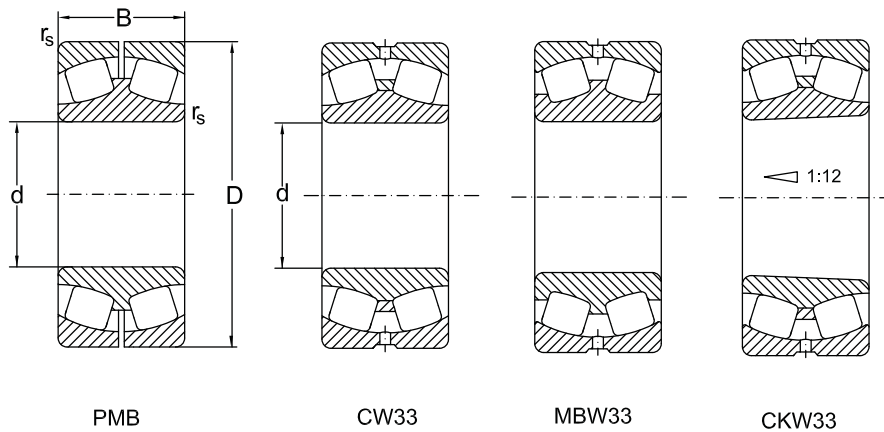


Dimensions								Designation	Withdrawal sleeve
d_1	d	D	B	r_s min.	d_2	B_1	B_2	Bearing	
mm									
135	150	320	108	4	195	139	26	22330MBKW33	H2330
140	160	240	60	2,1	190	93	28	23032MBKW33	H3032
	160	270	86	2,1	210	119	28	23132MBKW33	H3132
	160	290	104	3	210	147	28	23232MBKW33	H2332
	160	290	80	3	210	119	28	22232MBKW33	H3132
	160	340	114	4	210	147	28	22332MBKW33	H2332
150	170	260	67	2,1	200	101	29	23034MBKW33	H3034
	170	280	88	2,1	220	122	29	23134MBKW33	H3134
	170	310	110	4	220	154	29	23234MBKW33	H2334
	170	310	86	4	220	122	29	22234MBKW33	H3134
	170	360	120	4	220	154	29	22334MBKW33	H2334
160	180	280	74	2,1	210	109	30	23036MBKW33	H3036
	180	300	96	3	230	131	30	23136MBKW33	H3138
	180	320	112	4	230	161	30	23236MBKW33	H2336
	180	320	86	4	230	131	30	22236MBKW33	H3136
	180	380	126	4	230	161	30	22336MBKW33	H2336
170	190	290	75	2,1	220	112	31	23038MBKW33	H3038
	190	320	104	3	240	141	31	23138MBKW33	H3138
	190	340	120	4	240	169	31	23238MBKW33	H2338
	190	340	92	4	240	141	31	22238MBKW33	H3138
	190	400	132	5	240	169	31	22338MBKW33	H2338
180	200	310	82	2,1	240	120	32	23040CAKW33	H3040
	200	340	112	3	250	150	32	23140CAKW33	H3140
	200	360	128	4	250	176	32	23240MBKW33	H2340
	200	360	98	4	250	150	32	22240CAKW33	H3140
	200	420	138	5	250	176	32	22340CKW33	H2340
200	220	340	90	3	260	126	30	23044MBKW33	H3044
	220	340	90	3	260	126	30	23044MBKW33	H3044
	220	370	120	4	280	161	35	23144MBKW33	H3144
	220	400	108	4	280	161	35	22244MBKW33	H3144
	220	400	144	4	280	186	35	23244MBKW33	H2344

Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Weight
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	-		-	kN	-	min ⁻¹	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



d	Dimensions			Basical radial load						Speed limit		Designation	Weight
	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	25120MB	5,44
130	220	73	2	500	0,31	2,2	3,3	995	2,2	1100	1400	25326C	11,4
	240	80	3	572	0,33	2	3	1104	2	1100	1400	25126MBK	15,3
131,796	220	73	2	470	0,31	2,2	3,3	1020	2,2	1100	1400	25226C	11,2
	220	73	2	470	0,31	2,2	3,3	1020	2,2	1100	1400	25226CW33	11,2
	220	73	2	470				1020		1100	1400	25226CY	11,2
140	240	80	3	482	0,26	2,6	3,9	1030	2,5	950	1300	28228PMB	19,9
	260	86	3	663	0,26	2,6	3,9	1288	2,5	950	1300	25128MBK	19,9
144,475	250	80	2	625	0,33	2	3	1310	2	900	1200	25129C	16,5
169	310	110	3	1228				1970		1200	1400	25134C/C3	36,3

Spherical Roller Bearings Non-standardized

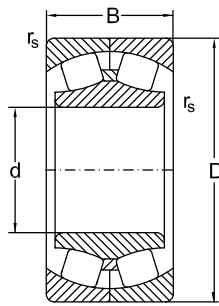


Fig. 5

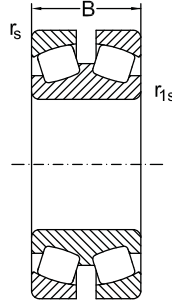


Fig. 6

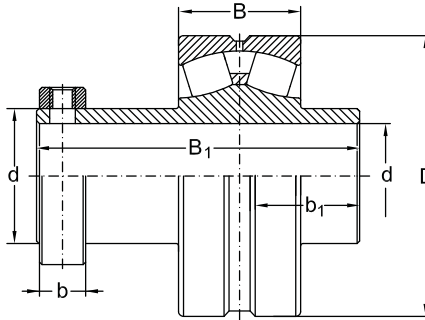


Fig. 7

Dimensions							Basical radial load		Designation	Weight	
d	D	B	B ₁	r _s min.	r _{1s} min.	b	Fig.	dyn. C _a			stat. C _{0a}
mm				kN							
44,998	85	40,08	52	2	2		6	129	170	A22177M	0,99
49,987	90	38,76	69	2,5	2		6	125	167	A22196M	1,0
57,15	100	42,06	69	3,5	3		6	157	218	A23225M	1,36
59,985	110	44,45		3,5	2		6	173	231	A24236M	1,82
66,675	127	55,58		3			6	257	356	A23262M	3,25
87,312	152,4	69,85		3,5			6	357	584	A22343M	5,46
89,154	152,4	69,85						357	584	A22351M	5,32
89,98	189,97	75,54		1,5	2		7	476	614	A22354M	10,22
92,075	152,4	69,85		1,1	2,1		7	357	584	A22362M	5,10
100	165	65		2	2	5	6	309,2	459,2	26120MB	5,08
100	180	82	69	2	2	5	6	436	627	26220CP	9,36
110	180	82		2	2	5	6	448,7	740,6	26122CAW33	7,53
100	180	82		2,1	2,5		5	436	627	26220CP	9,361
61,93	120	31			2	22,3		158	195	SB10002-7/16	2,953
42,877	85	59,1	23	1,5	1,5		7	131,5	188	SB10001-11116	1,16
48,48	80	23	69,85		1,1			88	98	SB10001-1/2	0,93
59,9	90	23	73	1,1	1,1	15,8	7	100	120	SB10001-15/16	1,23
74,61	130	75,92	31	1,5	1,5	15,8	7	190	250	SB10002-15/16	3,22
78	120	31	85,75	1,5	1,5	15,8	7	158	195	SB10002-7/16	2,95
100,03	180	46	116	2	2	222	7	536	904,5	SB10003-15/16	8,31
107,34	160	40	102,4	2	2	22,2	7	305	410	SB10003-7/16	5,74
112,71	200	155,58	53	2,1	2,1	25,4	8	590	770	SB10004-7/15VSB	11,8
147,8	230	64	168,28	3	3	22,2	8	660	1700	SB10004-15/16VSB	18
38,15	87,3	73,3	56	1,5	1,5	25,4	9	58	69	ZMC2108	1,7



Torodial roller bearings

DAS LAGER torodial bearings combine the self-aligning ability of the spherical roller bearing with the axial displacement ability of the cylindrical roller bearing.

They are specially using as non-locating bearings and as such they are excellent with their combination of self-aligning and axial displacement properties.

Torodial bearings have high load carrying capacity where it has to compensate for angular misalignment or axial displacement.

Torodial roller bearings are produced to two basic designs; bearings with cage, and full complement bearings. The full complement bearings have higher load capacity than bearings with cage design because the full complement bearings have more rollers.

Both designs can produce with tapered bore 1:12 (suffix code K) and 1:30 (suffix code K30)

Supplementary designations

- C2** Radial internal clearance smaller than Normal
- C3** Radial internal clearance larger than Normal
- C4** Radial internal clearance larger than C3
- C5** Radial internal clearance larger than C4
- CS5** Sheet steel reinforced contact seal of hydrogenated acrylonitrile-butadiene rubber (HNBR) on one side of the bearing
- DA3** Case-hardened inner ring
- K** K Tapered bore, taper 1:12
- K30** K30 Tapered bore, taper 1:30
- M** M Machined window-type brass cage, roller centred
- MB** MB Two-piece machined brass cage, inner ring centred
- TN9** TN9 Injection moulded window-type cage of glass fibre reinforced polyamide 4,6, roller centred
- V** V Full complement of rollers (no cage)
- DE240** Bearing modified for greater axial displacement

Internal Clearance:

The torodial bearings can produce different radial clearances. Table 1 show the radial internal clearance of torodial bearing with cylindrical bore and Table 2 show the radial internal clearance of torodial bearings with tapered bore

Mostly torodial bearing are used spherical roller bearings. The clearance is slightly larger than that of corresponding spherical roller bearing have the same clearance class. An axial displacement of the inner ring relative to the outer ring of 6 to 8 % the bearing width will reduce operational clearance to approximately the same value as a spherical roller bearing of the same size.

Misalignment

Without any negative effect on bearing, an angular misalignment between the inner ring and outer ring can be 0,5°. For higher misalignment than 0,5°. The bearing internal friction will increase so it will effect of bearing life. For above 0,5° misalignment please contact DAS LAGER engineering service.

For MB cage type an angular misalignment should never exceed 0.5°

Table 1: Radial internal clearance of torodial bearings with a cylindrical bore

Bore diameter		Radial internal clearance									
d		C2		Normal		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max
mm		µm									
24	30	18	32	32	46	46	60	60	76	76	94
30	40	21	39	39	55	55	73	73	93	93	117
40	50	25	45	45	65	65	85	85	109	109	137
50	65	33	54	54	79	79	104	104	139	139	174
65	80	40	66	66	96	96	124	124	164	164	208
80	100	52	82	82	120	120	158	158	206	206	258
100	120	64	100	100	144	144	186	186	244	244	306
120	140	76	119	119	166	166	215	215	280	280	349
140	160	87	138	138	195	195	252	252	321	321	398
160	180	97	152	152	217	217	280	280	361	361	448
180	200	108	171	171	238	238	307	307	394	394	495
200	225	118	187	187	262	262	337	337	434	434	545
225	250	128	202	202	282	282	368	368	478	478	602
250	280	137	221	221	307	307	407	407	519	519	655
280	315	152	236	236	330	330	434	434	570	570	714
315	355	164	259	259	360	360	483	483	620	620	789
355	400	175	280	280	395	395	528	528	675	675	850
400	450	191	307	307	435	435	577	577	745	745	929
450	500	205	335	335	475	475	633	633	811	811	1015
500	560	220	360	360	518	518	688	688	890	890	1110
560	630	245	395	395	567	567	751	751	975	975	1215
630	710	267	435	435	617	617	831	831	1075	1075	1335
710	800	300	494	494	680	680	920	920	1200	1200	1480
800	900	329	535	535	755	755	1015	1015	1325	1325	1655

Table 2: Radial internal clearance of torodial bearings with a tapered bore

Bore diameter		Radial internal clearance									
d		C2		Normal		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max
mm		µm									
24	30	23	37	37	51	51	65	65	81	81	99
30	40	28	46	46	62	62	80	80	100	100	124
40	50	33	53	53	73	73	93	93	117	117	145
50	65	42	63	63	88	88	113	113	148	148	183
65	80	52	78	78	108	108	136	136	176	176	220
80	100	64	96	96	132	132	172	172	218	218	272
100	120	75	115	115	155	155	201	201	255	255	321
120	140	90	135	135	180	180	231	231	294	294	365
140	160	104	155	155	212	212	269	269	338	338	415
160	180	118	173	173	238	238	301	301	382	382	469
180	200	130	193	193	260	260	329	329	416	416	517
200	225	144	213	213	288	288	363	363	460	460	571
225	250	161	235	235	315	315	401	401	511	511	635
250	280	174	258	258	344	344	444	444	556	556	692
280	315	199	283	283	377	377	481	481	617	617	761
315	355	223	318	318	419	419	542	542	679	679	848
355	400	251	350	350	471	471	598	598	751	751	920
400	450	281	383	383	525	525	653	653	835	835	1005
450	500	305	435	435	575	575	733	733	911	911	1115
500	560	335	475	475	633	633	803	803	1005	1005	1225
560	630	380	530	530	702	702	886	886	1110	1110	1350
630	710	422	590	590	772	772	986	986	1230	1230	1490
710	800	480	674	674	860	860	1100	1100	1380	1380	1660
800	900	529	735	735	955	955	1215	1215	1525	1525	1855

Axial Displacement

Torodial bearing are suitable axial displacement of shaft. The axial displacement can result from thermal expansion or deviations from determined bearing positions.

The bearing radial clearance depend on bearing misalignment and axial displacement .

To calculate bearing axial displacement and radial clearance limit. Please contact your DAS LAGER engineer service

Minimum Load:

The torodial bearings, like all ball and roller bearings, must always be subjected to a given minimum load.

If they are to operate at high speeds or are

subjected to high accelerations or rapid changes in the direction of load. it's possible to cause damaging sliding movements to occur between the rollers and raceways.

$$F_{rm} = 0,007 C_0$$

For a full complement bearing using

$$F_{rm} = 0,01 C_0$$

F_{rm} : minimum radial bearing load [kN]

C_0 : basic static load rating [kN] (see product data)

Equivalent dynamic bearing load

Torodial bearings can only accommodate radial loads

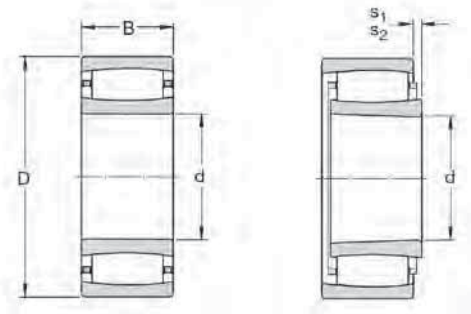
$$P = F_r$$

Equivalent static bearing load

Torodial bearings can only accommodate radial loads $P_0 = F_r$

Torodial Roller Bearings

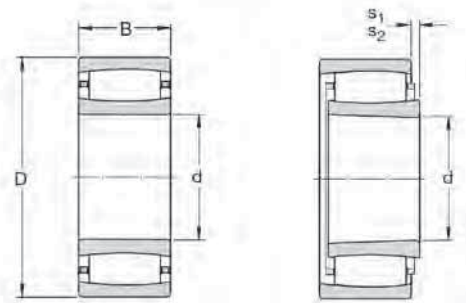
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	COr	Grease	Oil	(kg)	
25	52	17	48	48	4200	5040	0,18	C 2205 KV
25	52	17	48	48	4200	5040	0,18	C 2205 V
30	55	43	127	180	1800	2160	0,5	C 6006 V
30	62	19	66	62	9000	10800	0,27	C 2206 KTN9
30	62	19	73	71	3600	4320	0,29	C 2206 KV
30	62	19	66	62	9000	10800	0,27	C 2206 TN9
30	62	19	73	71	3600	4320	0,29	C 2206 V
35	72	22	79	80	7800	9360	0,43	C 2207 KTN9
35	72	22	90	96	3000	3600	0,45	C 2207 KV
35	72	22	79	80	7800	9360	0,43	C 2207 TN9
35	72	22	90	96	3000	3600	0,45	C 2207 V
40	62	21	73	100	2580	3100	0,25	C 4908 K30V
40	62	21	73	100	2580	3100	0,25	C 4908 V
40	62	38	116	180	1680	2020	0,47	C 6908 V
40	80	22	86	86,5	6600	7920	0,5	C 2208 KTN9
40	80	22	97	104	2700	3240	0,53	C 2208 KV
40	80	22	86	86,5	6600	7920	0,5	C 2208 TN9
40	80	22	97	104	2700	3240	0,53	C 2208 V
45	68	21	77	112	2280	2740	0,3	C 4909
45	68	21	77	112	2280	2740	0,3	C 4909
45	68	29	105	163	1920	2300	0,41	C 5909
45	68	38	125	200	1560	1870	0,55	C 6909
45	85	22	88	93	6600	7920	0,55	C 2209
45	85	22	101	110	2580	3100	0,58	C 2209
45	85	22	88	93	6600	7920	0,55	C 2209
45	85	22	101	110	2580	3100	0,58	C 2209
50	72	21	82	125	2160	2590	0,29	C 4910 K30V
50	72	21	82	125	2160	2590	0,29	C 4910 V
50	72	29	112	180	1680	2020	0,42	C 5910 V
50	72	38	133	224	1320	1580	0,54	C 6910 V
50	80	29	110	140	4500	5400	0,55	C 4010 K30TN9
50	80	29	130	176	1800	2160	0,59	C 4010 K30V
50	80	29	110	140	4500	5400	0,55	C 4010 TN9
50	80	29	130	176	1800	2160	0,59	C 4010 V
50	90	22	93	100	5700	6840	0,59	C 2210 KTN9
50	90	22	108	122	2280	2740	0,62	C 2210 KV

Torodial Roller Bearings

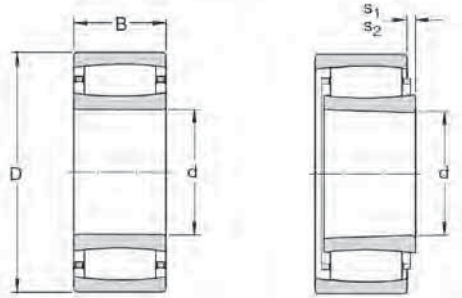
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	COr	Grease	Oil	(kg)	
50	90	22	93	100	5700	6840	0,59	C 2210 TN9
50	90	22	108	122	2280	2740	0,62	C 2210 V
55	80	24	101	153	1920	2300	0,43	C 4911 K30V
55	80	24	101	153	1920	2300	0,43	C 4911 V
55	80	32	136	224	1560	1870	0,6	C 5911 V
55	80	43	171	300	1200	1440	0,81	C 6911 V
55	100	24	110	114	5400	6480	0,79	C 2211 KTN9
55	100	24	125	134	2040	2450	0,81	C 2211 KV
55	100	24	110	114	5400	6480	0,79	C 2211 TN9
55	100	24	125	134	2040	2450	0,81	C 2211 V
60	85	24	106	170	1800	2160	0,46	C 4912 K30V
60	85	24	106	170	1800	2160	0,46	C 4912 V
60	85	32	143	240	1440	1730	0,64	C 5912 V
60	85	43	181	335	1140	1370	0,84	C 6912 V
60	110	27	136	156	4500	5400	1,1	C 2212 KTN9
60	110	27	158	190	1680	2020	1,15	C 2212 KV
60	110	27	136	156	4500	5400	1,1	C 2212 TN9
60	110	27	158	190	1680	2020	1,15	C 2212 V
65	90	24	110	180	1680	2020	0,5	C 4913 K30V
65	90	24	110	180	1680	2020	0,5	C 4913 V
65	90	32	148	260	1320	1580	0,7	C 5913 V
65	90	43	186	355	1080	1300	0,93	C 6913 V
65	100	33	186	275	1440	1730	1	C 4013 K30V
65	100	33	186	275	1440	1730	1	C 4013 V
65	120	29	171	180	4500	5400	1,4	C 2213 KTN9
65	120	29	194	216	1440	1730	1,47	C 2213 KV
65	120	29	171	180	4500	5400	1,4	C 2213 TN9
65	120	29	194	216	1440	1730	1,47	C 2213 V
70	100	29	155	240	1560	1870	0,78	C 4914 K30V
70	100	29	155	240	1560	1870	0,78	C 4914 V
70	100	38	186	310	1200	1440	1	C 5914 V
70	100	51	252	455	1020	1220	1,4	C 6914 V
70	125	29	177	196	4200	5040	1,45	C 2214 KTN9
70	125	29	201	228	1440	1730	1,5	C 2214 KV
70	125	29	177	196	4200	5040	1,45	C 2214 TN9
70	125	29	201	228	1440	1730	1,5	C 2214 V
70	150	48	385	430	3000	3600	4,25	C 2314
70	150	48	385	430	3000	3600	4,25	C 2314 K
75	105	29	158	255	1440	1730	0,82	C 4915 K30V
75	105	29	158	255	1440	1730	0,82	C 4915 V
75	105	38	194	325	1140	1370	1,1	C 5915 V
75	105	51	194	325	960	1150	1,4	C 6915 V/DE240
75	115	38	198	345	1200	1440	1,6	C 4015 K30V
75	115	38	198	345	1200	1440	1,6	C 4015 V
75	130	29	186	208	4020	4820	1,6	C 2215

Torodial Roller Bearings

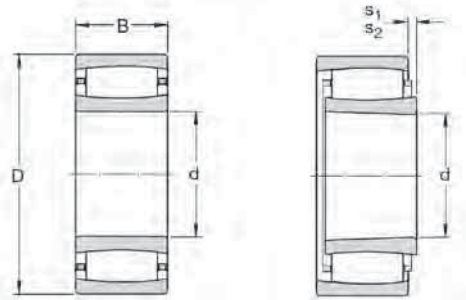
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	C0r	Grease	Oil	(kg)	
75	130	29	186	208	4020	4820	1,6	C 2215 K
75	130	29	209	240	1320	1580	1,65	C 2215 KV
75	130	29	209	240	1320	1580	1,65	C 2215 V
75	160	52	404	465	2880	3460	5,2	C 2315
75	160	52	404	465	2880	3460	5,2	C 2315 K
80	110	29	164	275	1320	1580	0,87	C 4916 K30V
80	110	29	164	275	1320	1580	0,87	C 4916 V
80	110	38	198	345	1080	1300	1,2	C 5916 V
80	140	31	209	250	3600	4320	2	C 2216
80	140	31	209	250	3600	4320	2	C 2216 K
80	140	31	242	305	1200	1440	2,1	C 2216 KV
80	140	31	242	305	1200	1440	2,1	C 2216 V
80	170	55	485	550	2700	3240	6,2	C 2316
80	170	55	485	550	2700	3240	6,2	C 2316 K
85	120	33	213	355	1200	1440	1,3	C 4917 K30V
85	120	33	213	355	1200	1440	1,3	C 4917 V
85	120	44	261	465	1020	1220	1,7	C 5917 V
85	150	34	261	320	3360	4030	2,6	C 2217
85	150	34	261	320	3360	4030	2,6	C 2217 K
85	150	34	299	390	1080	1300	2,8	C 2217 KV
85	150	34	299	390	1080	1300	2,8	C 2217 V
85	180	57	513	600	2580	3100	7,3	C 2317
85	180	57	513	600	2580	3100	7,3	C 2317 K
90	125	33	177	315	1200	1440	1,3	C 4918 K30V
90	125	33	177	315	1200	1440	1,3	C 4918 V
90	125	44	183	325	2400	2880	1,75	C 5918 MB
90	125	44	213	400	960	1150	1,75	C 5918 V
90	150	68	432	670	900	1080	5,1	BSC-2039
90	160	38	309	380	3180	3820	3,3	C 2218
90	160	38	309	380	3180	3820	3,3	C 2218 K
90	190	61	580	695	2400	2880	8,5	C 2318
90	190	61	580	695	2400	2880	8,5	C 2318 K
95	170	41	342	400	3000	3600	4	C 2219
95	170	41	342	400	3000	3600	4	C 2219
95	200	64	580	695	2400	2880	10	C 2319
95	200	64	580	695	2400	2880	10	C 2319
100	140	38	261	450	1020	1220	1,9	C 4920 K30V
100	140	38	261	450	1020	1220	1,9	C 4920 V
100	140	51	356	640	840	1010	2,7	C 5920 V
100	150	48	337	530	840	1010	3,05	C 4020 K30V
100	150	48	337	530	840	1010	3,05	C 4020 V
100	150	64	485	865	660	790	4,3	C 5020 V
100	165	49	451	655	780	940	4,4	C 3120 KV
100	165	49	451	655	780	940	4,4	C 3120 V
100	165	49	451	655	780	940	5,25	C 4120 K30V/DE240

Torodial Roller Bearings

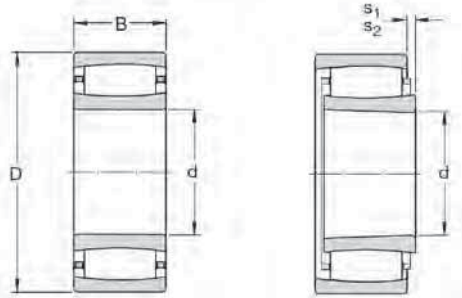
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	C0r	Grease	Oil	(kg)	
100	165	62	451	655	780	940	5,25	C 4120 V/DE240
100	180	44	394	465	2880	3460	4,85	C 2220
100	180	44	394	465	2880	3460	4,85	C 2220 K
100	215	69	760	880	2160	2590	12,5	C 2320
100	215	69	760	880	2160	2590	12,5	C 2320 K
110	170	43	337	480	2700	3240	3,5	C 3022
110	170	43	337	480	2700	3240	3,5	C 3022 K
110	170	57	409	655	2040	2450	5,3	C 4022 K30MB
110	170	57	475	800	720	860	5,2	C 4022 K30V
110	170	57	409	655	2040	2450	5,3	C 4022 MB
110	170	57	475	800	720	860	5,2	C 4022 V
110	180	66	637	1000	540	650	7,05	C 4122 K30V
110	180	66	637	1000	540	650	7,05	C 4122 V
110	200	50	504	620	2580	3100	6,9	C 2222
110	200	50	504	620	2580	3100	6,9	C 2222 K
120	180	44	356	530	2400	2880	3,9	C 3024
120	180	44	356	530	2400	2880	3,9	C 3024 K
120	180	44	409	640	840	1010	4,05	C 3024 KV
120	180	44	409	640	840	1010	4,05	C 3024 V
120	180	57	504	880	660	790	5,5	C 4024 K30V
120	180	57	504	880	660	790	5,5	C 4024 V
120	200	76	741	1120	450	540	10,5	C 4124 K30V
120	200	76	741	1120	450	540	10,5	C 4124 V
120	215	55	580	710	2400	2880	8,6	C 2224
120	215	55	580	710	2400	2880	8,6	C 2224 K
120	215	72	713	980	1920	2300	11,5	C 3224
120	215	72	713	980	1920	2300	11,5	C 3224 K
130	200	49	371	585	2280	2740	5,9	C 3026
130	200	49	371	585	2280	2740	5,9	C 3026 K
130	200	66	589	930	1680	2020	7,84	C 4026
130	200	66	589	930	1680	2020	7,84	C 4026 K30
130	200	66	684	1120	510	610	8,05	C 4026 K30V
130	200	66	684	1120	510	610	8,05	C 4026 V
130	210	76	713	1100	400	480	10,5	C 4126 K30V/DE240
130	210	76	713	1100	400	480	10,5	C 4126 V/DE240
130	230	61	698	930	2280	2740	11	C 2226
130	230	61	698	930	2280	2740	11	C 2226 K
130	280	88	931	1220	1920	2300	27,5	C 2326 K/DE240
130	280	88	931	1220	1920	2300	27,5	C 2326/DE240
140	210	50	466	735	2040	2450	6,3	C 3028
140	210	50	466	735	2040	2450	6,3	C 3028 K
140	210	66	713	1220	480	580	8,55	C 4028 K30V
140	210	66	713	1220	480	580	8,55	C 4028 V
140	225	81	950	1600	380	450	14,2	C 4128 K30V
140	225	81	950	1600	380	450	14,2	C 4128 V

Torodial Roller Bearings

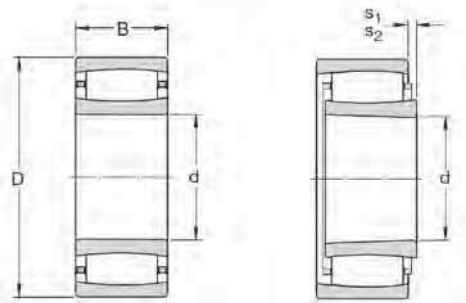
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	COr	Grease	Oil	(kg)	
140	250	65	789	1060	2040	2450	13,8	C 2228
140	250	65	789	1060	2040	2450	13,8	C 2228 K
150	225	53	513	850	1920	2300	8,45	C 3030 KMB
150	225	53	556	960	600	720	8	C 3030 KV
150	225	53	513	850	1920	2300	8,45	C 3030 MB
150	225	53	556	960	600	720	8	C 3030 V
150	225	71	741	1320	450	540	10,5	C 4030 K30V
150	225	71	741	1320	450	540	10,5	C 4030 V
150	250	76	836	1290	1680	2020	15	C 3130
150	250	76	836	1290	1680	2020	15	C 3130 K
150	250	95	1159	1860	270	320	20,5	C 4130 K30V
150	250	95	1159	1860	270	320	20,5	C 4130 V
150	270	69	931	1220	1920	2300	17,5	C 2230
150	270	69	931	1220	1920	2300	17,5	C 2230 K
160	240	57	570	980	1800	2160	9,6	C 3032
160	240	57	570	980	1800	2160	9,6	C 3032 K
160	240	76	755	1160	1440	1730	12,3	C 4032
160	240	76	755	1160	1440	1730	12,3	C 4032 K30
160	240	76	869	1460	360	430	12,6	C 4032 K30V
160	240	76	869	1460	360	430	12,6	C 4032 V
160	270	82	950	1400	1560	1870	21,5	C 3132 KMB
160	270	82	950	1400	1560	1870	21,5	C 3132 MB
160	270	104	1387	2160	180	220	26	C 4132 K30V
160	270	104	1387	2160	180	220	26	C 4132 V
160	290	99	1302	1830	1440	1730	28,5	C 3232
160	290	99	1302	1830	1440	1730	28,5	C 3232 K
170	260	64	713	1160	1680	2020	12,5	C 3034
170	260	64	713	1160	1680	2020	12,5	C 3034 K
170	260	86	1083	1860	300	360	17,5	C 4034 K30V
170	260	86	1083	1860	300	360	17,5	C 4034 V
170	280	84	988	1460	1560	1870	21	C 3134
170	280	84	988	1460	1560	1870	21	C 3134 K
170	280	104	1454	2280	170	200	27	C 4134 K30V
170	280	104	1454	2280	170	200	27	C 4134 V
170	310	82	1207	1630	1560	1870	28	C 2234
170	310	82	1207	1630	1560	1870	28	C 2234 K
180	280	70	836	1340	1560	1870	16,5	C 3036
180	280	70	836	1340	1560	1870	16,5	C 3036 K
180	280	70	836	1340	1560	1870	16,5	C 3036 K/DA3C4
180	280	95	1254	2120	260	310	23	C 4036 K30V
180	280	95	1254	2120	260	310	23	C 4036 V
180	300	91	1188	1730	1440	1730	26	C 3136
180	300	91	1188	1730	1440	1730	26	C 3136 K
180	300	91	1188	1730	1440	1730	26	C 3136 K/DA3C4
180	300	112	1672	2700	130	160	34,5	C 4136 K30V

Torodial Roller Bearings

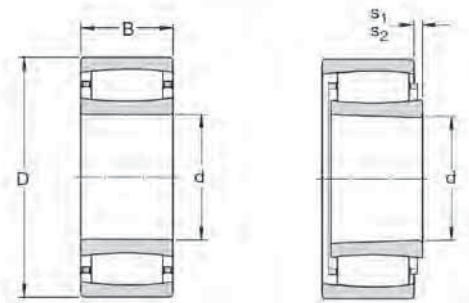
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	C0r	Grease	Oil	(kg)	
180	300	112	1672	2700	130	160	34,5	C 4136 V
180	320	106	1454	2200	1200	1440	37	C 3236
180	320	106	1454	2200	1200	1440	37	C 3236 K
190	290	71	884	1460	1440	1730	17,5	C 3038
190	290	71	884	1460	1440	1730	17,5	C 3038 K
190	290	71	884	1460	1440	1730	17,5	C 3038 K/DA3C4
190	290	95	1302	2320	230	270	24,5	C 4038 K30V
190	290	95	1302	2320	230	270	24,5	C 4038 V
190	320	99	1454	2200	1320	1580	33,5	C 3138
190	320	99	1454	2200	1320	1580	33,5	C 3138 K
190	320	122	1938	3150	80	90	43	C 4138 K30V
190	320	122	1938	3150	80	90	43	C 4138 V
190	340	87	1302	1730	1440	1730	34	C 2238
190	340	87	1302	1730	1440	1730	34	C 2238 K
190	340	87	1302	1730	1440	1730	34	C 2238 K/DA3C4
200	310	78	1064	1730	1440	1730	22	C 3040
200	310	78	1064	1730	1440	1730	22	C 3040 K
200	310	78	1064	1730	1440	1730	22	C 3040 K/DA3C4
200	310	104	1549	2650	160	190	30,5	C 4040 K30V
200	310	104	1549	2650	160	190	30,5	C 4040 V
200	340	106	1520	2320	1200	1440	40	C 3140
200	340	106	1520	2320	1200	1440	40	C 3140 K
200	340	106	1520	2320	1200	1440	40	C 3140 K/DA3C4
200	340	133	2242	3650	50	60	54	C 4140 K30V
200	340	133	2242	3650	50	60	54	C 4140 V
220	340	86	1254	2040	1320	1580	29	C 3044
220	340	86	1254	2040	1320	1580	29	C 3044 K
220	340	86	1254	2040	1320	1580	29	C 3044 K/DA3C4
220	340	112	1834	3250	120	140	40	C 4044 K30V
220	340	112	1834	3250	120	140	40	C 4044 V
220	370	114	1805	2900	1140	1370	51	C 3144
220	370	114	1805	2900	1140	1370	51	C 3144 K
220	370	114	1805	2900	1140	1370	51	C 3144 K/DA3C4
220	400	103	1900	2500	1200	1440	56,5	C 2244
220	400	103	1900	2500	1200	1440	56,5	C 2244 K
220	400	103	1900	2500	1200	1440	56,5	C 2244 K/DA3C4
240	360	87	1273	2160	1200	1440	31,5	C 3048
240	360	87	1273	2160	1200	1440	31,5	C 3048 K
240	360	87	1273	2160	1200	1440	31,5	C 3048 K/DA3C4
240	400	122	2204	3450	1020	1220	63	C 3148
240	400	122	2204	3450	1020	1220	63	C 3148 K
240	400	122	2204	3450	1020	1220	63	C 3148 K/DA3C4
260	400	99	1672	2850	1080	1300	46	C 3052
260	400	99	1672	2850	1080	1300	46	C 3052 K
260	400	99	1672	2850	1080	1300	46	C 3052 K/DA3C4

Torodial Roller Bearings

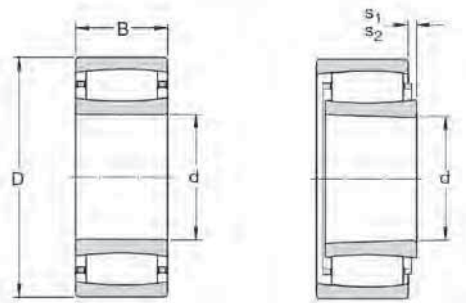
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	C0r	Grease	Oil	(kg)	
260	440	137	2518	4050	900	1080	87	C 3152
260	440	137	2518	4050	900	1080	87	C 3152 K
260	440	137	2518	4050	900	1080	87	C 3152 K/DA3C4
280	420	101	1767	3100	960	1150	50	C 3056
280	420	101	1767	3100	960	1150	50	C 3056 K
280	420	101	1767	3100	960	1150	50	C 3056 K/DA3C4
280	460	139	2708	4500	840	1010	93	C 3156
280	460	139	2708	4500	840	1010	93	C 3156 K
280	460	139	2708	4500	840	1010	93	C 3156 K/DA3C4
300	460	112	2052	3750	900	1080	71	C 3060 KM
300	460	112	2052	3750	900	1080	71	C 3060 M
300	460	152	2755	4900	720	860	95,5	C 4060 K30M
300	460	152	2755	4900	720	860	95,5	C 4060 M
300	500	152	3088	5200	780	940	120	C 3160
300	500	152	3088	5200	780	940	120	C 3160 K
300	500	152	3088	5200	780	940	120	C 3160 K/DA3C4
300	500	190	3943	6700	600	720	165	C 4160 K30MB
300	500	190	3943	6700	600	720	165	C 4160 MB
320	480	115	2166	4000	840	1010	76,5	C 3064 KM
320	480	115	2166	4000	840	1010	76,5	C 3064 M
320	540	167	3943	6300	780	940	160	C 3164 KM
320	540	167	3943	6300	780	940	160	C 3164 M
340	520	126	2755	5000	780	940	100	C 3068 KM
340	520	126	2755	5000	780	940	100	C 3068 M
340	580	181	4655	7500	720	860	205	C 3168 KM
340	580	181	4655	7500	720	860	205	C 3168 KM/DA3C4
340	580	181	4655	7500	720	860	205	C 3168 M
360	480	86	1672	3250	840	1010	44	C 3972 KM
360	480	86	1672	3250	840	1010	44	C 3972 M
360	540	127	2755	5000	720	860	105	C 3072 KM
360	540	127	2755	5000	720	860	105	C 3072 KM/DA3C4
360	540	127	2755	5000	720	860	105	C 3072 M
360	600	182	4750	8000	660	790	215	C 3172 KM
360	600	182	4750	8000	660	790	215	C 3172 KM/DA3C4
360	600	182	4750	8000	660	790	215	C 3172 M
380	520	101	2014	4000	780	940	66	C 3976 KM
380	520	101	2014	4000	780	940	66	C 3976 M
380	560	128	2850	5200	720	860	110	C 3076 KM
380	560	128	2850	5200	720	860	110	C 3076 M
380	620	184	4180	7200	600	720	243	C 3176 KMB
380	620	184	4180	7200	600	720	243	C 3176 MB
400	540	101	2014	4000	780	940	68,5	C 3980 KM
400	540	101	2014	4000	780	940	68,5	C 3980 M
400	600	141	3468	6200	660	790	145	C 3080 KM
400	600	141	3468	6200	660	790	145	C 3080 M

Torodial Roller Bearings

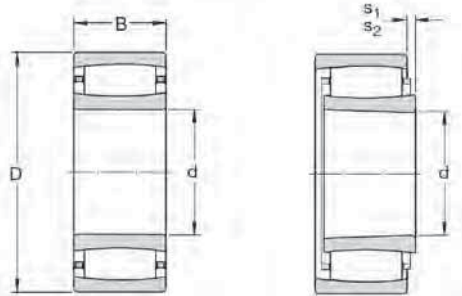
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	C0r	Grease	Oil	(kg)	
400	650	190	4560	8300	570	680	258	C 3180 KM
400	650	190	4560	8300	570	680	258	C 3180 M
420	560	101	2052	4250	720	860	71	C 3984 KM
420	560	101	2052	4250	720	860	71	C 3984 M
420	620	143	3610	6400	660	790	150	C 3084 KM
420	620	143	3610	6400	660	790	150	C 3084 M
420	700	213	5700	10400	540	650	340	C 3184 KM
420	700	213	5700	10400	540	650	340	C 3184 KM/DA3C4
420	700	213	5700	10400	540	650	340	C 3184 M
440	600	112	2470	5300	660	790	99	C 3988 KM
440	600	112	2470	5300	660	790	99	C 3988 M
440	650	149	3563	6400	600	720	185	C 3088 KMB
440	650	149	3563	6400	600	720	185	C 3088 MB
440	720	215	6365	11400	510	610	385	C 3188 KMB
440	720	215	6365	11400	510	610	385	C 3188 MB
440	720	266	7125	12900	400	480	471	C 4188 K30MB
440	720	266	7125	12900	400	480	471	C 4188 MB
460	620	112	2565	5300	660	790	100	C 3992 KMB
460	620	112	2565	5300	660	790	100	C 3992 MB
460	680	155	3800	7500	570	680	200	C 3092 KM
460	680	155	3800	7500	570	680	200	C 3092 KM/DA3C4
460	680	155	3800	7500	570	680	200	C 3092 M
460	760	228	6460	12000	480	580	430	C 3192 KM
460	760	228	6460	12000	480	580	430	C 3192 M
460	760	285	7885	14300	380	450	535	C 4192 K30M
460	760	285	7885	14300	380	450	535	C 4192 M
480	650	122	2945	6100	600	720	120	C 3996 KM
480	650	122	2945	6100	600	720	120	C 3996 M
480	700	157	3848	7800	540	650	210	C 3096 KM
480	700	157	3848	7800	540	650	210	C 3096 M
480	790	236	6603	12500	450	540	523	C 3196 KMB
480	790	236	6603	12500	450	540	523	C 3196 MB
500	670	122	2993	6300	570	680	125	C 39/500 KM
500	670	122	2993	6300	570	680	125	C 39/500 M
500	720	159	4038	8300	540	650	225	C 30/500 KM
500	720	159	4038	8300	540	650	225	C 30/500 KM/DA3C4
500	720	159	4038	8300	540	650	225	C 30/500 M
500	830	251	7125	12700	450	540	550	C 31/500 KM
500	830	251	7125	12700	450	540	550	C 31/500 KM/DA3C4
500	830	251	7125	12700	450	540	550	C 31/500 M
500	830	309	9690	18600	330	400	730	C 41/500 K30MB
500	830	309	9690	18600	330	400	730	C 41/500 MB
530	710	129	3373	7100	540	650	150	C 39/530 KM
530	710	129	3373	7100	540	650	150	C 39/530 M
530	780	176	4845	9500	480	580	295	C 30/530 KM

Torodial Roller Bearings

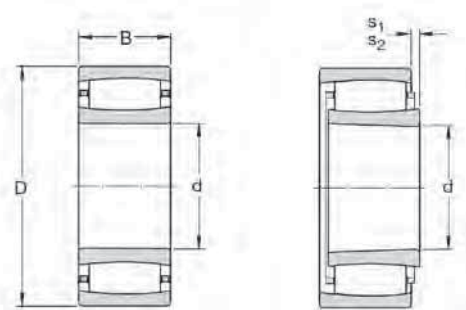
Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	COr	Grease	Oil	(kg)	
530	780	176	4845	9500	480	580	295	C 30/530 KM/DA3C4
530	780	176	4845	9500	480	580	295	C 30/530 M
530	870	258	8360	15600	400	480	630	C 31/530 KM
530	870	258	8360	15600	400	480	630	C 31/530 KM/DA3C4
530	870	258	8360	15600	400	480	630	C 31/530 M
560	750	133	3420	7350	510	610	170	C 39/560 KM
560	750	133	3420	7350	510	610	170	C 39/560 M
560	820	185	5320	11000	450	540	345	C 30/560 KM
560	820	185	5320	11000	450	540	345	C 30/560 KM/DA3C4
560	820	185	5320	11000	450	540	345	C 30/560 M
560	920	266	9025	17000	400	480	750	C 31/560 KMB
560	920	266	9025	17000	400	480	750	C 31/560 MB
600	800	143	3800	8800	450	540	210	C 39/600 KM
600	800	143	3800	8800	450	540	210	C 39/600 M
600	870	190	5985	12200	420	500	390	C 30/600 KM
600	870	190	5985	12200	420	500	390	C 30/600 KM/DA3C4
600	870	190	5985	12200	420	500	390	C 30/600 M
600	980	285	9690	18000	360	430	929	C 31/600 KMB
600	980	285	9690	18000	360	430	929	C 31/600 MB
600	980	356	12255	23200	270	320	1150	C 41/600 K30MB
600	980	356	12255	23200	270	320	1150	C 41/600 MB
630	850	157	4418	10000	420	500	270	C 39/630 KM
630	850	157	4418	10000	420	500	270	C 39/630 M
630	920	201	6460	12900	400	480	465	C 30/630 KM
630	920	201	6460	12900	400	480	465	C 30/630 KM/DA3C4
630	920	201	6460	12900	400	480	465	C 30/630 M
630	1030	299	11210	20800	330	400	1089	C 31/630 KMB
630	1030	299	11210	20800	330	400	1089	C 31/630 MB
670	900	162	4845	11600	380	450	335	C 39/670 KMB
670	900	162	4845	11600	380	450	335	C 39/670 MB
670	980	219	7743	16300	360	430	580	C 30/670 KM
670	980	219	7743	16300	360	430	580	C 30/670 KM/DA3C4
670	980	219	7743	16300	360	430	580	C 30/670 M
670	1090	319	11400	22000	320	380	1230	C 31/670 KMB
670	1090	319	11400	22000	320	380	1230	C 31/670 MB
710	950	171	5700	12500	380	450	355	C 39/710 KM
710	950	171	5700	12500	380	450	355	C 39/710 M
710	1030	224	8360	17300	330	400	645	C 30/710 KM
710	1030	224	8360	17300	330	400	645	C 30/710 M
710	1030	299	10070	21600	260	310	860	C 40/710 K30M
710	1030	299	10070	21600	260	310	860	C 40/710 M
710	1150	328	12065	24000	290	350	1410	C 31/710 KMB
710	1150	328	12065	24000	290	350	1410	C 31/710 MB
750	1000	176	5795	13400	330	400	405	C 39/750 KM
750	1000	176	5795	13400	330	400	405	C 39/750 M

Torodial Roller Bearings

Non-standardized



Principal dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	B	Cr	C0r	Grease	Oil	(kg)	
750	1090	238	9025	19300	320	380	838	C 30/750 KMB
750	1090	238	9025	19300	320	380	838	C 30/750 MB
750	1220	347	13015	30500	270	320	1802	C 31/750 KMB
750	1220	347	13015	30500	270	320	1802	C 31/750 MB
800	1060	185	6080	14600	320	380	470	C 39/800 KMB
800	1060	185	6080	14600	320	380	470	C 39/800 MB
800	1150	245	8693	18600	290	350	860	C 30/800 KMB
800	1150	245	8693	18600	290	350	860	C 30/800 MB
800	1280	356	14820	30500	240	290	1870	C 31/800 KMB
800	1280	356	14820	30500	240	290	1870	C 31/800 MB
850	1120	190	6983	16300	290	350	530	C 39/850 KM
850	1120	190	6983	16300	290	350	530	C 39/850 M
850	1220	258	11020	24500	270	320	1105	C 30/850 KMB
850	1220	258	11020	24500	270	320	1105	C 30/850 MB
850	1360	380	15200	32000	230	270	2260	C 31/850 KMB
850	1360	380	15200	32000	230	270	2260	C 31/850 MB
900	1180	196	7743	18000	270	320	580	C 39/900 KMB
900	1180	196	7743	18000	270	320	580	C 39/900 MB
900	1280	266	12065	26500	240	290	1200	C 30/900 KMB
900	1280	266	12065	26500	240	290	1200	C 30/900 MB
950	1250	213	8835	22000	260	310	745	C 39/950 KMB
950	1250	213	8835	22000	260	310	745	C 39/950 MB
950	1360	285	12255	27500	230	270	1410	C 30/950 KMB
950	1360	285	12255	27500	230	270	1410	C 30/950 MB
1000	1420	293	12730	29000	200	240	1570	C 30/1000 KMB
1000	1420	293	12730	29000	200	240	1570	C 30/1000 MB
1000	1580	439	21660	45500	180	220	3470	C 31/1000 KMB
1000	1580	439	21660	45500	180	220	3470	C 31/1000 MB
1060	1400	238	10450	26000	220	260	1120	C 39/1060 KMB
1060	1400	238	10450	26000	220	260	1120	C 39/1060 MB
1180	1540	258	12730	33500	180	220	1400	C 39/1180 KMB
1180	1540	258	12730	33500	180	220	1400	C 39/1180 MB
1250	1750	356	19380	45000	140	170	2740	C 30/1250 KMB
1250	1750	356	19380	45000	140	170	2740	C 30/1250 MB



Cylindrical roller bearings

Single row cylindrical roller bearings are manufactured in several basic separable designs, with different guide flange locations to achieve a variety of capabilities. In case of cylindrical roller bearings, the rollers are laterally guided by the fixed ribs of one ring. Cylindrical roller bearings are especially suitable for use in applications with heavy radial loads, high speeds, and where interference fits are required on both bearing rings.

DAS LAGER single or more rows cylindrical roller bearings are manufactured 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 following.

NU

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

N

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

NJ

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).

NUP

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.

NNU49- NN30:

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 machinetools and rolling mills.

FULL COMPLEMENT:

Cylindrical roller bearings without cage 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

- single row



NU



NJ



NUP



N



RNU

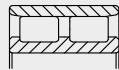


NJ+HJ

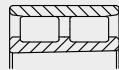


NU+HJ

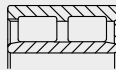
- double row



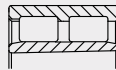
NN30



NN30K



NNU49



NNU49K

- without cage (full complement)



NCF V



NJ VH

Suffix:

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
MA	Machined brass cage guided in the 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
ZS	NA radial clearance; changing the bearing elements, the clearance can be obtained from the interchangeable elements.

Dimensions

The main dimensions of standardized bearings given in tables are in accordance with ISO 15.

Misalignment

The modified contact between rollers and raceway allows not only peripheral stresses to be avoided but also, in case of single row roller bearings, permits an angular misalignment of the outer ring with respect to the inner ring, depending on the bearing series and load according to the table 1.

Tolerances and radial clearance

Single row cylindrical roller bearings are usually manufactured to normal tolerance class with normal radial clearance.

They can also be manufactured to more accurate tolerance classes and with larger (C3NA and C4NA) or smaller (C1NA and C2NA) radial clearances.

Tolerances of cylindrical roller bearings are given on pages 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).

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		C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm									
24	30	0	25	20	45	35	60	50	75	65	90
30	40	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.

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 weight, 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												Table 3	
With cylindrical bore ¹⁾													
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

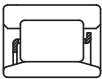
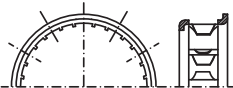
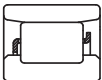
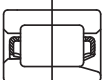
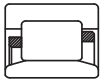
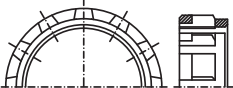
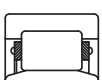
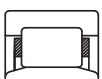
Cylindrical roller bearings must be subjected to a given minimum load, so that a proper operation of these bearings can be guaranteed.

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:

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

Cage design and some technical data				
Cage	Design bearing	cage	Application	Max. value
				$D_m n$ oil grease
Pressed sheet cage with fins			- General application - Low inertia - Provides proper bearing lubrication - Moderate speeds - Bearings NU, NJ, NUP	550x10 ³ 400x10 ³
Pressed sheet cage with fins			- General application - Low inertia - Provides proper bearing lubrication - Moderate speeds - Bearings N	550x10 ³ 400x10 ³
Pressed sheet cage			- General application - Low inertia - Provides proper bearing lubrication - Moderate speeds - Bearings construction E type NU, NJ, NUP	550x10 ³ 400x10 ³
Polyamide cage TN			- General application - Low frictional moment - High speeds - Bearings with d < 150 mm	1400x10 ³ 1100x10 ³
Machined brass cage M, MA, MB			- General application - Heavy loads - Moderate and high speeds - Bearings with d > 150 mm	1200x10 ³ 900x10 ³
One piece machined brass cage MPA			- General application - Heavy loads - Provides proper lubrication - High speeds	1400x10 ³ 1100x10 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:

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

Dynamic axial load

Bearings with ribs on the outer ring can accommodate axial loads in addition to radial loads. The axial load carrying capacity of cylindrical roller bearings do not depend essentially on the steel fatigue strength, but on the resistance of the sliding surfaces at the roller end and rib contact and therefore on lubrication, operating temperature and bearing thermal conductivity.

Considering the above mentioned, axial load carrying capacity of a cylindrical roller bearing can be enough accurately calculated using the following equation:

$$F_{a \max} = \frac{k_1 C_{0r} 10^4}{n(d + D)} - k_2 F_r,$$

where:

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

C_{0r} - radial static load, kN

F_r - radial load component, kN

n - operating speed, r/min

d - bearing bore diameter, mm

D - bearing outside diameter, mm

k_1 - auxiliary factor, see table 5

k_2 - auxiliary factor, see table 5

The above equation is based on conditions which are considered typical for normal bearing operation:

- a difference of 60°C between the bearing operating temperature and the ambient temperature

- a specific heat loss from the bearing of 0,5 mW/mm²°C

- a viscosity ratio $k=2$.

The viscosity ratio k is the ratio of the actual viscosity at the operating temperature to the requisite viscosity for a proper lubrication at that temperature. Further details can be found in subchapter "Adjusted rating life", life adjustment factor a_{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 $3D^2$.

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 rigs should not be less 59 HRC.

Small-sized bearings operate normally up to $+120^{\circ}\text{C}$.

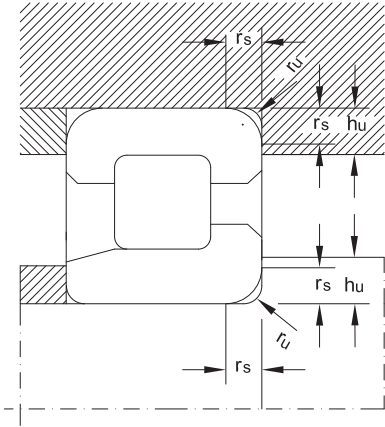
Abutment dimensions

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 $r_{s\text{ min}}$.

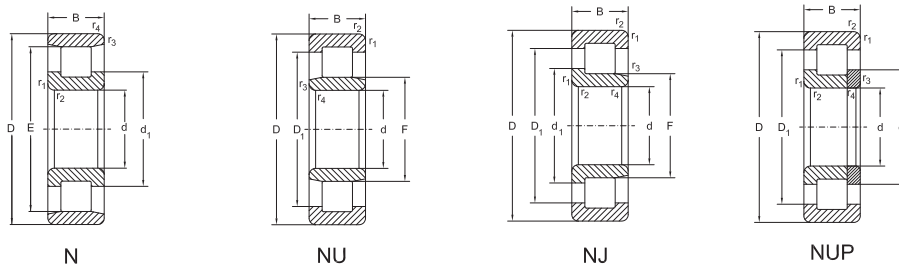
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

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

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

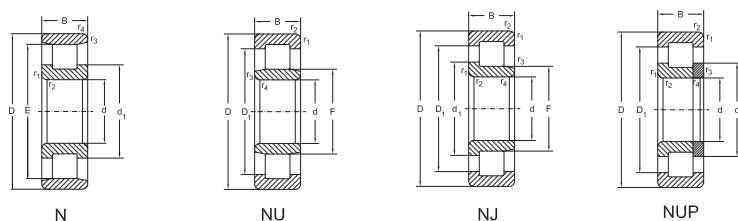


Single Row Cylindrical Roller Bearings



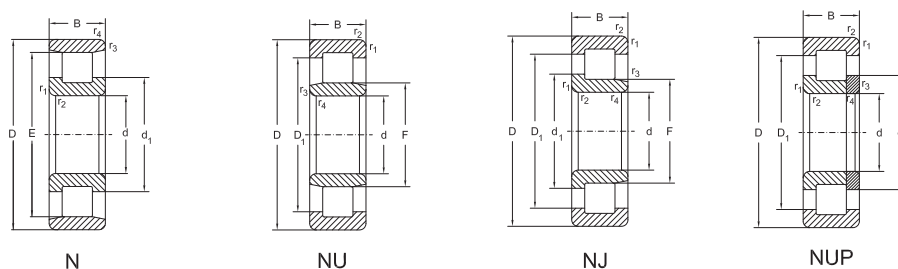
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
15	35	11	0,6	0,3	1	11,9	9,7	18000	22000	N 202 E
	35	11	0,6	0,3	1	11,9	9,7	18000	22000	NU 202 E
	35	11	0,6	0,3	-	11,9	9,7	18000	22000	NJ 202 E
17	40	12	0,6	0,3	1,2	16,3	13,6	15000	18000	N 203 E
	40	12	0,6	0,3	1,2	16,3	13,6	15000	18000	NU 203 E
	40	12	0,6	0,3	-	16,3	13,6	15000	18000	NJ 203 E
	40	12	0,6	0,3	-	16,3	13,6	15000	18000	NUP 203 E
	40	16	0,6	0,3	1,0	16,3	13,6	15000	18000	NU 2203 E
	40	16	0,6	0,3	-	22,6	20,5	15000	18000	NJ 2203 E
	40	16	0,6	0,3	-	22,6	20,5	15000	18000	NUP 2203 E
	47	14	1,1	0,6	1,2	23,4	19,4	13000	16000	NU 303 E
	47	14	1,1	0,6	-	23,4	19,4	13000	16000	NJ 303 E
	47	14	1,1	0,6	-	23,4	19,4	13000	16000	NUP 303 E
20	47	14	1	0,6	1	23,8	20,9	13000	16000	N 204 E
	47	14	1	0,6	1	23,8	20,9	13000	16000	NU 204 E
	47	14	1	0,6	-	23,8	20,9	13000	16000	NJ 204 E
	47	14	1	0,6	-	23,8	20,9	13000	16000	NUP 204 E
	47	18	1	0,6	1,8	28,2	26,1	13000	16000	NU 2204 E
	47	18	1	0,6	-	28,2	26,1	13000	16000	NJ 2204 E
	47	18	1	0,6	-	28,2	26,1	13000	16000	NUP 2204 E
	52	15	1	0,6	1,1	33,7	24,7	11000	14000	N 304 E
	52	15	1	0,6	1,1	33,7	24,7	11000	14000	NU 304 E
	52	15	1	0,6	-	33,7	24,7	11000	14000	NJ 304 E

Single Row Cylindrical Roller Bearings



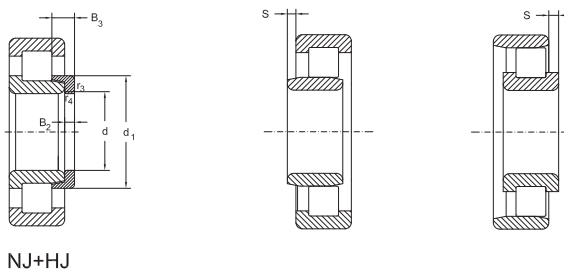
Dimensions				Thrust collar				Weight	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
15	30,3	-	21,8	-	-	-	-	0,047	-
	-	19,3	-	27,8	-	-	-	0,047	-
	-	19,3	21,8	27,8	2,5	5	HJ 202 E	0,047	0,007
17	35,1	-	24,7	-	-	-	-	0,068	-
	-	22,1	-	32	-	-	-	0,068	-
	-	22,1	24,7	32	3	5,5	HJ 203 E	0,068	0,009
	-	22,1	24,7	32	-	-	-	0,068	-
	-	22,1	-	32	-	-	-	0,091	-
	-	22,1	24,7	32	3	6	HJ 2203 E	0,091	0,01
	-	22,1	24,7	32	-	-	-	0,091	-
	-	24,2	-	36,8	-	-	-	0,120	-
	-	24,2	27,6	36,8	4	6,5	HJ 303 E	0,120	0,012
	-	24,2	27,6	36,8	-	-	-	0,120	-
20	41,5	-	29,9	-	-	-	-	0,132	-
	-	26,5	-	38,8	-	-	-	0,132	-
	-	26,5	29,9	38,8	3	5,5	HJ 204 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	HJ 2204 E	0,142	0,012
	-	26,5	29,9	38,4	-	-	-	0,142	-
	45,5	-	31,4	-	-	-	-	0,151	-
	-	27,5	-	41,8	-	-	-	0,151	-
	-	27,5	31,4	41,8	4	6,5	HJ 304 E	0,151	0,017

Single Row Cylindrical Roller Bearings



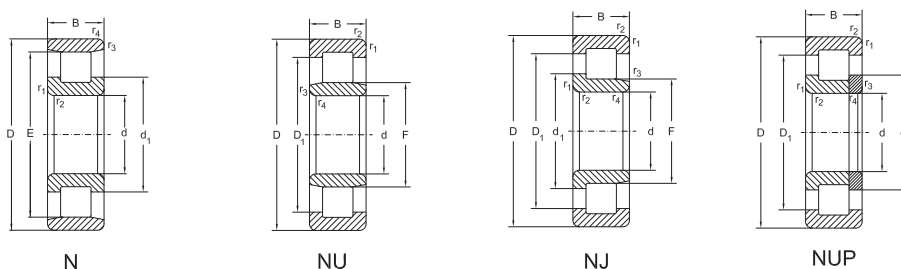
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein ⁻¹		
20	52	15	1,1	0,6	-	33,7	24,7	11000	14000	NUP 304 E
	52	21	1,1	0,6	2	45,1	36,1	11000	14000	NU 2304 E
	52	21	1,1	0,6	-	45,1	36,1	11000	14000	NJ 2304 E
	52	21	1,1	0,6	-	45,1	36,1	11000	14000	NUP 2304 E
25	47	12	0,6	0,3	2,4	13,5	12,5	14000	17000	NU 1005
	52	15	1	0,6	1,3	27,2	25,7	12000	15000	N 205 E
	52	15	1	0,6	1,3	27,2	25,7	12000	15000	NU 205 E
	52	15	1	0,6	-	27,2	25,7	12000	15000	NJ 205 E
	52	15	1	0,6	-	27,2	25,7	12000	15000	NUP 205 E
	52	18	1	0,6	1,7	32,4	32,3	12000	15000	NU 2205 E
	52	18	1	0,6	-	32,4	32,3	12000	15000	NJ 2205 E
	52	18	1	0,6	-	32,4	32,3	12000	15000	NUP 2205 E
	62	17	1,1	1,1	1,5	44,2	34,7	9500	12000	N 305 E
	62	17	1,1	1,1	1,5	44,2	34,7	9500	12000	NU 305 E
	62	17	1,1	1,1	-	44,2	34,7	9500	12000	NJ 305 E
	62	17	1,1	1,1	-	44,2	34,7	9500	12000	NUP 305 E
	62	24	1,1	1,1	1,9	60,8	52,3	9500	12000	NU 2305 E
	62	24	1,1	1,1	-	60,8	52,3	9500	12000	NJ 2305 E
	62	24	1,1	1,1	-	60,8	52,3	9500	12000	NUP 2305 E
	80	21	1,5	1,5	2,2	45	38	8500	10000	NU 405 E
	80	21	1,5	1,5	-	50,6	44,4	8500	10000	NJ 405 E
30	55	13	1	0,6	2,4	17	16,4	12000	15000	NU 1006 E
	62	16	1	0,6	1,4	41,8	34,7	9500	12000	N 206 E

Single Row Cylindrical Roller Bearings



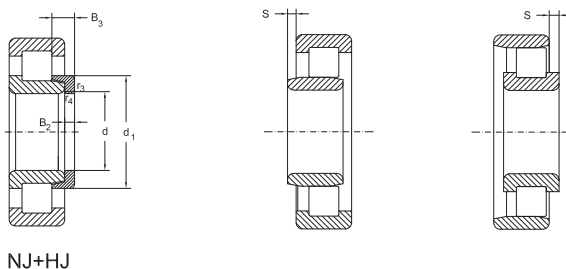
Dimensions						Thrust collar		Weight	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
20	-	27,5	31,4	41,8	-	-	-	0,150	-
	-	27,5	-	41,8	-	-	-	0,210	-
	-	27,5	31,4	41,8	4	7,5	HJ 2304 E	0,210	0,019
	-	27,5	31,4	41,8	-	-	-	0,210	-
25	-	30,5	-	38,9	-	-	-	0,083	-
	46,5	-	34,9	-	-	-	-	0,140	-
	-	31,5	-	43,3	-	-	-	0,140	-
	-	31,5	34,9	43,3	3	6	HJ 205 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	HJ 2205 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	HJ 305 E	0,245	0,025
	-	34	38,3	50,1	-	-	-	0,245	-
	-	34	-	50,1	-	-	-	0,350	-
	-	34	38,3	50,1	4	8	HJ 2305 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	HJ 405	0,625	0,057
30	-	36,5	-	45,7	-	-	-	0,134	-
	55,5	-	41,4	-	-	-	-	0,210	-

Single Row Cylindrical Roller Bearings



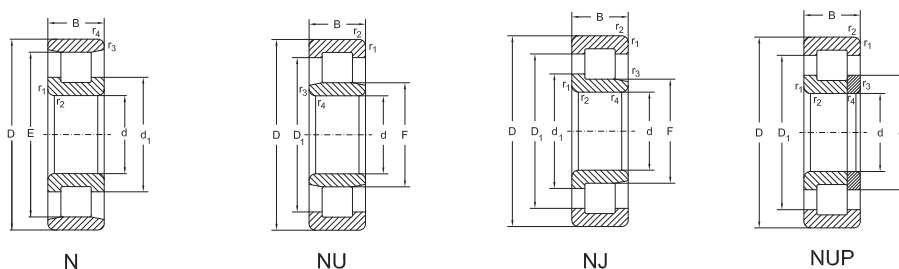
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	$r_{1,2}$ Ein.	$r_{3,4}$ Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN			Ein^{-1}	
30	62	16	1	0,6	1,4	41,8	34,7	9500	12000	NU 206 E
	62	16	1	0,6	-	41,8	34,7	9500	12000	NJ 206 E
	62	16	1	0,6	-	41,8	34,7	9500	12000	NUP 206 E ECKP * E
	62	20	1	0,6	1,6	52,3	46,6	9500	12000	NU 2206 E
	62	20	1	0,6	-	52,3	46,6	9500	12000	NJ 2206 E
	62	20	1	0,6	-	52,3	46,6	9500	12000	NUP 2206 E
	72	19	1,1	1,1	1,9	55,6	45,6	8500	10000	N 306 E
	72	19	1,1	1,1	1,9	55,6	45,6	8500	10000	NU 306 E
	72	19	1,1	1,1	-	55,6	45,6	8500	10000	NJ 306 E
	72	19	1,1	1,1	-	55,6	45,6	8500	10000	NUP 306 E
	72	27	1,1	1,1	2,5	78,9	71,3	8500	10000	NU 2306 E
	72	27	1,1	1,1	-	78,9	71,3	8500	10000	NJ 2306 E
	72	27	1,1	1,1	-	78,9	71,3	8500	10000	NUP 2306 E
	90	23	1,5	1,5	2,3	57,5	50,4	7000	8500	N 406 E
	90	23	1,5	1,5	2,3	57,5	50,4	7000	8500	NU 406 E
	90	23	1,5	1,5	-	57,5	50,4	7000	8500	NJ 406 E
	90	23	1,5	1,5	-	57,5	50,4	7000	8500	NUP 406 E
35	62	14	1	0,6	2,6	34	36,1	10000	13000	NU 1007 E
	72	17	1,1	0,6	1,7	53,2	45,6	8500	10000	N 207 E
	72	17	1,1	0,6	1,7	53,2	45,6	8500	10000	NU 207 E
	72	17	1,1	0,6	-	53,2	45,6	8500	10000	NJ 207 E
	72	17	1,1	0,6	-	53,2	45,6	8500	10000	NUP 207 E
	72	23	1,1	0,6	2,9	66	59,9	8500	10000	NU 2207 E

Single Row Cylindrical Roller Bearings



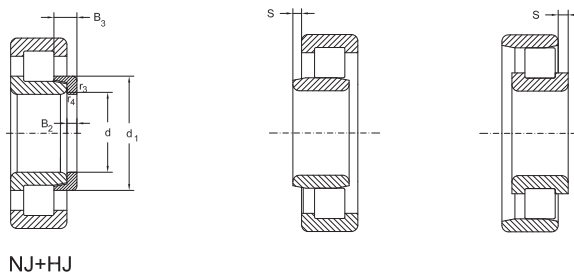
Dimensions					Thrust collar			Weight	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
30	-	37,5	-	52	-	-	-	0,210	-
	-	37,5	41,4	52	4	7	HJ 206 E	0,210	0,025
	-	37,5	41,4	52	-	-	-	0,210	-
	-	37,5	-	52	-	-	-	0,260	-
	-	37,5	41,4	52	4	7,5	HJ 2206 E	0,260	0,025
	-	37,5	41,4	52	-	-	-	0,260	-
	62,5	-	45,1	-	-	-	-	0,370	-
	-	40,5	-	58,3	-	-	-	0,370	-
	-	40,5	45,1	58,3	5	8,5	HJ 306 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	HJ 2306 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	HJ 406	0,870	0,09
	-	45	50,5	67,8	-	-	-	0,870	-
35	-	42	44,5	51,9	4	7,75	HJ 1007	0,180	0,02
	64	-	48	-	-	-	-	0,305	-
	-	44	-	60,1	-	-	-	0,305	-
	-	44	48	60,1	4	7	HJ 207 E	0,305	0,033
	-	44	48	60,1	-	-	-	0,305	-
	-	44	-	60,1	-	-	-	0,395	-

Single Row Cylindrical Roller Bearings



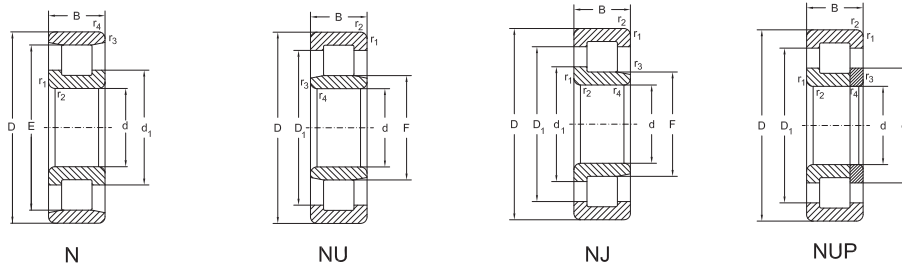
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
35	72	23	1	0,6	2,9	66	59,9	8500	10000	NJ 2207 E
	72	23	1	0,6	-	66	59,9	8500	10000	NUP 2207 E
	80	21	1,1	1,5	0,6	71,3	59,9	7500	9000	N 307 E
	80	21	1,1	1,5	0,6	71,3	59,9	7500	9000	NU 307 E
	80	21	1,1	1,5	-	71,3	59,9	7500	9000	NJ 307 E
	80	21	1,1	1,5	-	71,3	59,9	7500	9000	NUP 307 E
	80	31	1,1	1,5	3	101	93,1	7500	9000	NU 2307 E
	80	31	1,1	1,5	-	101	93,1	7500	9000	NJ 2307 E
	80	31	1,1	1,5	-	101	93,1	7500	9000	NUP 2307 E
	100	25	1,5	1,5	2,6	72,7	66	6300	7500	N 407 E
	100	25	1,5	1,5	2,6	72,7	66	6300	7500	NU 407 E
	100	25	1,5	1,5	-	72,7	66	6300	7500	NJ 407 TN9 E
	100	25	1,5	1,5	-	72,7	66	6300	7500	NUP 407 E
40	68	15	1	0,6	2,7	23,8	24,7	9500	12000	NU 1008 E
	80	18	1,1	1,1	1,9	58,9	50,4	7500	9000	N 208 B * E
	80	18	1,1	1,1	1,9	58,9	50,4	7500	9000	NU 208 E
	80	18	1,1	1,1	-	58,9	50,4	7500	9000	NJ 208 E
	80	18	1,1	1,1	-	58,9	50,4	7500	9000	NUP 208 E
	80	23	1,1	1,1	2,3	77,4	71,3	7500	9000	NU 2208 E
	80	23	1,1	1,1	-	77,4	71,3	7500	9000	NJ 2208 E
	80	23	1,1	1,1	-	77,4	71,3	7500	9000	NUP 2208 E
	90	23	1,5	1,5	2,5	88,4	74,1	6300	7500	N 308 E
	90	23	1,5	1,5	2,5	88,4	74,1	6300	7500	NU 308 E

Single Row Cylindrical Roller Bearings



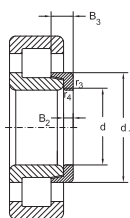
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
35	-	44	48	60,1	4	8,5	HJ 2207 E	0,395	0,035
	-	44	48	60,1	-	-	-	0,395	-
	70,2	-	51,2	-	-	-	-	0,485	-
	-	46,2	-	65,7	-	-	-	0,485	-
	-	46,2	51,2	65,7	6	9,5	HJ 307 E	0,485	0,062
	-	46,2	51,2	65,7	-	-	-	0,485	-
	-	46,2	-	65,7	-	-	-	0,715	-
	-	46,2	51,2	65,7	6	11	HJ 2307 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	HJ 407	1,05	0,13
	-	53	59	77,6	-	-	-	1,05	-
40	-	47	50	57,6	4	8	HJ 1008	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	HJ 208 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	HJ 2208 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

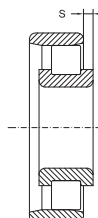
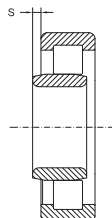


Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
40	90	23	1,5	1,5	-	88,4	74,1	6300	7500	NJ 308 E
	90	23	1,5	1,5	-	88,4	74,1	6300	7500	NUP 308 E
	90	33	1,5	1,5	3,5	123	114	6300	7500	NU 2308 E
	90	33	1,5	1,5	-	123	114	6300	7500	NJ 2308 E
	90	33	1,5	1,5	-	123	114	6300	7500	NUP 2308 E
	110	27	2	2	2,6	92	85,5	5500	6800	N 408 E
	110	27	2	2	2,6	92	85,5	5500	6800	NU 408 E
	110	27	2	2	-	92	85,5	5500	6800	NJ 408 E
	110	27	2	2	-	92	85,5	5500	6800	NUP 408 E
45	75	16	1	0,6	2,5	42,4	49,4	8500	10000	NU 1009 E
	85	19	1,1	1,1	1,9	66	60,8	7000	8500	N 209 E
	85	19	1,1	1,1	1,9	66	60,8	7000	8500	NU 209 E
	85	19	1,1	1,1	-	66	60,8	7000	8500	NJ 209 E
	85	19	1,1	1,1	-	66	60,8	7000	8500	NUP 209 E
	85	23	1,1	1,1	2,3	80,8	77,4	7000	8500	NU 2209 E
	85	23	1,1	1,1	-	80,8	77,4	7000	8500	NJ 2209 E
	85	23	1,1	1,1	-	80,8	77,4	7000	8500	NUP 2209 E
	100	25	1,5	1,5	2,9	106	95	5600	6700	N 309 E
	100	25	1,5	1,5	2,9	106	95	5600	6700	NU 309 E
	100	25	1,5	1,5	-	106	95	5600	6700	NJ 309 E
	100	25	1,5	1,5	-	106	95	5600	6700	NUP 309 E
	100	36	1,5	1,5	3,5	152	145	5600	6700	NU 2309 E
	100	36	1,5	1,5	-	152	145	5600	6700	NJ 2309 E

Single Row Cylindrical Roller Bearings

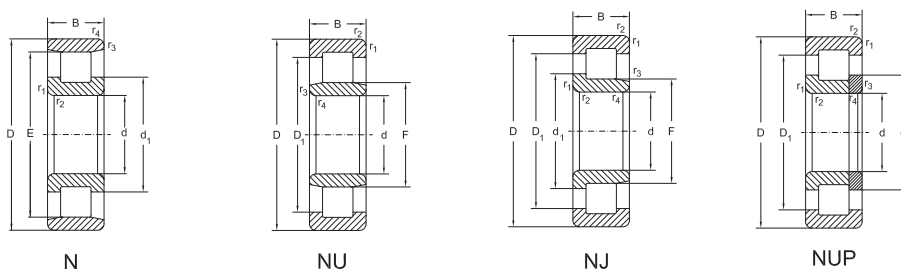


NJ+HJ



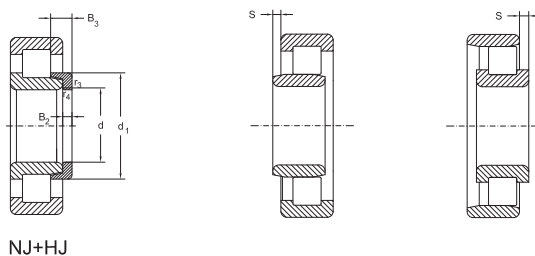
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
40	-	52	57,7	74,9	7	11	HJ 308 E	0,66	0,088
	-	52	57,7	74,9	-	-	-	0,66	-
	-	52	-	74,9	-	-	-	0,95	-
	-	52	57,7	74,9	7	12,5	HJ 2308 E	0,95	0,92
	-	52	57,7	74,9	-	-	-	0,95	-
	92	-	64,8	-	-	-	-	1,30	-
	-	58	-	85,8	-	-	-	1,30	-
	-	58	64,8	85,8	8	13	HJ 408	1,30	0,15
	-	58	64,8	85,8	-	-	-	1,30	-
45	-	52,5	55,5	63,9	4	8,25	HJ 1009	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	HJ 209 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	HJ 2209 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	HJ 309 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	HJ 2309 E	1,3	0,12

Single Row Cylindrical Roller Bearings



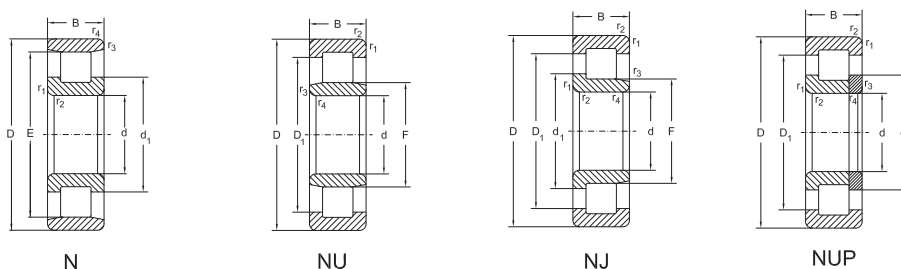
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
45	100	36	1,5	1,5	-	152	145	5600	6700	NUP 2309 E
	120	29	2	2	2,9	101	96,9	5000	6000	N 409 E
	120	29	2	2	2,9	101	96,9	5000	6000	NU 409 S E
	120	29	2	2	-	101	96,9	5000	6000	NJ 409 S E
	120	29	2	2	-	101	96,9	5000	6000	NUP 409 S E
50	80	16	1	0,6	2,1	44,5	53,2	8000	9500	NU 1010 E
	90	20	1,1	1,1	2,2	69,8	66	6700	8000	N 210 E
	90	20	1,1	1,1	2,2	69,8	66	6700	8000	NU 210 E
	90	20	1,1	1,1	-	69,8	66	6700	8000	NJ 210 E
	90	20	1,1	1,1	-	69,8	66	6700	8000	NUP 210 E
	90	23	1,1	1,1	2,2	85,5	83,6	6700	8000	NU 2210 E
	90	23	1,1	1,1	-	85,5	83,6	6700	8000	NJ 2210 E
	90	23	1,1	1,1	-	85,5	83,6	6700	8000	NUP 2210 E
	110	27	2	2	3	121	106	5300	6300	N 310 E
	110	27	2	2	3	121	106	5300	6300	NU 310 E
	110	27	2	2	-	121	106	5300	6300	NJ 310 E
	110	27	2	2	-	121	106	5300	6300	NUP 310 E
	110	40	2	2	4,2	177	177	5300	6300	NU 2310 E
	110	40	2	2	-	177	177	5300	6300	NJ 2310 E
	110	40	2	2	-	177	177	5300	6300	NUP 2310 E
	130	31	2,1	2,1	3	124	121	4500	5300	N 410 E
	130	31	2,1	2,1	3	124	121	4500	5300	NU 410 E
	130	31	2,1	2,1	-	124	121	4500	5300	NJ 410 E

Single Row Cylindrical Roller Bearings



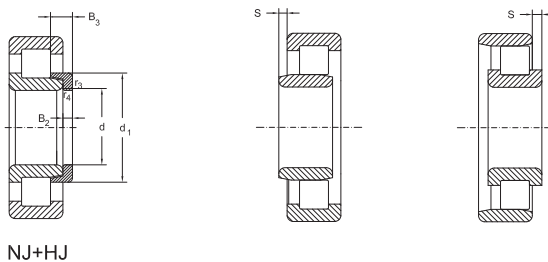
Dimensions				Thrust collar				Weight	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
45	-	58,5	64,6	83,1	-	-	-	1,3	-
	100,5	-	71,8	-	-	-	-	1,7	-
	-	64,5	-	93,9	-	-	-	1,7	-
	-	64,5	71,8	93,9	8	13,5	HJ 409	1,7	0,19
	-	64,5	71,8	93,9	-	-	-	1,7	-
50	-	57,5	60,5	68,9	4	8,25	HJ 1010	0,32	0,04
	81,5	-	64,1	-	-	-	-	0,6	-
	-	59,5	-	77,4	-	-	-	0,6	-
	-	59,5	64,1	77,4	5	9	HJ 210 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	HJ 2210 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	HJ 310 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	HJ 2310 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	HJ 410	2,1	0,24

Single Row Cylindrical Roller Bearings



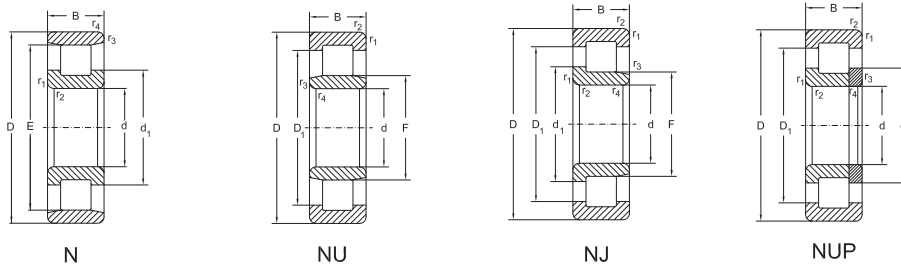
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN			Ein^{-1}	
50	130	31	2,1	2,1	-	124	121	4500	5300	NUP 410 E
55	90	18	1,1	1	2,4	54,3	66	7800	9200	NU 1011 E
	100	21	1,5	1,1	1,7	91,7	90,3	6300	7500	N 211 E
	100	21	1,5	1,1	-	91,7	90,3	6300	7500	NU 211 E
	100	21	1,5	1,1	-	91,7	90,3	6300	7500	NJ 211 E
	100	21	1,5	1,1	-	91,7	90,3	6300	7500	NUP 211 E
	100	25	1,5	1,1	2,2	108	112	6300	7500	NUP 2211 E
	100	25	1,5	1,1	-	148	136	6300	7500	N 311 E
	100	25	1,5	1,1	-	148	136	6300	7500	NU 311 E
	120	29	2	2	3	148	136	5000	6000	NJ 311 E
	120	29	2	2	3	148	136	5000	6000	NUP 311 E
	120	29	2	2	-	220	220	5000	6000	NU 2311 E
	120	29	2	2	-	220	220	5000	6000	NJ 2311 E
	120	43	2	2	4,3	220	220	5000	6000	NUP 2311 E
	120	43	2	2	-	135	133	5000	6000	N 411 E
	120	43	2	2	-	135	133	5000	6000	NU 411 E
	140	33	2,1	2,1	3,3	135	133	4300	5000	NJ 411 E
	140	33	2,1	2,1	3,3	135	133	4300	5000	NUP 411 E
	140	33	2,1	2,1	-	35,5	41,8	4300	5000	NU 1012 E
	140	33	2,1	2,1	-	103	96,9	4300	5000	N 212 E
60	95	18	1,1	1	3,3	103	96,9	6700	8000	NU 212 E
	110	22	1,5	1,5	1,6	95	104	5600	6700	N 212 E
	110	22	1,5	1,5	1,6	95	104	5600	6700	NU 212 E

Single Row Cylindrical Roller Bearings



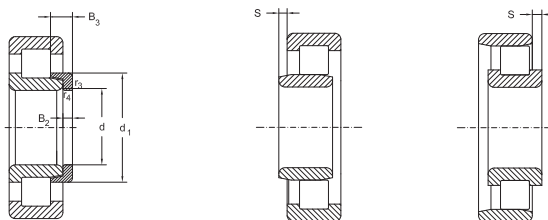
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
50	-	70,8	78,8	103,6	-	-	-	2,2	-
55	-	64,5	67,5	76,7	5	10	HJ 1011	0,47	0,05
	90	-	71	-	-	-	-	0,75	-
	-	66	-	85,6	-	-	-	0,75	-
	-	66	71	85,6	6	9,5	HJ 211 E	0,75	0,09
	-	66	71	85,6	-	-	-	0,75	-
	-	66	-	85,6	-	-	-	0,9	-
	-	66	71	85,6	6	10	HJ 2211 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	HJ 3122 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	HJ 2311 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	HJ 411	2,5	0,31
	-	77,2	85,2	109,9	-	-	-	2,5	-
60	-	69,5	72,5	81,7	5	10	HJ 1012	0,49	0,06
	100	-	77,7	-	-	-	-	1	-
	-	72	-	95,1	-	-	-	1	-

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
60	110	22	1,5	1,5	-	103	96,9	5600	6700	NJ 212 E
	110	22	1,5	1,5	-	103	96,9	5600	6700	NUP 212 E
	110	28	1,5	1,5	2,4	139	145	5300	6300	NU 2212 E
	110	28	1,5	1,5	-	139	145	5300	6300	NJ 2212 E
	110	28	1,5	1,5	-	139	145	5300	6300	NUP 2212 E
	130	31	2,1	2,1	3	164	152	4300	5000	N 312 E
	130	31	2,1	2,1	3	164	152	4300	5000	NU 312 E
	130	31	2,1	2,1	-	164	152	4300	5000	NJ 312 E
	130	31	2,1	2,1	-	164	152	4300	5000	NUP 312 E
	130	46	2,1	2,1	4,2	247	252	4300	5000	NU 2312 E
	130	46	2,1	2,1	-	247	252	4300	5000	NJ 2312 E
	130	46	2,1	2,1	-	247	252	4300	5000	NUP 2312 E
	150	35	2,1	2,1	3,4	160	164	4000	4800	N 412 E
	150	35	2,1	2,1	3,4	160	164	4000	4800	NU 412 E
	150	35	2,1	2,1	-	160	164	4000	4800	NJ 412 E
	150	35	2,1	2,1	-	160	164	4000	4800	NUP 412 E
65	100	18	1,1	1	3,3	59,6	77,4	6600	7800	NU 1013 E
	120	23	1,5	1,5	1,4	116	112	5300	6300	N 213 E
	120	23	1,5	1,5	1,4	116	112	5300	6300	NU 213 E
	120	23	1,5	1,5	-	116	112	5300	6300	NJ 213 E
	120	23	1,5	1,5	-	116	112	5300	6300	NUP 213 E
	120	31	1,5	1,5	1,9	162	171	4800	5600	NU 2213 E
	120	31	1,5	1,5	-	162	171	4800	5600	NJ 2213 E

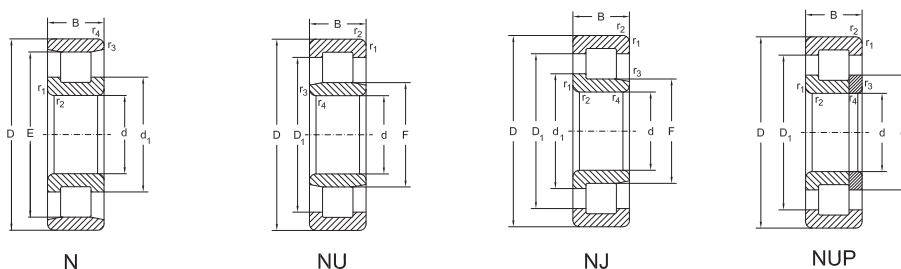
Single Row Cylindrical Roller Bearings



NJ+HJ

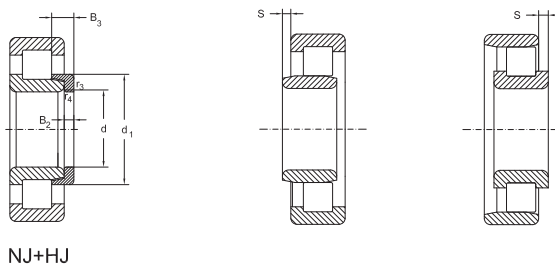
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
60	-	72	77,7	95,1	6	10	HJ 212 E	1	0,11
	-	72	77,7	95,1	-	-	-	1	-
	-	72	-	95,1	-	-	-	1,2	-
	-	72	77,7	95,1	6	10	HJ 2212 E	1,2	0,11
	-	72	77,7	95,1	-	-	-	1,2	-
	115	-	84,5	-	-	-	-	1,9	-
	-	77	-	108,5	-	-	-	1,9	-
	-	77	84,5	108,5	9	14,5	HJ 312 E	1,9	0,24
	-	77	84,5	108,5	-	-	-	1,9	-
	-	77	-	108,5	-	-	-	2,9	-
	-	77	84,5	108,5	9	16	HJ 2312 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	HJ 412	3,1	0,35
	-	83	91,8	118,8	-	-	-	3,1	-
65	-	74,5	77,5	86,7	5	10	HJ 1013	0,52	0,07
	108,5	-	84,6	-	-	-	-	1,2	-
	-	78,5	-	103,2	-	-	-	1,2	-
	-	78,5	84,6	103,2	6	10	HJ 213 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	HJ 2213 E	1,6	0,13

Single Row Cylindrical Roller Bearings



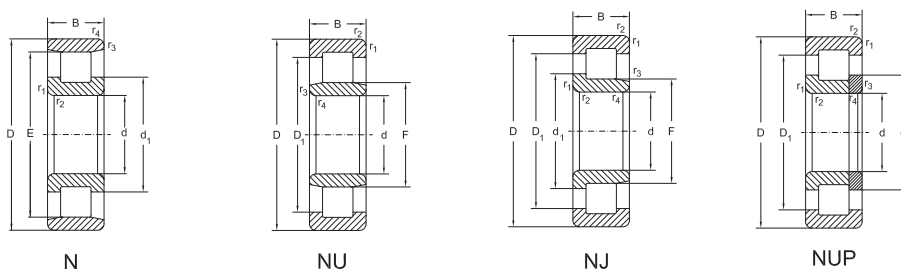
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
65	120	31	1,5	1,5	-	162	171	4800	5600	NUP 2213 E
	140	33	2,1	2,1	1,4	201	186	4300	5000	N 313 E
	140	33	2,1	2,1	1,4	201	186	4300	5000	NU 313 E
	140	33	2,1	2,1	-	201	186	4300	5000	NJ 313 E
	140	33	2,1	2,1	-	201	186	4300	5000	NUP 313 E
	140	48	2,1	2,1	3,9	271	276	4000	4800	NU 2313 E
	140	48	2,1	2,1	-	271	276	4000	4800	NJ 2313 E
	140	48	2,1	2,1	-	271	276	4000	4800	NUP 2313 E
	160	37	2,1	2,1	3,5	174	181	3800	4500	N 413 E
	160	37	2,1	2,1	3,5	174	181	3800	4500	NU 413 E
	160	37	2,1	2,1	-	174	181	3800	4500	NJ 413 E
	160	37	2,1	2,1	-	174	181	3800	4500	NUP 413 E
70	110	20	1,1	1	3,3	72,7	88,4	6000	7000	NU 1014 E
	125	24	1,5	1,5	1,1	130	130	5000	6000	N 214 E
	125	24	1,5	1,5	1,1	130	130	5000	6000	NU 214 E
	125	24	1,5	1,5	-	130	130	5000	6000	NJ 214 E
	125	24	1,5	1,5	-	130	130	5000	6000	NUP 214 E
	125	31	1,5	1,5	1,6	171	183	4800	5600	NU 2214 E
	125	31	1,5	1,5	-	171	183	4800	5600	NJ 2214 E
	125	31	1,5	1,5	-	171	183	4800	5600	NUP 2214 E
	150	35	2,1	2,1	1,6	224	217	4000	4800	N 314 E
	150	35	2,1	2,1	1,6	224	217	4000	4800	NU 314 E
	150	35	2,1	2,1	-	224	217	4000	4800	NJ 314 E

Single Row Cylindrical Roller Bearings



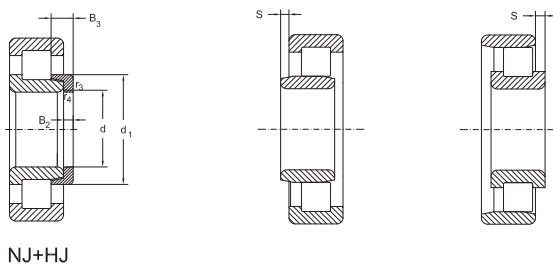
Dimensions					Thrust collar			Weight	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
65	-	78,5	84,6	103,2	-	-	-	1,6	-
	124,5	-	90,7	-	-	-	-	2,3	-
	-	82,5	-	117,4	-	-	-	2,3	-
	-	82,5	90,7	177,4	10	15,5	HJ 313 E	2,3	0,29
	-	82,5	90,7	117,4	-	-	-	2,3	-
	-	82,5	-	117,4	-	-	-	3,3	-
	-	82,5	90,7	117,4	10	18	HJ 2313 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	HJ 413	3,8	0,43
	-	89,3	98,5	126,9	-	-	-	3,8	-
70	-	80	84	95,3	5	10	HJ 1014	0,75	0,08
	113,5	-	89,6	-	-	-	-	1,3	-
	-	83,5	-	108,2	-	-	-	1,3	-
	-	83,5	89,6	108,2	7	11	HJ 214 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	HJ 2214 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	HJ 314 E	2,8	0,34

Single Row Cylindrical Roller Bearings



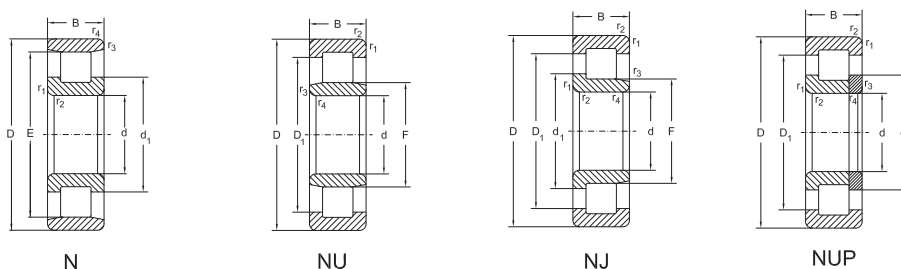
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	$r_{1,2}$ Ein.	$r_{3,4}$ Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
70	150	35	2,1	2,1	-	224	217	4000	4800	NUP 314 E
	150	51	2,1	2,1	4,6	299	309	3800	4500	NU 2314 E
	150	51	2,1	2,1	-	299	309	3800	4500	NJ 2314 E
	150	51	2,1	2,1	-	299	309	3800	4500	NUP 2314 E
	180	42	3	3	4	218	228	3400	4000	N 414 E
	180	42	3	3	4	218	228	3400	4000	NU 414 E
	180	42	3	3	-	218	228	3400	4000	NJ 414 E
	180	42	3	3	-	218	228	3400	4000	NUP 414 E
75	115	20	1,1	1	2,5	55,4	67,5	5600	6600	NU 1015 E
	130	25	1,5	1,5	1,2	143	148	4800	5600	N 215 E
	130	25	1,5	1,5	1,2	143	148	4800	5600	NU 215 E
	130	25	1,5	1,5	-	143	148	4800	5600	NJ 215 E
	130	25	1,5	1,5	-	143	148	4800	5600	NUP 215 E
	130	31	1,5	1,5	1,6	177	198	4500	5300	NU 2215 E
	130	31	1,5	1,5	-	177	198	4500	5300	NJ 2215 E
	130	31	1,5	1,5	-	177	198	4500	5300	NUP 2215 E
	160	37	2,1	2,1	1,8	266	252	4000	4800	N 315 E
	160	37	2,1	2,1	1,8	266	252	4000	4800	NU 315 E
	160	37	2,1	2,1	-	266	252	4000	4800	NJ 315 E
	160	37	2,1	2,1	-	266	252	4000	4800	NUP 315 E
	160	55	2,1	2,1	4,1	361	380	4000	4800	NU 2315 E
	160	55	2,1	2,1	-	361	380	4000	4800	NJ 2315 E
	160	55	2,1	2,1	-	361	380	4000	4800	NUP 2315 E

Single Row Cylindrical Roller Bearings



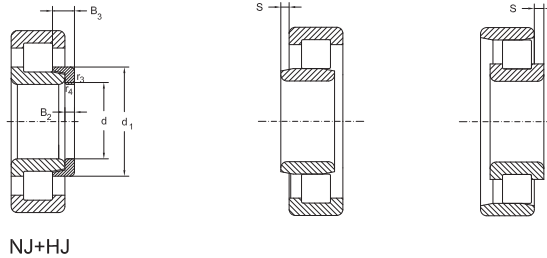
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
70	-	89	97,5	125,6	-	-	-	2,8	-
	-	89	-	125,6	-	-	-	4,0	-
	-	89	97,5	125,6	10	18,5	HJ 2314 E	4,0	0,35
	-	89	97,5	125,6	-	-	-	4,0	-
	152	-	110,3	-	-	-	-	5,5	-
	-	100	-	142	-	-	-	5,5	-
	-	100	110,3	142	12	20	HJ 414	5,5	0,61
	-	100	110,3	142	-	-	-	5,5	-
75	-	85	89	100,9	5	10	HJ 1015	0,75	0,09
	118,5	-	94,5	-	-	-	-	1,25	-
	-	88,5	-	113,2	-	-	-	1,25	-
	-	88,5	94,5	113,2	7	11	HJ 215 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	HJ 2215 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	HJ 315 E	3,4	0,42
	-	95	104,3	135	-	-	-	3,4	-
	-	95	-	135	-	-	-	5,0	-
	-	95	104,3	135	11	19,5	HJ 2315 E	5,0	0,43
	-	95	104,3	135	-	-	-	5,0	-

Single Row Cylindrical Roller Bearings



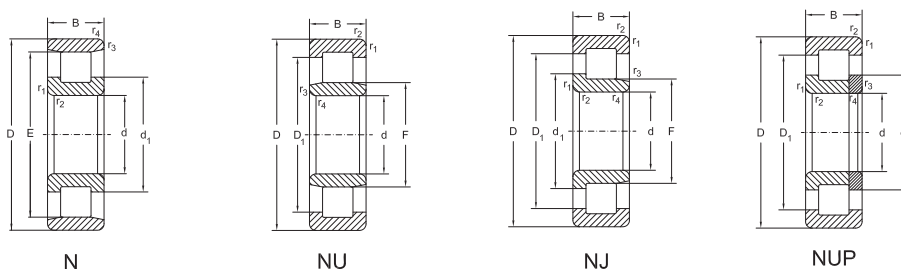
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	$r_{1,2}$ Ein.	$r_{3,4}$ Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
75	190	45	3	3	4,5	251	266	4000	4800	N 415 E
	190	45	3	3	4,5	251	266	4000	4800	NU 415 E
	190	45	3	3	-	251	266	4000	4800	NJ 415 E
	190	45	3	3	-	251	266	4000	4800	NUP 415 E
80	125	22	1,1	1	3,8	94,1	121	5200	6200	NJ 1016 E
	140	26	2	2	1,2	152	158	4300	5000	N 216 E
	140	26	2	2	1,2	152	158	4300	5000	NU 216 E
	140	26	2	2	-	152	158	4300	5000	NJ 216 E
	140	26	2	2	-	152	158	4300	5000	NUP 216 E
	140	33	2	2	2,5	201	233	4300	5000	NU 2216 E
	140	33	2	2		201	233	4300	5000	NJ 2216 E
	140	33	2	2		201	233	4300	5000	NUP 2216 E
	170	39	2,1	2,1	2,8	285	276	3600	4300	N 316 E
	170	39	2,1	2,1	2,8	285	276	3600	4300	NU 316 E
	170	39	2,1	2,1	-	285	276	3600	4300	NJ 316 E
	170	39	2,1	2,1	-	285	276	3600	4300	NUP 316 E
	170	58	2,1	2,1	3,6	394	418	3600	4300	NU 2316 E
	170	58	2,1	2,1	-	394	418	3600	4300	NJ 2316 E
	170	58	2,1	2,1	-	394	418	3600	4300	NUP 2316 E
	200	48	3	3	4,6	288	304	3000	3600	N 416 E
	200	48	3	3	4,6	288	304	3000	3600	NU 416 E
	200	48	3	3	-	288	304	3000	3600	NJ 416 E
	200	48	3	3	-	288	304	3000	3600	NUP 416 E

Single Row Cylindrical Roller Bearings



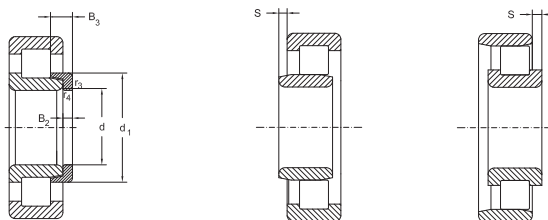
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
75	160,5	-	116	-	-	-	-	6,45	-
	-	104,5	-	149,8	-	-	-	6,45	-
	-	104,5	116	149,8	13	21,5	HJ 415	6,45	0,71
	-	104,5	116	149,8	-	-	-	6,45	-
80	-	91,5	96	109,1	6	11,5	HJ 1016	1,03	0,13
	127,3	-	101,7	-	-	-	-	1,54	-
	-	95,3	-	121,6	-	-	-	1,54	-
	-	95,3	101,7	121,6	8	12,5	HJ 216 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	HJ 2216 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	HJ 316 E	3,95	0,47
	-	101	110,6	142,7	-	-	-	3,95	-
	-	101	-	142,7	-	-	-	5,9	-
	-	101	110,6	142,7	11	20	HJ 2316 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	HJ 416	8,3	0,79
	-	110	122	158,8	-	-	-	8,3	-

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
85	130	22	1,1	1	4	64,8	82,2	4800	5600	NU 1017 E
	150	28	2	2	2	181	190	4300	5000	N 217 E
	150	28	2	2	2	181	190	4300	5000	NU 217 E
	150	28	2	2	-	181	190	4300	5000	NJ 217 E
	150	28	2	2	-	181	190	4300	5000	NUP 217 E
	150	36	2	2	2,4	238	266	3800	4500	NU 2217 E
	150	36	2	2	-	238	266	3800	4500	NJ 2217 E
	150	36	2	2	-	238	266	3800	4500	NUP 2217 E
	180	41	3	3	3	323	318	3400	4000	N 317 E
	180	41	3	3	3	323	318	3400	4000	NU 317 E
	180	41	3	3	-	323	318	3400	4000	NJ 317 E
	180	41	3	3	-	323	318	3400	4000	NUP 317 E
	180	60	3	3	5	432	466	3400	4000	NU 2317 E
	180	60	3	3	-	432	466	3400	4000	NJ 2317 E
	180	60	3	3	-	432	466	3400	4000	NUP 2317 E
	210	52	4	4	5	303	318	2800	3400	N 417 E
	210	52	4	4	5	303	318	2800	3400	NU 417 E
	210	52	4	4	-	303	318	2800	3400	NJ 417 E
	210	52	4	4	-	303	318	2800	3400	NUP 417 E
90	140	24	1,5	1,1	4	76,9	98,8	4500	5300	NU 1018 E
	160	30	2	2	1,4	198	209	3800	4500	N 218 E
	160	30	2	2	1,4	198	209	3800	4500	NU 218 E
	160	30	2	2	-	198	209	3800	4500	NUP 218 E

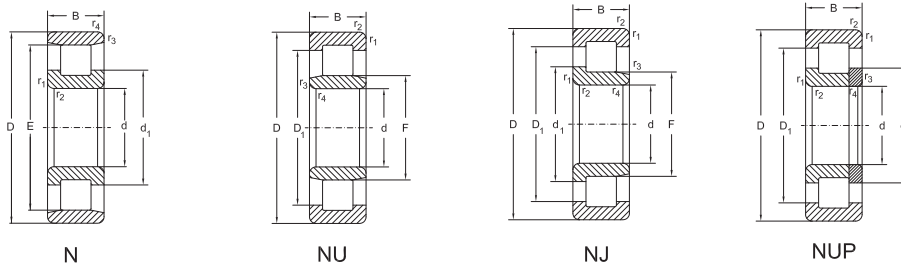
Single Row Cylindrical Roller Bearings



NJ+HJ

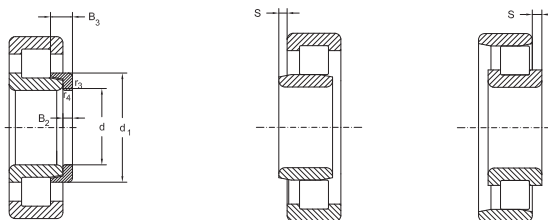
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
85	-	96,5	101	114,1	6	11,5	HJ 1017	1,1	0,14
	136,5	-	107,6	-	-	-	-	1,9	-
	-	100,5	-	130,3	-	-	-	1,9	-
	-	100,5	107,6	130,3	8	12,5	HJ 217 E	1,9	0,25
	-	100,5	107,6	130,3	-	-	-	1,9	-
	-	100,5	-	130,3	-	-	-	2,6	-
	-	100,5	107,6	130,3	8	13	HJ 2217 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	HJ 317 E	5,3	0,58
	-	108	118	151,3	-	-	-	5,3	-
	-	108	-	151,3	-	-	-	6,9	-
	-	108	118	151,3	12	22	HJ 2317 E	6,9	0,6
	-	108	118	151,3	-	-	-	6,9	-
	177	-	126	-	-	-	-	9,8	-
	-	113	-	164,8	-	-	-	9,8	-
	-	113	126	164,8	14	24	HJ 417	9,8	0,92
	-	113	126	164,8	-	-	-	9,8	-
90	-	103	108	122,1	6	12	HJ 1018	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



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	$r_{1,2}$ Ein.	$r_{3,4}$ Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
90	160	30	2	2	-	198	209	3800	4500	NJ 218 E
	160	40	2	2	3,5	266	299	3200	3800	NU 2218 E
	160	40	2	2	-	266	299	3200	3800	NJ 2218 E
	160	40	2	2	-	266	299	3200	3800	NUP 2218 E
	190	43	3	3	3	347	342	3200	3800	N 318 E
	190	43	3	3	3	347	342	3200	3800	NU 318 E
	190	43	3	3	-	347	342	3200	3800	NJ 318 E
	190	43	3	3	-	347	342	3200	3800	NUP 318 E
	190	64	3	3	6	475	513	3000	3600	NU 2318 E
	190	64	3	3	-	475	513	3000	3600	NJ 2318 E
	190	64	3	3	-	475	513	3000	3600	NUP 2318 E
	225	54	4	4	5	361	394	2800	3400	N 418 E
	225	54	4	4	5	361	394	2800	3400	NU 418 E
	225	54	4	4	-	361	394	2800	3400	NJ 418 E
	225	54	4	4	-	361	394	2800	3400	NUP 418 E
95	145	24	1,5	1,1	4,1	80	105	4400	5200	NU 1019 E
	170	32	2,1	2,1	1,4	242	252	3800	4500	N 219 E
	170	32	2,1	2,1	1,4	242	252	3800	4500	NU 219 E
	170	32	2,1	2,1	-	242	252	3800	4500	NJ 219 E
	170	32	2,1	2,1	-	242	252	3800	4500	NUP 219 E
	170	43	2,1	2,1	3,5	309	356	3200	3800	NU 2219 E
	170	43	2,1	2,1	-	309	356	3200	3800	NJ 2219 E
	170	43	2,1	2,1	-	309	356	3200	3800	NUP 2219 E

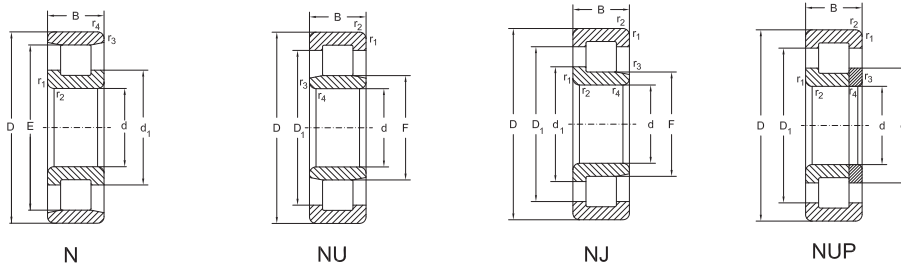
Single Row Cylindrical Roller Bearings



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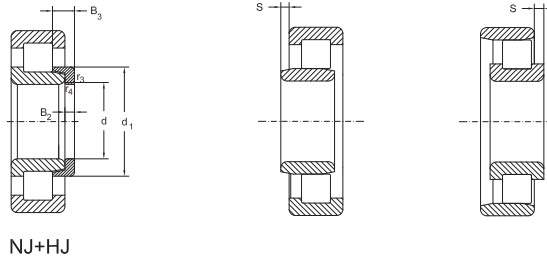
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
90	-	107	114,5	138,5	9	14	HJ 218 E	2,7	0,33
	-	107	-	138,5	-	-	-	3,2	-
	-	107	114,5	138,5	9	15	HJ 2218 E	3,2	0,32
	-	107	114,5	138,5	-	-	-	3,2	-
	169,5	-	124	-	-	-	-	5,4	-
	-	113,5	-	160,2	-	-	-	5,4	-
	-	113,5	124	160,2	12	18,5	HJ 318 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	HJ 2318 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	HJ 418	11,5	1,1
	-	123,5	137	178,8	-	-	-	11,5	-
95	-	108	113	127,1	6	12	HJ 1019	1,45	0,18
	154,5	-	120,7	-	-	-	-	2,8	-
	-	112,5	-	147,4	-	-	-	2,8	-
	-	112,5	120,7	147,4	9	14	HJ 219 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	HJ 2219 E	3,8	0,37
	-	112,5	120,7	147,4	-	-	-	3,8	-

Single Row Cylindrical Roller Bearings



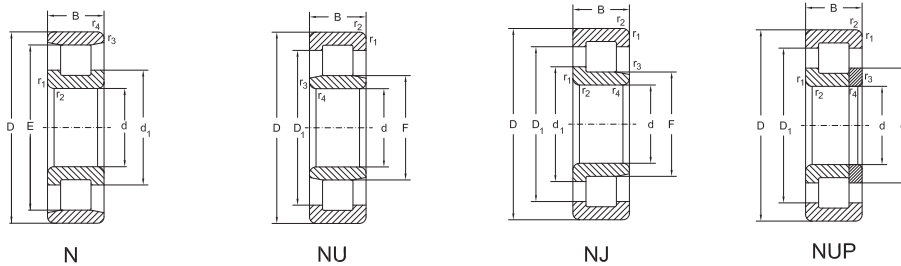
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
95	200	45	3	3	3,5	371	371	3000	3600	N 319 E
	200	45	3	3	3,5	371	371	3000	3600	NU 319 E
	200	45	3	3	-	371	371	3000	3600	NJ 319 E
	200	45	3	3	-	371	371	3000	3600	NUP 319 E
	200	67	3	3	7,2	504	556	2800	3400	NU 2319 E
	200	67	3	3	-	504	556	2800	3400	NJ 2319 E
	200	67	3	3	-	504	556	2800	3400	NUP 2319 E
	240	55	4	4	5,2	392	432	2400	3000	N 419 E
	240	55	4	4	5,2	392	432	2400	3000	NU 419 E
	240	55	4	4	-	392	432	2400	3000	NJ 419 E
	240	55	4	4	-	392	432	2400	3000	NUP 419 E
100	150	24	1,5	1,1	4,3	81,5	108	4300	5000	NU 1020 E
	180	34	2,1	2,1	1,4	271	290	3200	3800	N 220 E
	180	34	2,1	2,1	1,4	271	290	3200	3800	NU 220 E
	180	34	2,1	2,1	-	271	290	3200	3800	NJ 220 E
	180	34	2,1	2,1	-	271	290	3200	3800	NUP 220 E
	180	46	2,1	2,1	3	361	428	3000	3800	NU 2220 E
	180	46	2,1	2,1	-	361	428	3000	3600	NJ 2220 E
	180	46	2,1	2,1	-	361	428	3000	3600	NUP 2220 E
	215	47	3	3	3,5	428	418	3000	3600	N 320 E
	215	47	3	3	3,5	428	418	3000	3600	NU 320 E
	215	47	3	3	-	428	418	3000	3600	NJ 320 E
	215	47	3	3	-	428	418	3000	3600	NUP 320 E

Single Row Cylindrical Roller Bearings



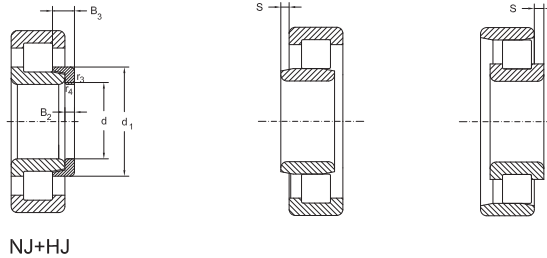
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
95	117,5	-	132,2	-	-	-	-	6,3	-
	-	121,5	-	168,2	-	-	-	6,3	-
	-	121,5	132,2	168,2	13	20,5	HJ 319 E	6,3	0,8
	-	121,5	132,2	168,2	-	-	-	6,3	-
	-	121,5	-	168,2	-	-	-	9,3	-
	-	121,5	132,2	168,2	13	24,5	HJ 2319 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	HJ 419	13,8	1,3
	-	133,5	147	188,8	-	-	-	13,8	-
100	-	113	118	132,1	6	12	HJ 1020	1,5	0,18
	163	-	127,3	-	-	-	-	3,44	-
	-	119	-	155,5	-	-	-	3,44	-
	-	119	127,3	155,5	10	15	HJ 220 E	3,44	0,44
	-	119	127,3	155,5	-	-	-	3,44	-
	-	119	-	155,5	-	-	-	5,5	-
	-	119	127,3	155,5	10	16	HJ 2220 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	HJ 320 E	7,7	0,9
	-	127,5	139,6	181	-	-	-	7,7	-

Single Row Cylindrical Roller Bearings



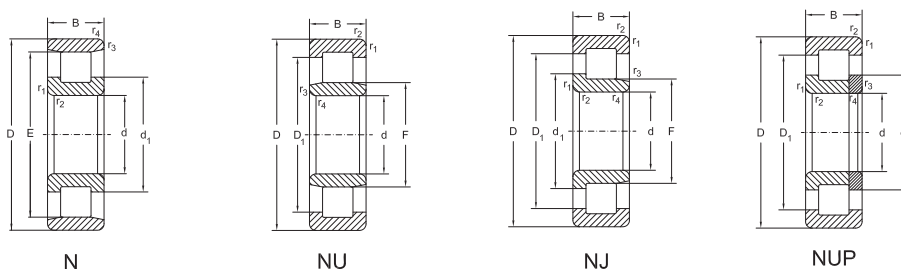
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
100	215	73	3	3	6,1	637	698	2600	3200	NU 2320 E
	215	73	3	3	-	637	698	2600	3200	NJ 2320 E
	215	73	3	3	-	637	698	2600	3200	NUP 2320 E
	250	58	4	4	5,7	408	451	2400	3000	N 420 E
	250	58	4	4	5,7	408	451	2400	3000	NU 420 E
	250	58	4	4	-	408	451	2400	3000	NJ 420 E
	250	58	4	4	-	408	451	2400	3000	NUP 420 E
105	160	26	2	1,1	4,5	96	130	3800	4500	NU 1021 E
	190	36	2,1	2,1	1,4	285	299	3000	3600	N 221 E
	190	36	2,1	2,1	1,4	285	299	3000	3600	NU 221 E
	190	36	2,1	2,1	-	285	299	3000	3600	NJ 221 E
	190	36	2,1	2,1	-	285	299	3000	3600	NUP 221 E
	225	49	3	3	3,4	475	475	2600	3200	N 321 E
	225	49	3	3	3,4	475	475	2600	3200	NU 321 E
	225	49	3	3	-	475	475	2600	3200	NJ 321 E
	225	49	3	3	-	475	475	2600	3200	NUP 321 E
	260	60	4	4	5,7	476	542	2200	2800	NU 421 E
	260	60	4	4	-	476	542	2200	2800	NJ 421 E
	260	60	4	4	-	476	542	2200	2800	NUP 421 E
110	170	28	2	1,1	4,5	122	158	3600	4500	NU 1022 E
	200	38	2,1	2,1	1,4	318	347	3000	3600	N 222 E
	200	38	2,1	2,1	1,4	318	347	3000	3600	NU 222 E
	200	38	2,1	2,1	-	318	347	3000	3600	NJ 222 E

Single Row Cylindrical Roller Bearings



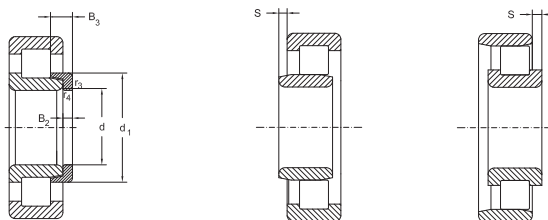
Dimensions					Thrust collar			Weight	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
100	-	127,5	-	181	-	-	-	12	-
	-	127,5	139,6	181	13	23,5	HJ 2320 E	12	0,95
	-	127,5	139,6	181	-	-	-	12	-
	211	-	153,5	-	-	-	-	15,8	-
	-	139	-	197	-	-	-	15,8	-
	-	139	153,5	197	16	27	HJ 420	15,8	1,6
	-	139	153,5	197	-	-	-	15,8	-
105	-	119,5	124,5	140,3	7	13,5	HJ 1021	1,9	0,24
	171,5	-	134,7	-	-	-	-	4,1	-
	-	125,5	-	163	-	-	-	4,1	-
	-	125,5	134,7	163	10	16	HJ 221 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	HJ 321 E	9,1	1
	-	135	147	183,8	-	-	-	9,1	-
	-	144,5	-	206	-	-	-	17,5	-
	-	144,5	159,5	206	16	27	HJ 421	17,5	1,7
	-	144,5	159,5	206	-	-	-	17,5	-
110	-	125	131	149	7	13,5	HJ 1022	2,4	0,27
	180,5	-	141,6	-	-	-	-	4,9	-
	-	132,5	-	172,4	-	-	-	4,9	-
	-	132,5	141,6	172,4	11	17	HJ 222 E	4,9	0,62

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
110	200	38	2,1	2,1	-	318	347	3000	3600	NUP 222 E
	200	53	2,1	2,1	4	418	494	2800	3400	NU 2222 E
	200	53	2,1	2,1	-	418	494	2800	3400	NJ 2222 E
	200	53	2,1	2,1	-	418	494	2800	3400	NUP 2222 E
	240	50	3	3	4	504	513	2400	3000	N 322 E
	240	50	3	3	4	504	513	2400	3000	NU 322 E
	240	50	3	3	-	504	513	2400	3000	NJ 322 E
	240	50	3	3	-	504	513	2400	3000	NUP 322 E
	240	80	3	3	7,2	741	855	2200	2800	NU 2322 E
	240	80	3	3	-	741	855	2200	2800	NJ 2322 E
	240	80	3	3	-	741	855	2200	2800	NUP 2322 ECK E
	280	65	4	4	6,2	505	556	2200	2800	N 422 E
	280	65	4	4	-	505	556	2200	2800	NU 422 E
	280	65	4	4	-	505	556	2200	2800	NJ 422 E
120	180	28	2	1	3,2	505	556	3400	4000	NUP 422 E
	215	40	2,1	2,1	3,5	127	174	2600	3200	NU 1024 E
	215	40	2,1	2,1	3,5	371	409	2600	3200	N 224 E
	215	40	2,1	2,1	-	371	409	2600	3200	NU 224 E
	215	40	2,1	2,1	-	371	409	2600	3200	NJ 224 E
	215	58	2,1	2,1	5	371	409	2600	3200	NUP 224 E
	215	58	2,1	2,1	-	494	599	2600	3200	NU 2224 E
	215	58	2,1	2,1	-	494	599	2600	3200	NJ 2224 E
	260	55	3	3	4,5	494	599	2200	2800	NUP 2224 E

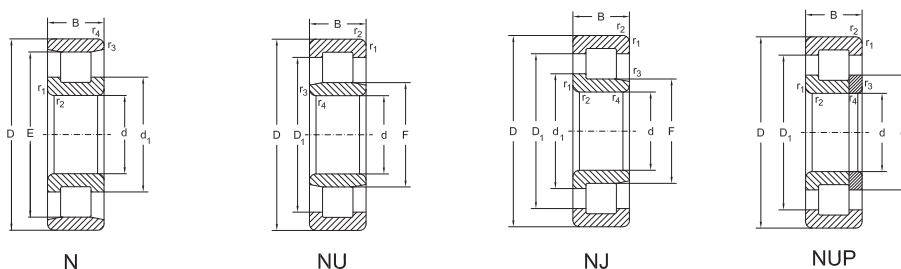
Single Row Cylindrical Roller Bearings



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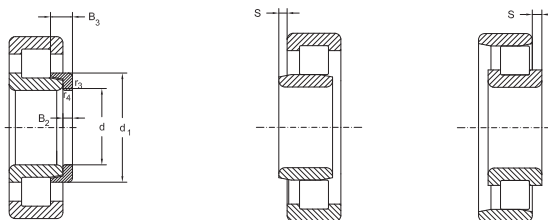
Dimensions					Thrust collar		Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
110	-	132,5	141,6	172,4	-	-	-	4,9	-
	-	132,5	-	172,4	-	-	-	6,7	-
	-	132,5	141,6	172,4	11	19,5	HJ 2222 E	6,7	0,65
	-	132,5	141,6	172,4	-	-	-	6,7	-
	211	-	155,9	-	-	-	-	10,5	-
	-	143	-	199,9	-	-	-	10,5	-
	-	143	155,9	199,9	14	22	HJ 322 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	HJ 2322 E	17,0	1,3
	-	143	155,9	199,9	-	-	-	17,0	-
	-	155	-	219,5	-	-	-	20,8	-
	-	155	171	219,5	17	29,5	HJ 422	20,8	2,1
	-	155	171	219,5	-	-	-	20,8	-
120	-	135	141	158,8	7	13,5	HJ 1024	2,6	0,3
	195,5	-	153,5	-	-	-	-	5,7	-
	-	143,5	-	186,9	-	-	-	5,7	-
	-	143,5	153,5	186,9	11	17	HJ 224 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	HJ 2224 E	8,3	0,75
	-	143,5	153,5	186,9	-	-	-	8,3	-
	230	-	168,7	-	-	-	-	15,2	-

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
120	260	55	3	3	4,5	580	589	2200	2800	N 324 E
	260	55	3	3	-	580	589	2200	2800	NJ 324 E
	260	55	3	3	-	580	589	2200	2800	NUP 324 E
	260	86	3	3	7,2	869	988	2000	2600	NU 2324 EE
	260	86	3	3	-	869	988	2000	2600	NJ 2324 EE
	260	86	3	3	-	869	988	2000	2600	NUP 2324 EE
	310	72	5	5	6,9	612	698	1800	2200	NU 424 E
	310	72	5	5	-	612	698	1800	2200	NJ 424 E
130	200	33	2	1	5,5	157	213	3000	3600	NU 1026 E
	230	40	3	3	3,6	394	432	2400	3000	N 226 E
	230	40	3	3	3,6	394	432	2400	3000	NU 226 E
	230	40	3	3	-	394	432	2400	3000	NJ 226 E
	230	40	3	3	-	394	432	2400	3000	NUP 226 E
	230	64	3	3	6	580	698	2400	3000	NU 2226 E
	230	64	3	3	-	580	698	2400	3000	NJ 2226 E
	230	64	3	3	-	580	698	2400	3000	NUP 2226 E
	280	58	4	4	4,5	684	713	2000	2600	N 326 E
	280	58	4	4	4,5	684	713	2000	2600	NU 326 E
	280	58	4	4	-	684	713	2000	2600	NJ 326 E
	280	58	4	4	-	684	713	2000	2600	NUP 326 E
	280	93	4	4	8,1	1007	1188	1900	2400	NU 2326 EE
	280	93	4	4	-	1007	1188	1900	2400	NJ 2326 EE
	280	93	4	4	-	1007	1188	1900	2400	NUP 2326 EE

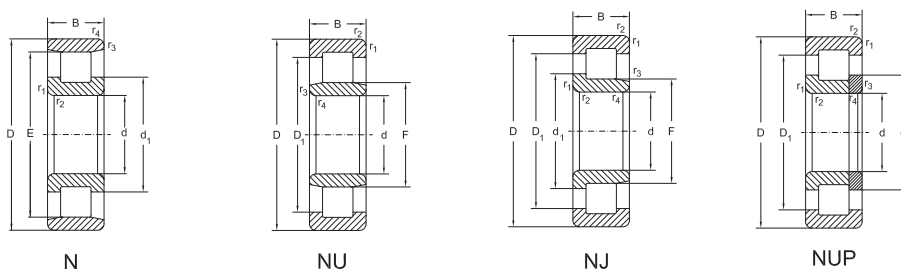
Single Row Cylindrical Roller Bearings



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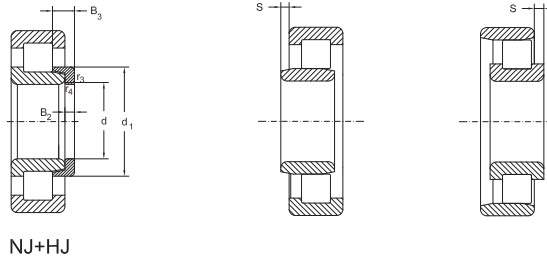
Dimensions					Thrust collar		Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
120	-	154	-	217,3	-	-	-	13,4	-
	-	154	168,7	217,3	14	22,5	HJ 324 E	13,4	1,4
	-	154	168,7	217,3	-	-	-	13,4	-
	-	154	-	217,3	-	-	-	23,5	-
	-	154	168,7	217,3	14	26	HJ 2324 E	23,5	1,5
	-	154	168,7	217,3	-	-	-	23,5	-
	-	170	-	242,5	-	-	-	30,5	-
	-	170	188	242,5	17	30,5	HJ 424	30,5	2,7
130	-	148	155	175	8	16	HJ 1026	3,9	0,45
	209,5	-	164,2	-	-	-	-	6,5	-
	-	153,5	-	200,2	-	-	-	6,5	-
	-	153,5	164,2	200,2	11	17	HJ 226 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	HJ 2226 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	HJ 326 E	16,5	1,7
	-	167	182,3	233,8	-	-	-	16,5	-
	-	167	-	233,8	-	-	-	29,6	-
	-	167	182,3	233,8	14	28	HJ 2326 E	29,6	1,8
	-	167	182,3	233,8	-	-	-	29,6	-

Single Row Cylindrical Roller Bearings



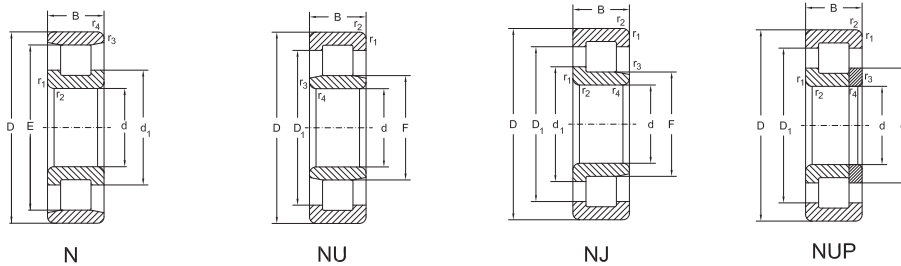
Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
130	340	78	6	5	6,5	790	960	1800	2200	NU 426 E
	340	78	6	5	-	790	960	1800	2200	NJ 426 E
140	210	33	2	1,1	3,8	163	233	2800	3400	NU 1028 E
	250	42	3	3	3,7	428	485	2400	3000	N 228 E
	250	42	3	3	3,7	428	485	2400	3000	NU 228 E
	250	42	3	3	-	428	485	2400	3000	NJ 228 E
	250	42	3	3	-	428	485	2400	3000	NUP 228 E
	250	68	3	3	7	622	789	2200	2800	NU 2228 E
	250	68	3	3	-	622	789	2200	2800	NJ 2228 E
	250	68	3	3	-	622	789	2200	2800	NUP 2228 E
	300	62	4	4	5,2	741	789	1900	2400	N 328 E
	300	62	4	4	5,2	741	789	1900	2400	NU 328 E
	300	62	4	4	-	741	789	1900	2400	NJ 328 E
	300	62	4	4	-	741	789	1900	2400	NUP 328 E
	300	102	4	4	9,2	1140	1359	1800	2200	NU 2328 E
	300	102	4	4	-	1140	1359	1800	2200	NJ 2328 E
	300	102	4	4	-	1140	1359	1800	2200	NUP 2328 E
	360	82	6	5	7	850	1020	1600	1900	NU 428 E
	360	82	6	5	-	850	1020	1600	1900	NJ 428 E
150	225	35	2,1	1,5	4,2	184	261	2600	3200	NU 1030 E
	270	45	3	3	4	485	570	2200	2800	N 230 E
	270	45	3	3	4	485	570	2200	2800	NU 230 E
	270	45	3	3	-	485	570	2200	2800	NJ 230 E

Single Row Cylindrical Roller Bearings



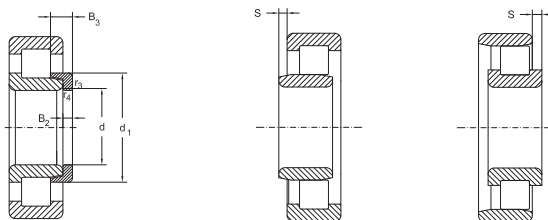
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
130	-	185	-	265	-	-	-	42,6	-
	-	185	205	265	18	32	HJ 426	42,6	3,4
140	-	158	165	185	8	16	HJ 1028	4,1	0,48
	225	-	180	-	-	-	-	9,5	-
	-	169	-	215,3	-	-	-	9,5	-
	-	169	180	215,3	11	18	HJ 228 E	9,5	1
	-	169	180	215,3	-	-	-	9,5	-
	-	169	-	215,3	-	-	-	15,5	-
	-	169	180	215,3	11	23	HJ 2228 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	HJ 328 E	22,5	2
	-	180	195,5	250,3	-	-	-	22,5	-
	-	180	-	250,3	-	-	-	37,2	-
	-	180	195,5	250,3	15	31	HJ 2328 E	37,2	2,2
	-	180	195,5	250,3	-	-	-	37,2	-
	-	198	-	281	-	-	-	49,5	-
	-	198	219	281	18	33	HJ 428	49,5	3,9
150	-	169,5	176,5	198,1	9	18	HJ 1030	5	0,6
	242	-	193,7	-	-	-	-	11,8	-
	-	182	-	231,8	-	-	-	11,8	-
	-	182	193,7	231,8	12	19,5	HJ 230 E	11,8	1,3

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
150	270	45	3	3	-	485	570	2200	2800	NUP 230 E
	270	73	3	3	7,3	698	884	2000	2600	NU 2230 E
	270	73	3	3	-	698	884	2000	2600	NJ 2230 E
	270	73	3	3	-	698	884	2000	2600	NUP 2230 E
	320	65	4	4	5,5	855	917	1800	2200	N 330 E
	320	65	4	4	5,5	855	917	1800	2200	NU 330 E
	320	65	4	4	-	855	917	1800	2200	NJ 330 E
	320	65	4	4	-	855	917	1800	2200	NUP 330 E
	320	108	4	4	9,8	1302	1549	1700	2000	NU 2330 E
	320	108	4	4	-	1302	1549	1700	2000	NJ 2330 E
	320	108	4	4	-	1302	1549	1700	2000	NUP 2330 E
	380	85	6	5	7,5	898	1145	1500	1800	NU 430 E
	380	85	6	5	-	898	1145	1500	1800	NJ 430 E
160	240	38	2,1	1,5	4,3	218	309	2400	3000	NU 1032 E
	290	48	3	3	4,1	556	646	2000	2600	N 232 E
	290	48	3	3	4,1	556	646	2000	2600	NU 232 E
	290	48	3	3	-	556	646	2000	2600	NJ 232 E
	290	48	3	3	-	556	646	2000	2600	NUP 232 E
	290	80	3	3	7,3	884	1140	1900	2400	NU 2232 E
	290	80	3	3	-	884	1140	1900	2400	NJ 2232 E
	290	80	3	3	-	950	1026	1900	2400	NUP 2232 E
	340	68	4	4	5,5	950	1026	1600	1900	N 332 E
	340	68	4	4	5,5	950	1026	1600	1900	NU 332 E

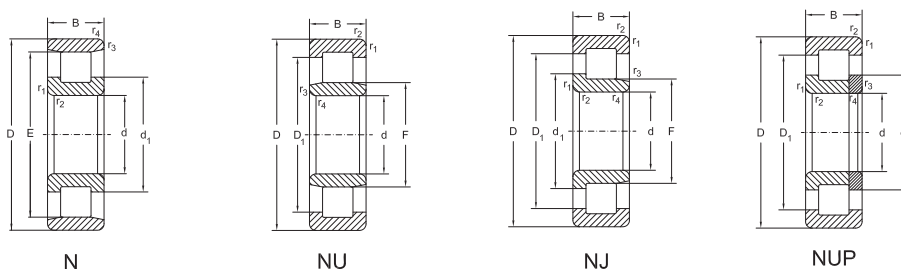
Single Row Cylindrical Roller Bearings



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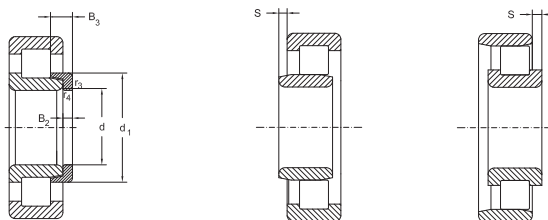
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
150	-	182	193,7	231,8	-	-	-	11,8	-
	-	182	-	231,8	-	-	-	19,5	-
	-	182	193,7	231,8	12	24,5	HJ 2230 E	19,5	1,4
	-	182	193,7	231,8	-	-	-	19,5	-
	283	-	210,1	-	-	-	-	27,5	-
	-	193	-	268,4	-	-	-	27,5	-
	-	193	210,1	268,4	15	25	HJ 330 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	HJ 2330 E	44,8	2,5
	-	193	210,1	268,4	-	-	-	44,8	-
	-	213	-	296	-	-	-	48	-
	-	213	234	296	20	36,5	HJ 430	48	4,9
160	-	180	188	211,7	10	19	HJ 1032	6,2	0,75
	259	-	207,4	-	-	-	-	14,6	-
	-	195	-	248,2	-	-	-	14,6	-
	-	195	207,4	248,2	12	20	HJ 232 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	HJ 2232 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



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
160	340	68	4	4	-	950	1026	1600	1900	NJ 332 E
	340	68	4	4	-	950	1026	1600	1900	NUP 332 E
	340	114	4	4	10	1188	1644	1600	1900	NU 2332 E
	340	114	4	4	-	1188	1644	1600	1900	NJ 2332 E
	340	114	4	4	-	1188	1644	1600	1900	NUP 2332 E
170	260	42	2,1	2,1	6,9	261	380	2200	2800	NU 1034 E
	310	52	4	4	4,3	660	774	1800	2200	N 234 E
	310	52	4	4	4,3	660	774	1800	2200	NU 234 E
	310	52	4	4	-	660	774	1800	2200	NJ 234 E
	310	52	4	4	-	660	774	1800	2200	NUP 234 E
	310	86	4	4	7,2	1007	1359	1700	2000	NU 2234 E
	310	86	4	4	-	1007	1359	1700	2000	NJ 2234 E
	310	86	4	4	-	1007	1359	1700	2000	NUP 2234 E
	360	72	4	4	7	904	1121	1600	1900	N 334 E
	360	72	4	4	7	904	1121	1600	1900	NU 334 E
	360	72	4	4	-	904	1121	1600	1900	NJ 334 E
	360	72	4	4	-	904	1121	1600	1900	NUP 334 E
	360	120	4	4	13	1378	1938	1500	1800	NU 2334 E
	360	120	4	4	-	1378	1938	1500	1800	NJ 2334 E
	360	120	4	4	-	1378	1938	1500	1800	NUP 2334 E
180	280	46	2,1	2,1	7	319	451	2200	2800	NU 1036 E
	320	52	4	4	4,5	684	808	1800	2200	N 236 E
	320	52	4	4	4,5	684	808	1800	2200	NU 236 E

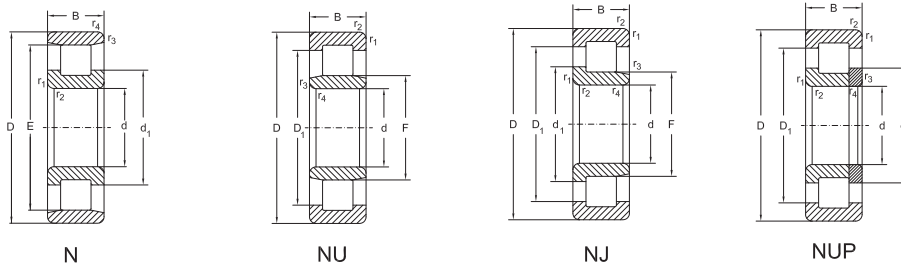
Single Row Cylindrical Roller Bearings



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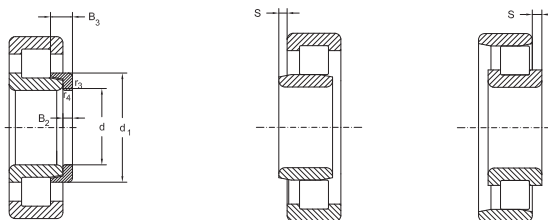
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
160	-	204	222,2	284,6	15	25	HJ 332 E	32,1	2,7
	-	204	222,2	284,6	-	-	-	32,1	-
	-	204	-	284,6	-	-	-	53,5	-
	-	204	222,2	284,6	15	32	HJ 2332 E	53,5	2,9
	-	204	222,2	284,6	-	-	-	53,5	-
170	-	193	200,9	227,7	11	21	HJ 1034	8,4	1
	279	-	220,8	-	-	-	-	18,2	-
	-	207	-	267,1	-	-	-	18,2	-
	-	207	220,8	267,1	12	20	HJ 234 E	18,2	1,7
	-	207	220,8	267,1	-	-	-	18,2	-
	-	205	-	268,5	-	-	-	29,8	-
	-	205	219,6	268,5	12	24	HJ 2234 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	HJ 334 E	38	3,3
	-	220	238	292,5	-	-	-	38	-
	-	220	-	292,5	-	-	-	63,5	-
	-	220	238	292,5	16	38,5	HJ 2334	63,5	3,7
	-	220	238	292,5	-	-	-	63,5	-
180	-	205	214,1	244,7	12	22,5	HJ 1036	10,9	1,3
	289	-	230,2	-	-	-	-	18,9	-
	-	217	-	277,2	-	-	-	18,9	-

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
180	320	52	4	4	-	684	808	1800	2200	NJ 236 E
	320	52	4	4	-	684	808	1800	2200	NUP 236 E
	320	86	4	4	7,2	1045	1359	1700	2000	NU 2236 E
	320	86	4	4	-	1045	1359	1700	2000	NJ 2236 E
	320	86	4	4	-	1045	1359	1700	2000	NUP 2236 E
	380	75	4	4	6,9	969	1226	1500	1800	N 336 E
	380	75	4	4	6,9	969	1226	1500	1800	NU 336 E
	380	75	4	4	-	969	1226	1500	1800	NJ 336 E
	380	75	4	4	-	969	1226	1500	1800	NUP 336 E
	380	126	4	4	13	1530	2128	1400	1700	NU 2336 E
	380	126	4	4	-	1530	2128	1400	1700	NJ 2336 E
	380	126	4	4	-	1530	2128	1400	1700	NUP 2336 E
190	290	46	2,1	2,1	5	330	475	2000	2600	NU 1038 E
	340	55	4	4	4,7	760	917	1700	2000	N 238 E
	340	55	4	4	4,7	760	917	1700	2000	NU 238 E
	340	55	4	4	-	760	917	1700	2000	NJ 238 E
	340	55	4	4	-	760	917	1700	2000	NUP 238 E
	340	92	4	4	8	1159	1520	1600	1900	NU 2238 E
	340	92	4	4	-	1159	1520	1600	1900	NJ 2238 E
	400	78	5	5	7,1	1083	1425	1400	1700	NU 338 E
	400	78	5	5	-	1083	1425	1400	1700	NJ 338 E
	400	132	5	5	13,5	1739	2423	1400	1700	NU 2338 E
	400	132	5	5	-	1739	2423	1400	1700	NJ 2338 E

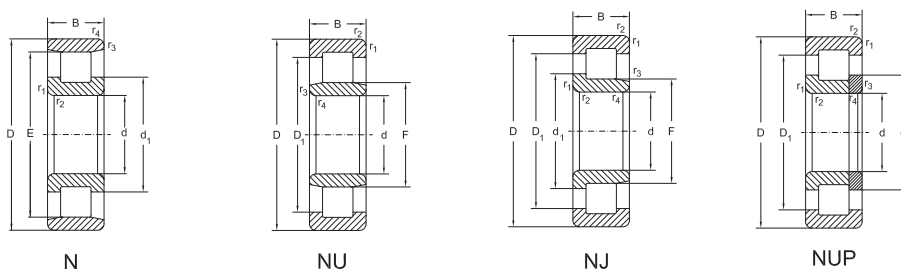
Single Row Cylindrical Roller Bearings



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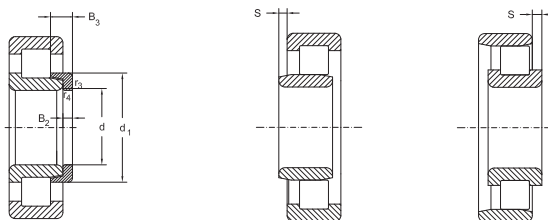
Dimensions				Thrust collar			Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
180	-	217	230,2	277,2	12	20	HJ 236 E	19	1,8
	-	217	230,2	277,2	-	-	-	19	-
	-	215	-	278,6	-	-	-	31,2	-
	-	215	229,6	278,6	12	24	HJ 2236 E	31,2	1,9
	-	215	229,6	278,6	-	-	-	31,2	-
	328	-	252	-	-	-	-	44	-
	-	232	-	308,5	-	-	-	44	-
	-	232	252	308,5	17	30,5	HJ 336	44	3,9
	-	232	252	308,5	-	-	-	44	-
	-	232	-	308,5	-	-	-	74	-
	-	232	252	308,5	17	40	HJ 2336	74	4,9
	-	232	252	308,5	-	-	-	74	-
190	-	215	225	254,5	12	22,5	HJ 1038	11,4	1,4
	306	-	244,6	-	-	-	-	22,8	-
	-	230	-	293,6	-	-	-	22,8	-
	-	230	244,6	293,6	13	21,5	HJ 238 E	22,8	2,2
	-	230	244,6	293,6	-	-	-	22,8	-
	-	228	-	295	-	-	-	37,9	-
	-	228	243,3	295	13	26,5	HJ 2238 E	37,9	2,4
	-	245	-	324,3	-	-	-	50,5	-
	-	245	265	324,3	18	31	HJ 338	50,5	4,5
	-	245	-	324,3	-	-	-	88,5	-
	-	245	265	324,3	18	36,5	HJ 2338 E	88,5	5

Single Row Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein^{-1}		
190	400	132	5	5	-	1739	2423	1400	1700	NUP 2338 E
200	310	51	2,1	2,1	8,3	361	542	2000	2600	NU 1040 E
	360	58	4	4	5	808	969	1600	1900	N 240 E
	360	58	4	4	5	808	969	1600	1900	NU 240 E
	360	58	4	4	-	808	969	1600	1900	NJ 240 E
	360	58	4	4	-	808	969	1600	1900	NUP 240 E
	360	98	4	4	8,1	1302	1710	1500	1800	NU 2240 E
	360	98	4	4	-	1302	1710	1500	1800	NJ 2240 E
	420	80	5	5	7,5	1169	1549	1400	1700	NU 340 E
	420	80	5	5	-	1169	1549	1400	1700	NJ 340 E
	420	138	5	5	15	1881	2660	1300	1600	NU 2340 E
	420	138	5	5	-	1881	2660	1300	1600	NJ 2340 E
220	340	56	3	3	6,2	470	698	1700	2000	NU 1044 E
	400	65	4	4	6	1007	1226	1500	1800	NU 244 E
	400	65	4	4	-	1007	1226	1500	1800	NJ 244 E
	400	65	4	4	-	1007	1226	1500	1800	NUP 244 E
	400	108	4	4	11,8	1492	2166	1400	1700	NU 2244 E
	400	108	4	4	-	1492	2166	1400	1700	NJ 2244 E
	460	88	5	5	8	1150	1549	1300	1600	NU 344 E
	460	145	5	5	10	2261	3278	1200	1500	NU 2344 E
240	360	56	3	3	8,5	497	760	1600	1900	NU 1048 E
	440	72	4	4	7	904	1302	1400	1700	NU 248 E
	440	72	4	4	-	904	1302	1400	1700	NJ 248 E

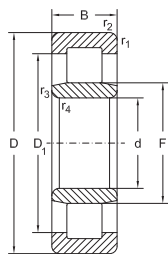
Single Row Cylindrical Roller Bearings



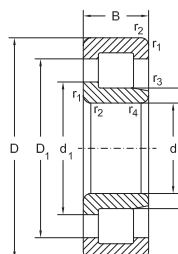
NJ+HJ

Dimensions				Thrust collar			Weight		
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	HJ 1040	14,8	1,7
	323	-	258,2	-	-	-	-	26,9	-
	-	243	-	310,1	-	-	-	26,9	-
	-	243	258,2	310,1	14	23	HJ 240 E	26,9	2,6
	-	243	258,2	310,1	-	-	-	26,9	-
	-	241	-	311,5	-	-	-	45,7	-
	-	241	256,9	311,5	14	28	HJ 2240 E	45,7	3
	-	260	-	339,3	-	-	-	57,5	-
	-	260	280	339,3	18	33	HJ 340	57,5	5,2
	-	260	-	339,3	-	-	-	99	-
	-	260	280	339,3	18	44,5	HJ 2340	99	5,5
220	-	250	262	297,3	14	27	HJ 1044	19,3	2,2
	-	270	-	334,3	-	-	-	38,1	-
	-	270	285,5	334,3	15	27,5	HJ 244	38,1	3,6
	-	270	285,5	334,3	-	-	-	38,1	-
	-	270	-	334,3	-	-	-	63,5	-
	-	270	285,5	334,3	15	36,5	HJ 2244	63,5	3,6
	-	284	-	373,3	-	-	-	75,5	-
	-	284	-	373,3	-	-	-	124	-
240	-	270	282	317,3	14	27	HJ 1048	20,7	2,4
	-	295	-	367,3	-	-	-	51,5	-
	-	295	313	367,3	16	29,5	HJ 248	51,5	4,65

Single Row Cylindrical Roller Bearings



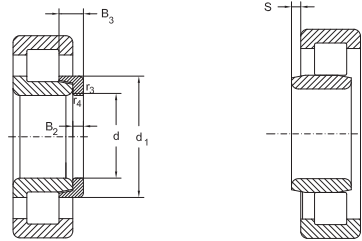
NU



NJ

DiEensions						Basical radial load		Speed liEit		Designation
d	D	B	r ₁ , r ₂ Ein.	r ₃ , r ₄ Ein.	s ≈	dyn. C _r	stat. C _{0r}	grease	oil	
EE						kN	Ein ⁻¹			
240	440	120	4	4	12,8	1378	2242	1300	1600	NU 2248 E
	500	95	5	5	8.9	1378	1900	1200	1500	NU 348 E
	500	155	5	5	17	2470	3468	1100	1400	NU 2348 E
260	400	65	4	4	10,5	596	917	1500	1800	NU 1052 E
	480	80	5	5	5	1112	1615	1200	1500	NU 252 E
	480	80	5	5	-	1140	1630	1200	1500	NJ 252 E
	480	130	5	5	12,8	1701	2850	1100	1400	NU 2252 E
	540	102	6	6	9,4	1843	2565	1100	1400	NU 352 E
	540	165	6	6	18	3031	4275	1000	1300	NU 2352 E
280	420	65	4	4	10,5	627	1007	1400	1700	NU 1056 E
	500	80	5	5	7,5	1083	1615	1200	1500	NU 256 E
	500	80	5	5	-	1083	1615	1200	1500	NJ 256 E
	500	130	5	5	12,8	2090	3088	1100	1400	NU 2256 E
	580	108	6	6	22	1800	2500	1000	1300	NU 356 E
300	460	74	4	4	12	815	1302	1300	1600	NU 1060 E
	540	85	5	5	7,2	1349	2014	1100	1400	NU 260 E
	540	85	5	5	-	1349	2014	1100	1400	NJ 260 E
	540	140	5	5	14	1986	3278	1000	1300	NU 2260 E
	620	109	7,5	7,5	9,5	2080	3000	900	1100	NU 360 E
320	480	74	4	4	11,5	836	1359	1200	1500	NU 1064 E
	580	92	5	5	8,3	1530	2328	1000	1300	NU 264 E
	580	92	5	5	-	1530	2328	1000	1300	NJ 264 E

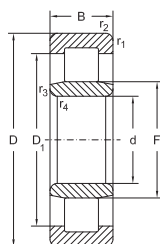
Single Row Cylindrical Roller Bearings



NJ+HJ

Dimensions			Thrust collar				Weight		
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	HJ 1052	30,8	3,3
	-	320	-	399,3	-	-	-	68,3	-
	-	320	340	399,3	18	33	HJ 252	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	HJ 1056	32,8	3,7
	-	340	-	419,3	-	-	-	71,8	-
	-	340	360	419,3	18	33	HJ 256	71,8	6,5
	-	340	-	419,3	-	-	-	117	-
	-	362	-	469,3	-	-	-	147	-
300	-	340	356	403,6	19	36	HJ 1060	46,3	5,4
	-	364	-	453,3	-	-	-	89,9	-
	-	364	387	453,3	20	34,5	HJ 260	89,9	8,4
	-	364	-	453,3	-	-	-	148	-
	-	388	-	506,7	-	-	-	168	-
320	-	360	376	423,1	19	36	HJ 1064	48,7	5,5
	-	390	-	485,3	-	-	-	113	-
	-	390	415	485,3	21	37	HJ 260	113	10,2

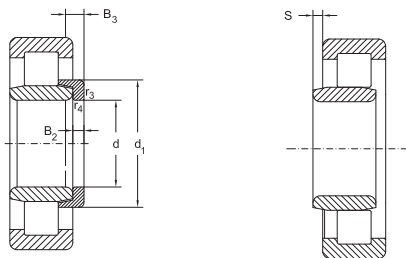
Single Row Cylindrical Roller Bearings



NU

Dimensions						Basic radial load		Speed limit		Designation
d	D	B	r_1, r_2 Ein.	r_3, r_4 Ein.	s ≈	dyn. C_r	stat. C_{0r}	grease	oil	
EE						kN		Ein ⁻¹		
340	520	82	5	5	12,5	1026	1672	1200	1400	NU 1068 E
360	540	82	5	5	12,5	1045	1739	1200	1400	NU 1072 E
380	560	82	5	5	12,5	1083	1834	1000	1300	NU 1076 E
400	600	90	5	5	13,5	543	1121	950	1200	NU 1080 E
420	620	90	5	5	15	1349	2328	900	1100	NU 1084 E
440	650	94	6	6	9,8	1435	2518	850	1000	NU 1088 E
460	680	100	6	6	10,5	1568	2708	850	1000	NU 1092 E
480	650	78	5	5	6,8	1112	2128	900	1100	NU 1996 E
	700	100	5	5	15,9	1596	2850	900	1100	NU 1096 E
500	670	78	5	5	6,8	1150	2242	850	1000	NU 19/500 E
	720	100	6	6	10,5	1634	2945	800	950	NU 10/500 E
560	750	85	5	5	7,5	1568	3088	750	900	NU 19/560 E
	820	115	6	6	12,3	2214	4038	630	750	NU 10/560 E
600	870	118	6	6	13,9	2613	4845	580	480	NU 10/600 E
630	850	100	6	6	8,5	2128	4180	670	800	NU 19/630 E
710	950	106	6	6	9,3	4446	8075	600	700	NU 19/710 E
	1030	140	7,5	7,5	17	4650	8300	400	450	NU 10/710 E
800	1060	115	6	6	10	2450	5400	530	630	NU 19/800 E

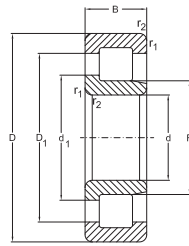
Single Row Cylindrical Roller Bearings



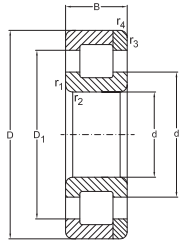
NU+HJ

Dimensions			Thrust collar				Weight		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
340	-	385	403	456	21	39,5	HJ 1068	65	7,1
360	-	405	423	476,4	21	39,5	HJ 1072	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	-
	-	774	-	860,6	-	-	-	420	-
800	-	870	-	965,4	-	-	-	287	-

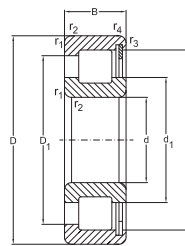
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



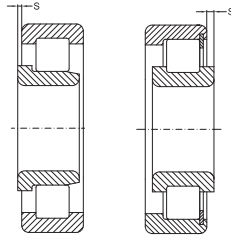
NC



NCF

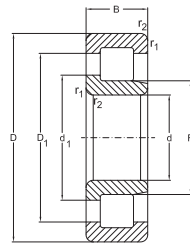
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
20	37	11	0,3	0,3	16	18,5	NC 2904 V
	37	11	0,3	0,3	16	18,5	NCF 2904 V
	42	16	0,6	0,3	33	39,7	NC 3004 V
	42	16	0,6	0,3	33	39,7	NCF 3004 V
25	42	11	0,3	0,3	18	22,5	NC 2905 V
	42	11	0,3	0,3	18	22,5	NCF 2905 V
	47	16	0,6	0,3	37,4	46,9	NC 3005 V
	47	16	0,6	0,3	37,4	46,9	NCF 3005 V
	62	24	1,1	-	68,2	82,8	NJ 2305 VH
30	47	11	0,3	0,3	19,8	26	NC 2906 V
	47	11	0,3	0,3	19,8	26	NCF 2906 V
	55	19	1	0,4	49	63	NC 3006 V
	55	19	1	0,4	49	63	NCF 3006 V
	72	27	1	-	84	102	NJ 2306 VH
35	55	13	0,6	0,3	31	40,5	NC 2907 V
	55	13	0,6	0,3	31	40,5	NCF 2907 V
	62	20	1	0,4	55	71,5	NC 3007 V
	62	20	1	0,4	55	71,5	NCF 3007 V
	80	31	1,5	-	108	124	NJ 2307 VH
40	62	14	0,6	0,3	34	46,5	NC 2908 V
	62	14	0,6	0,3	34	46,5	NCF 2908 V
	68	21	1	0,4	66	87,4	NC 3008 V

Single Row Full Complement Cylindrical Roller Bearings

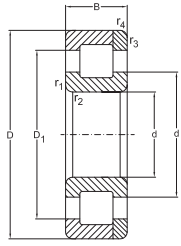


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	26,3	30,3	-	4800	9000	0,06	NC 2904 V
32,3	-	26,3	30,3	0,5	4800	9000	0,05	NCF 2904 V
-	-	27,5	34,5	-	4500	8400	0,12	NC 3004 V
37,5	-	27,5	34,5	0,5	4500	8400	0,11	NCF 3004 V
-	-	31,4	35,4	-	4000	7500	0,07	NC 2905 V
37,45	-	31,4	35,4	0,5	4000	7500	0,06	NCF 2905 V
-	-	36,3	49	-	3600	7000	0,13	NC 3005 V
42,7	-	36,3	49	0,5	3600	7000	0,12	NCF 3005 VH
-	31,71	36,3	49	1,7	3000	5300	0,40	NJ 2305 V
-	-	36,5	40,5	-	3600	6700	0,08	NC 2906 V
42,5	-	36,5	40,5	0,5	3600	6700	0,07	NCF 2906 V
-	-	38,4	46,8	-	3200	5600	0,22	NC 3006 V
49,6	-	38,4	46,8	0,8	3200	5600	0,20	NCF 3006 V
-	38,34	43,3	56,5	1,8	1900	4000	0,56	NJ 2306 VH
-	-	42,4	47,4	-	3000	5600	0,14	NC 2907 V
49,9	-	42,4	47,4	0,5	3000	5600	0,12	NCF 2907 V
-	-	43,6	52,6	-	2800	5300	0,27	NC 3007 V
55,52	-	43,6	52,6	1	2800	5300	0,25	NCF 3007 V
-	44,74	50,3	65,8	2	1600	3400	0,73	NJ 2307 VH
-	-	48,3	53,9	-	2600	5000	0,16	NC 2908 V
56,6	-	48,3	53,9	0,5	2600	5000	0,15	NCF 2908 V
-	-	49,1	58,7	-	2400	4500	0,32	NC 3008 V

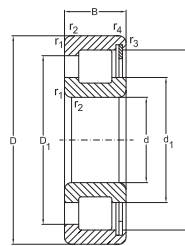
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



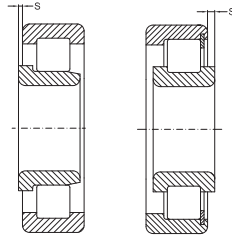
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NCF

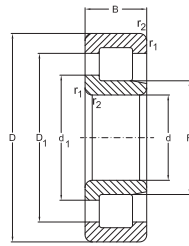
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
40	68	21	1	0,4	65	86	NCF 3008 V
	90	33	1,5	-	145	184	NJ 2308 VH
45	68	14	0,6	0,3	37	52	NC 2909 V
	68	14	0,6	0,3	37	52	NCF 2909 V
	75	23	1	0,4	81	110	NC 3009 V
	75	23	1	0,4	81	110	NCF 3009 V
	100	36	1,5	-	170	220	NJ 2309 VH
50	72	14	0,6	0,3	39	56	NC 2910 V
	72	14	0,6	0,3	39	56	NCF 2910 V
	80	23	1	0,4	86	120	NC 3010 V
	80	23	1	0,4	86	120	NCF 3010 V
	110	40	2	-	198	250	NJ 2310 VH
55	80	16	1	0,6	42	60	NC 2911 V
	80	16	1	0,6	42	60	NCF 2911 V
	90	26	1,1	0,6	105	152	NC 3011 V
	90	26	1,1	0,6	105	152	NCF 3011 V
	120	43	2	-	230	260	NJ 2311 VH
60	85	16	1	0,6	52	78	NC 2912 V
	85	16	1	0,6	52	78	NCF 2912 V
	95	26	1,1	0,6	110	160	NC 3012 V
	95	26	1,1	0,6	110	160	NCF 3012 V
	130	46	2,1	-	260	352	NJ 2312 VH

Single Row Full Complement Cylindrical Roller Bearings

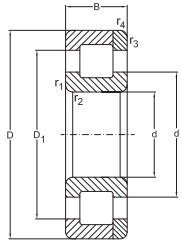


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
61,8	-	49	58,6	1	2400	4500	0,30	NCF 3008 V
-	51,1	57,5	76	2,4	1400	3000	1,00	NJ 2308 VH
-	-	53,6	59,2	-	2200	4500	0,20	NC 2909 V
61,9	-	53,6	59,2	0,5	2200	4500	0,18	NCF 2909 V
-	-	55	65	-	2000	4300	0,42	NC 3009 V
68,5	-	55	65	1	2000	4300	0,40	NCF 3009 V
-	56,13	62,5	81,8	2,4	1300	2800	1,35	NJ 2309 VH
-	-	58,7	64,4	-	1900	4000	0,21	NC 2910 V
67,1	-	58,7	64,4	0,5	1900	4000	0,18	NCF 2910 V
-	-	58	68,8	-	1900	4000	0,45	NC 3010 V
72,33	-	58	68,8	1	1900	4000	0,43	NCF 3010 V
-	60,7	68,3	90,3	2,6	1600	3200	1,85	NJ 2310 VH
-	-	64,2	70,2	-	1800	3800	0,30	NC 2911 V
73,2	-	64,2	70,2	0,5	1800	3800	0,27	NCF 2911 V
-	-	67,5	79,5	-	1600	3400	0,66	NC 3011 V
83,7	-	67,5	79,5	1,2	1600	3400	0,63	NCF 3011 V
-	67,1	75,5	98,6	2,6	1000	2200	2,30	NJ 2311 VH
-	-	69,5	76,1	-	1600	3400	0,30	NC 2912 V
79,3	-	69,5	76,1	0,5	1600	3400	0,28	NCF 2912 V
-	-	70,9	82,9	-	1600	3200	0,71	NC 3012 V
86,9	-	70,9	82,9	1,2	1600	3200	0,68	NCF 3012 V
-	73,68	82,1	106	3	950	2000	2,83	NJ 2312 VH

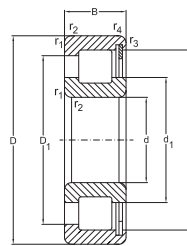
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



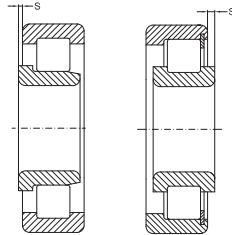
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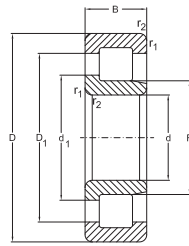
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
65	90	16	1	0,6	53,5	80	NC 2913 V
	90	16	1	0,6	53,5	80	NCF 2913 V
	100	26	1,1	0,6	117	175	NC 3013 V
	100	26	1,1	0,6	117	175	NCF 3013 V
	140	48	2,1	-	302	358	NJ 2313 VH
70	100	19	1	0,6	77	118	NC 2914 V
	100	19	1	0,6	77	118	NCF 2914 V
	110	30	1,1	0,6	145	215	NC 3014 V
	110	30	1,1	0,6	145	215	NCF 3014 V
	150	51	2,1	-	335	455	NJ 2314 VH
75	105	19	1	0,6	79,5	124	NC 2915 V
	105	19	1	0,6	79,5	124	NCF 2915 V
	115	30	1,1	0,6	154	224	NC 3015 V
	115	30	1,1	0,6	154	224	NCF 3015 V
	160	55	2,1	-	390	550	NJ 2315 VH
80	110	19	1	0,6	81	128	NC 2916 V
	110	19	1	0,6	81	128	NCF 2916 V
	125	34	1,1	0,6	194	285	NC 3016 V
	125	34	1,1	0,6	194	285	NCF 3016 V
	170	58	2,1	-	455	550	NJ 2316 VH
85	120	22	1,1	1	105	168	NC 2917 V
	120	22	1,1	1	105	168	NCF 2917 V
	130	34	1,1	0,6	195	295	NC 3017 V

Single Row Full Complement Cylindrical Roller Bearings

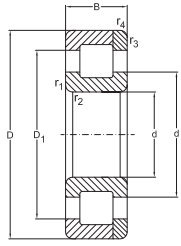


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	73,7	80,3	-	1600	3400	0,33	NC 2913 V
83,5	-	73,7	80,3	0,5	1600	3400	0,30	NCF 2913 V
-	-	77,1	87,1	-	1400	3000	0,75	NC 3013 V
93,1	-	77,1	87,1	1,2	1400	3000	0,72	NCF 3013 V
-	80,71	89,4	117	3	900	1900	3,48	NJ 2313 VH
-	-	80,5	88,5	-	1400	3000	0,52	NC 2914 V
92,5	-	80,5	88,5	0,75	1400	3000	0,48	NCF 2914 V
-	-	82,6	97,2	-	1300	2800	1,10	NC 3014 V
102,1	-	82,6	97,2	1,5	1300	2800	1,05	NCF 3014 V
-	84,22	93,8	121	3	850	1800	4,40	NJ 2314 VH
-	-	85,6	93,6	-	1300	2800	0,55	NC 2915 V
97,6	-	85,6	93,6	0,75	1300	2800	0,50	NCF 2915 V
-	-	87	102	-	1200	2600	1,15	NC 3015 V
106,5	-	87	102	1,5	1200	2600	1,10	NCF 3015 V
-	91,25	100,8	132,5	3	750	1600	5,18	NJ 2315 VH
-	-	90,7	98,7	-	1200	2600	0,57	NC 2916 V
102,7	-	90,7	98,7	0,75	1200	2600	0,53	NCF 2916 V
-	-	94,8	112	-	1100	2400	1,56	NC 3016 V
117,2	-	94,8	112	1,8	1100	2400	1,50	NCF 3016 V
-	98,3	109	141	4	700	1500	6,40	NJ 2316 VH
-	-	99,1	109	-	1100	2400	0,79	NC 2917 V
112,5	-	99,1	109	0,75	1100	2400	0,78	NCF 2917 V
-	-	99,2	116	-	1100	2400	1,60	NC 3017 V

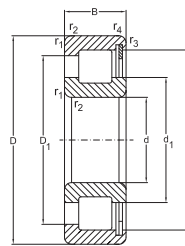
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



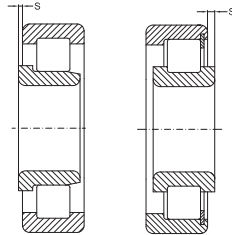
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NCF

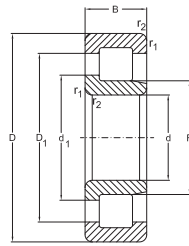
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
85	130	34	1,1	0,6	195	295	NCF 3017 V
	180	60	3	-	482	695	NJ 2317 VH
90	125	22	1,1	1	105	172	NC 2918 V
	125	22	1,1	1	105	172	NCF 2918 V
	140	37	1,5	1	227	348	NC 3018 V
	140	37	1,5	1	227	348	NCF 3018 V
	190	64	3	-	520	790	NJ 2318 VH
95	130	22	1,1	1	108	180	NC 2919 V
	130	22	1,1	1	108	180	NCF 2919 V
	145	37	1,5	1	230	360	NC 3019 V
	145	37	1,5	1	230	360	NCF 3019 V
100	140	24	1,1	1	132	220	NC 2920 V
	140	24	1,1	1	132	220	NCF 2920 V
	150	37	1,5	1	242	375	NC 3020 V
	150	37	1,5	1	242	375	NCF 3020 V
	215	73	3	-	704	1030	NJ 2320 VH
110	150	24	1,1	1	140	243	NC 2922 V
	150	24	1,1	1	140	243	NCF 2922 V
	170	45	2	1	325	510	NC 3022 V
	170	45	2	1	325	510	NCF 3022 V
	240	80	3	-	830	1060	NJ 2322 VH
120	165	27	1,1	1	172	287	NC 2924 V
	165	27	1,1	1	172	287	NCF 2924 V

Single Row Full Complement Cylindrical Roller Bearings

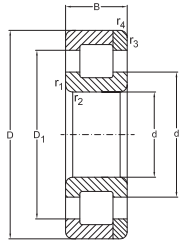


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
121,6	-	99,2	116	1,8	1100	2200	1,55	NCF 3017 V
-	107,02	117,4	151,5	4	900	1800	7,3	NJ 2317 VH
-	-	102	111	-	1100	2400	0,9	NC 2918 V
115,6	-	102	111	0,75	1100	2400	0,82	NCF 2918 V
-	-	106,2	125	-	1000	2200	2,12	NC 3018 V
130,3	-	106,2	125	2	1000	2200	2,05	NCF 3018 V
-	108,8	121	156	4	670	1400	8,75	NJ 2318 VH
-	-	107	117	-	1000	2200	0,94	NC 2919 V
120,4	-	107	117	0,75	1000	2200	0,86	NCF 2919 V
-	-	111	129	2	950	2000	2,28	NC 3019 V
135,1	-	111	129	4,5	950	2000	2,15	NCF 3019 V
-	-	114	124	-	1000	2200	1,25	NC 2920 V
129	-	114	124	0,75	1000	2200	1,15	NCF 2920 V
-	-	116	134	-	950	2000	2,29	NC 3020 V
139,9	-	116	134	2	950	2000	2,20	NCF 3020 V
-	122,8	136	176	4,5	600	1200	13,00	NJ 2320 VH
-	-	126	137	-	900	1900	1,35	NC 2922 V
141,3	-	126	137	0,75	900	1900	1,25	NCF 2922 V
-	-	129	150	-	900	1800	3,79	NC 3022 V
157	-	129	150	3	900	1800	3,65	NCF 3022 V
-	134,3	151	198	5	700	1400	17,80	NJ 2322 VH
-	-	136	149	-	850	1800	1,88	NC 2924 V
154,3	-	136	149	0,75	850	1800	1,70	NCF 2924 V

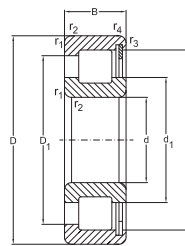
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



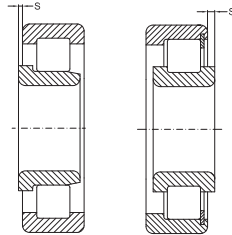
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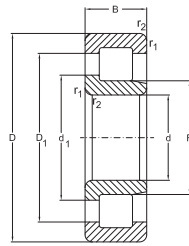
Dimensions					Basical radial load		Designation
d	D	B	r ₁ , r ₂ min.	r ₃ , r ₄ min.	dyn. C _r	stat. C _{0r}	
mm					kN		
120	180	46	2	1	340	550	NC 3024 V
	180	46	2	1	340	550	NCF 3024 V
	260	86	3	-	920	1300	NJ 2324 VH
130	180	30	1,5	1,1	205	350	NC 2926 V
	180	30	1,5	1,1	205	350	NCF 2926 V
	200	52	2	1	415	620	NC 3026 V
	200	52	2	1	415	620	NCF 3026 V
	280	93	4	-	1080	1660	NJ 2326 VH
140	190	30	1,5	1,1	220	375	NC 2928 V
	190	30	1,5	1,1	220	375	NCF 2928 V
	210	53	2	1	440	680	NC 3028 V
	210	53	2	1	440	680	NCF 3028 V
	300	102	4	-	1250	1910	NJ 2328 VH
150	190	20	1	1,1	108	185	NC 1830 V
	190	20	1	1,1	108	185	NCF 1830 V
	210	36	2	1,1	286	497	NC 2930 V
	210	36	2	1,1	286	497	NCF 2930 V
	225	56	2,1	1,1	530	880	NC 3030 V
	225	56	2,1	1,1	530	880	NCF 3030 V
	320	108	4	-	1450	2240	NJ 2330 VH
160	200	20	1,1	1,1	112	199	NC 1832 V
	200	20	1,1	1,1	112	199	NCF 1832 V
	220	36	2	1,1	297	524	NC 2932 V

Single Row Full Complement Cylindrical Roller Bearings

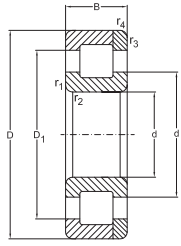


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	139	160,5	-	800	1700	4,10	NC 3024 V
167,9	-	139	160,5	3,5	800	1700	3,95	NCF 3024 V
-	147,7	164	211	5,5	530	1000	22,30	NJ 2324 VH
-	-	147	161	-	750	1600	2,50	NC 2926 V
167,1	-	147	161	0,75	750	1600	2,30	NCF 2926 V
-	-	148,6	175	-	700	1500	6,00	NC 3026 V
186,5	-	148,6	175	3,5	700	1500	5,80	NCF 3026 V
-	157,95	174,1	229,6	6	500	950	28	NJ 2326 VH
-	-	159	173	-	700	1500	2,59	NC 2928 V
180	-	159	173	0,75	700	1500	2,40	NCF 2928 V
-	-	162,7	189,1	-	670	1400	6,21	NC 3028 V
198,2	-	162,7	189,1	3,5	670	1400	6,10	NCF 3028 V
-	168,5	184,7	245,3	6,5	450	850	35,5	NJ 2328 VH
-	-	163	176	1,5	700	1500	1,54	NC 1830 V
159,5	-	163	176	1,5	700	1500	1,30	NCF 1830 V
-	-	171	188	-	670	1400	4	NC 2930 V
195,5	-	171	188	0,8	670	1400	3,85	NCF 2930 V
-	-	174	203	-	630	1300	7,72	NC 3030 V
211,7	-	174	203	3,5	630	1300	7,50	NCF 3030 V
-	182,5	203	261	6,5	430	800	42,5	NJ 2330 VH
-	-	173	185	1,5	670	1400	1,60	NC 1832 V
169	-	173	185	1,5	670	1400	1,45	NCF 1832 V
-	-	181	198	-	630	1300	4	NC 2932 V

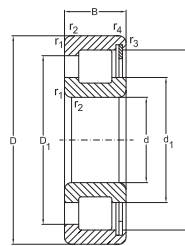
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



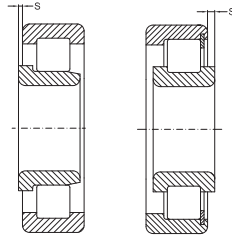
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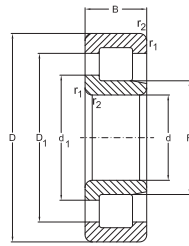
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
160	220	36	2	1,1	297	524	NCF 2932 V
	240	60	2,1	1,1	580	970	NC 3032 V
	240	60	2,1	1,1	580	970	NCF 3032 V
	340	114	4	-	1630	2550	NJ 2332 VH
170	215	22	1,1	1,1	142	245	NC 1834 V
	215	22	1,1	1,1	142	245	NCF 1834 V
	230	36	2	1,1	308	552	NC 2934 V
	230	36	2	1,1	308	552	NCF 2934 V
	260	67	2,1	1,1	728	1230	NC 3034 V
	260	67	2,1	1,1	728	1230	NCF 3034 V
	360	120	3	-	1760	2400	NJ 2334 VH
180	225	22	1,1	1,1	147	275	NC 1836 V
	225	22	1,1	1,1	147	275	NCF 1836 V
	250	42	2	1,1	391	690	NC 2936 V
	250	42	2	1,1	391	690	NCF 2936 V
	280	74	2,1	2,1	820	1400	NC 3036 V
	280	74	2,1	2,1	820	1400	NCF 3036 V
	300	126	3	-	1900	2700	NJ 2336 VH
190	240	24	1,5	1,5	172	320	NC 1838 V
	240	24	1,5	1,5	172	320	NCF 1838 V
	260	42	2	1,1	440	782	NC 2938 V
	260	42	2	1,1	440	782	NCF 2938 V
	290	75	2,1	2,1	850	1450	NC 3038 V

Single Row Full Complement Cylindrical Roller Bearings

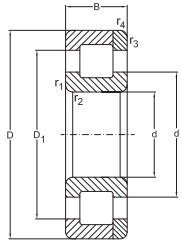


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
205,7	-	181	198	0,8	630	1300	4,05	NCF 2932 V
-	-	184,8	214,8	-	600	1100	9,26	NC 3032 V
225,1	-	184,8	214,8	4	600	1100	9,10	NCF 3032 V
-	196,55	216,7	286	7	400	750	48,80	NJ 2332 VH
-	-	185	200	1,5	630	1300	2	NC 1834 V
204,5	-	185	200	1,5	630	1300	1,85	NCF 1834 V
-	-	192	208	-	600	1200	4,50	NC 2934 V
216	-	192	208	0,8	600	1200	4,25	NCF 2934 V
-	-	198	232	-	560	1000	13,70	NC 3034 V
243,2	-	198	232	4	560	1000	12,50	NCF 3034 V
-	203,56	224,5	296,4	7	450	800	59,20	NJ 2334 VH
-	-	196	211	1,5	600	1200	2,20	NC 1836 V
215,2	-	196	211	1,5	600	1200	1,95	NCF 1836 V
-	-	203	223	-	560	1100	6,40	NC 2936 V
232	-	203	223	1	560	1100	6,25	NCF 2936 V
-	-	212	249	-	560	1100	17,10	NC 3036 V
260,5	-	212	249	5	560	1100	16,50	NCF 3036 V
-	221,74	242,6	314,6	9	400	700	69,60	NJ 2336 VH
-	-	208	224	1,8	560	1100	2,70	NC 1838 V
229	-	208	224	1,8	560	1100	2,45	NCF 1838 V
-	-	212	236	-	560	1100	6,80	NC 2938 V
244	-	212	236	1	560	1100	6,55	NCF 2938 V
-	-	222	258	-	530	1000	17,9	NC 3038 V

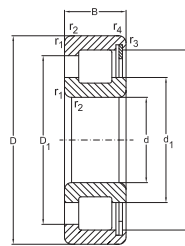
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



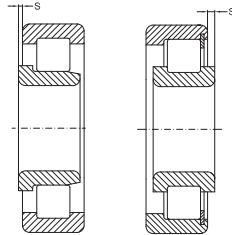
NC



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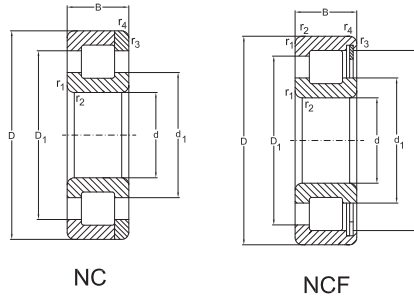
Dimensions					Basical radial load		Designation
d	D	B	r ₁ , r ₂ min.	r ₃ , r ₄ min.	dyn. C _r	stat. C _{0r}	
mm					kN		
190	290	75	2,1	2,1	800	1290	NCF 3038 V
	400	132	4	-	2080	2900	NJ 2338 VH
200	250	24	1,5	1,5	176	335	NC 1840 V
	250	24	1,5	1,5	176	335	NCF 1840 V
	280	48	2,1	1,5	528	938	NC 2940 V
	280	48	2,1	1,5	528	938	NCF 2940 V
	310	82	2,1	2,1	990	1750	NC 3040 V
	310	82	2,1	2,1	990	1750	NCF 3040 V
	420	138	5	-	2290	3680	NJ 2340 VH
220	270	24	1,5	1,5	183	350	NC 1844 V
	270	24	1,5	1,5	183	350	NCF 1844 V
	300	48	2,1	1,5	550	1030	NC 2944 V
	300	48	2,1	1,5	550	1030	NCF 2944 V
	340	90	3	3	1190	2100	NC 3044 V
	340	90	3	3	1190	2100	NCF 3044 V
240	300	28	2	2	260	510	NC 1848 V
	300	28	2	2	260	510	NCF 1848 V
	320	48	2,1	1,5	583	1120	NC 2948 V
	320	48	2,1	1,5	583	1120	NCF 2948 V
	360	92	3	3	1250	2240	NC 3048 V
	360	92	3	3	1250	2240	NCF 3048 V
260	320	28	2	2	270	550	NC 1852 V
	320	28	2	2	270	550	NCF 1852 V

Single Row Full Complement Cylindrical Roller Bearings



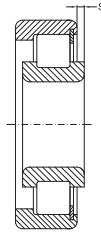
Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
270	-	222	258	6	530	1000	17,00	NCF 3038 V
-	224,6	247,6	327	7	400	700	80,00	NJ 2338 VH
-	-	216	233	1,8	560	1100	3	NC 1840 V
237,5	-	216	233	1,8	560	1100	2,60	NCF 1840 V
-	-	227	253	-	530	1000	9,50	NC 2940 V
262	-	227	253	3	530	1000	9,15	NCF 2940 V
-	-	227	276	-	450	800	23,00	NC 3040 V
287,75	-	227	276	6,5	450	800	22,50	NCF 3040 V
-	238,65	263,2	347,5	9	320	600	91,60	NJ 2340 VH
-	-	237	253	1,8	530	1000	3,35	NC 1844 V
258	-	237	253	1,8	530	1000	2,85	NCF 1844 V
-	-	248	274	-	480	900	10,90	NC 2944 V
283	-	248	274	2,5	480	900	9,90	NCF 2944 V
-	-	254,7	297,9	-	430	850	30,50	NC 3044 V
312,7	-	254,7	297,9	7	430	850	29,50	NCF 3044 V
-	-	261	281	1,8	480	900	5,30	NC 1848 V
287	-	261	281	1,8	480	900	4,40	NCF 1848 V
-	-	261	296	-	450	850	12,00	NC 2948 V
303	-	261	296	2,5	450	850	11,00	NCF 2948 V
-	-	278	322	-	430	800	33,00	NC 3048 V
335,6	-	278	322	7	430	800	32,00	NCF 3048 V
-	-	281	301	1,8	430	800	5,55	NC 1852 V
307,2	-	281	301	1,8	430	800	4,75	NCF 1852 V

Single Row Full Complement Cylindrical Roller Bearings



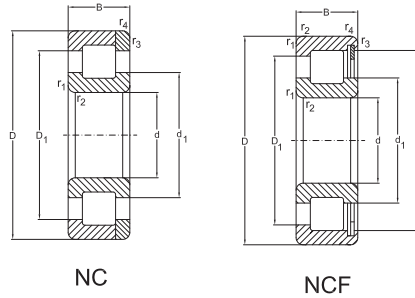
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
260	360	60	2,1	1,5	737	1410	NC 2952 V
	360	60	2,1	1,5	737	1410	NCF 2952 V
	400	104	4	4	1600	2920	NC 3052 V
	400	104	4	4	1600	2920	NCF 3052 V
280	350	33	2	2	330	650	NC 1856 V
	350	33	2	2	330	650	NCF 1856 V
	380	60	2,1	1,5	897	1710	NC 2956 V
	380	60	2,1	1,5	897	1710	NCF 2956 V
	420	106	4	4	1650	3100	NC 3056 V
	420	106	4	4	1650	3100	NCF 3056 V
300	380	38	2,1	2,1	418	850	NC 1860 V
	380	38	2,1	2,1	418	850	NCF 1860 V
	420	72	3	3	1120	2170	NC 2960 V
	420	72	3	3	1120	2170	NCF 2960 V
320	400	38	2,1	2,1	440	852	NC 1864 V
	400	38	2,1	2,1	440	852	NCF 1864 V
	440	72	3	3	1140	2300	NC 2964 V
	440	72	3	3	1140	2300	NCF 2964 V
340	420	38	2,1	2,1	446	900	NC 1868 V
	420	38	2,1	2,1	446	900	NCF 1868 V
	460	72	3	3	1190	2430	NC 2968 V
	460	72	3	3	1190	2430	NCF 2968 V

Single Row Full Complement Cylindrical Roller Bearings



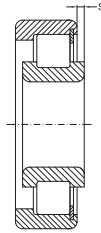
Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	294	321	-	400	750	19,30	NC 2952 V
333,7	-	294	321	5	400	750	18,50	NCF 2952 V
-	-	304,1	358,1	-	380	700	47,50	NC 3052 V
373,5	-	304,1	358,1	8	380	700	46,50	NCF 3052 V
-	-	305	327	2,5	400	750	8,00	NC 1856 V
334	-	305	327	2,5	400	750	7,10	NCF 1856 V
-	-	305	346	-	380	700	21,10	NC 2956 V
362,7	-	319	346	4	380	700	20,00	NCF 2956 V
-	-	324	375	-	320	560	52,5	NC 3056 V
391	-	324	375	9	320	560	50	NCF 3056 V
-	-	329	355	3	360	670	11,50	NC 1860 V
363	-	329	355	3	360	670	10,00	NCF 1860 V
-	-	342	375	-	340	630	32,30	NC 2960 V
390,5	-	342	375	5	340	630	31,50	NCF 2960 V
-	-	349	375	3	340	630	11,30	NC 1864 V
383	-	349	375	3	340	630	10,50	NCF 1864 V
-	-	363	395	-	320	600	34,00	NC 2964 V
411	-	363	395	5	320	600	33,00	NCF 2964 V
-	-	369	395	3	320	600	12,80	NC 1868 V
403	-	369	395	3	320	600	11,00	NCF 1868 V
-	-	383	415	-	300	560	36,00	NC 2968 V
431	-	383	415	3	300	560	35,00	NCF 2968

Single Row Full Complement Cylindrical Roller Bearings



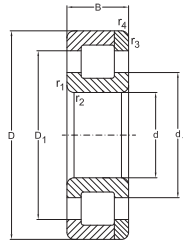
Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
360	440	38	2,1	2,1	452	950	NC 1872 V
	440	38	2,1	2,1	452	950	NCF 1872 V
	480	72	3	3	1230	2580	NC 2972 V
	480	72	3	3	1230	2580	NCF 2972 V
380	480	46	2,1	2,1	627	1230	NC 1876 V
	480	46	2,1	2,1	627	1230	NCF 1876 V
	520	82	4	4	1570	3000	NC 2976 V
	520	82	4	4	1570	3000	NCF 2976 V
400	500	46	2,1	2,1	627	1280	NC 1880 V
	500	46	2,1	2,1	627	1280	NCF 1880 V
	540	82	4	4	1650	3420	NC 2980 V
	540	82	4	4	1650	3420	NCF 2980 V
420	520	46	2,1	2,1	660	1340	NC 1884 V
	520	46	2,1	2,1	660	1340	NCF 1884 V
	560	82	4	4	1650	3500	NC 2984 V
	560	82	4	4	1650	3500	NCF 2984 V
440	540	46	2,1	2,1	670	1405	NC 1888 V
	540	46	2,1	2,1	670	1405	NCF 1888 V
	600	95	4	4	2010	4270	NC 2988 V
	600	95	4	4	2010	4270	NCF 2988 V
460	580	56	3	3	913	1850	NC 1892 V
	580	56	3	3	913	1850	NCF 1892 V

Single Row Full Complement Cylindrical Roller Bearings

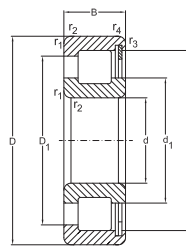


Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	389	415	3	300	560	12,40	NC 1872 V
423,3	-	389	415	3	300	560	12,00	NCF 1872 V
-	-	403	436	-	280	530	36,80	NC 2972 V
451,5	-	403	436	5	280	530	36,50	NCF 2972 V
-	-	416	448	3,5	280	530	19,90	NC 1876 V
458	-	416	448	3,5	280	530	19,50	NCF 1876 V
-	-	427	473	-	260	500	53,50	NC 2976 V
488	-	427	473	5	260	500	52,50	NCF 2976 V
-	-	433	465	3,5	260	500	21,20	NC 1880 V
475	-	433	465	3,5	260	500	20,50	NCF 1880 V
-	-	450	496	-	240	480	55	NC 2980 V
511	-	450	496	5	240	480	54,50	NCF 2980 V
-	-	457	489	3,5	240	480	21,60	NC 1884 V
499	-	457	489	3,5	240	480	21,00	NCF 1884 V
-	-	463	509	-	220	450	57,70	NC 2984 V
524	-	463	509	5	220	450	57,00	NCF 2984 V
-	-	474	506	3,5	220	450	22,60	NC 1888 V
516	-	474	506	3,5	220	450	22,00	NCF 1888 V
-	-	502	545	-	200	430	81,10	NC 2988 V
565,5	-	502	545	6	200	430	80,50	NCF 2988 V
-	-	501	541	5	200	430	34,80	NC 1892 V
533	-	501	541	5	200	430	34,00	NCF 1892 V

Single Row Full Complement Cylindrical Roller Bearings



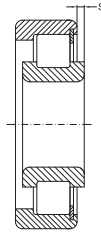
NC



NCF

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		
460	620	95	4	4	2050	4420	NC 2992 V
	620	95	4	4	2050	4420	NCF 2992 V
480	600	56	3	3	935	1920	NCF 1896 V
	650	100	5	5	2290	4950	NCF 2996 V
500	620	56	3	3	952	2120	NCF 18/500 V
	670	100	5	5	2380	5240	NCF 29/500 V
530	650	56	3	3	990	2110	NCF 18/530 V
560	680	56	3	3	1020	2230	NCF 18/560 V
600	730	60	3	3	1050	2350	NCF 18/600 V
630	780	69	4	4	1250	2800	NCF 18/630 V
670	820	69	4	4	1300	3000	NCF 18/670 V
710	870	74	4	4	1540	3550	NCF 18/710 V
750	920	78	5	5	1760	4030	NCF 18/750 V

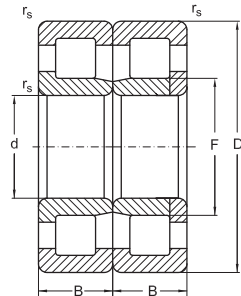
Single Row Full Complement Cylindrical Roller Bearings



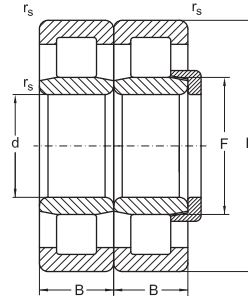
Dimensions					Speed Ratings		Weight	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	516	558	-	190	400	83,90	NC 2992 V
579	-	516	558	6	190	400	83,50	NCF 2992 V
573,5	-	522	561	5	190	400	35,50	NCF 1896 V
606	-	538	584	-	180	380	98,00	NCF 2996 V
594	-	542	582	5	180	380	36,50	NCF 18/500 V
634,5	-	567	612	7	170	360	100,00	NCF 29/500 V
624,5	-	573	612	5	170	360	38,50	NCF 18/530 V
655	-	603	643	5	160	340	40,50	NCF 18/560 V
696	-	644	684	7	150	320	51,50	NCF 18/600 V
739	-	681	725	8	140	300	72,50	NCF 18/630 V
783	-	725	769	8	130	280	76,50	NCF 18/670 V
831	-	767	815	8	120	260	92,50	NCF 18/710 V
880	-	811	863	8	110	240	110,00	NCF 18/750 V

Cylindrical roller bearings, double row and three row

Non-standardized



NJ+NJP
WJ+WJP



WJ+WUJ

Dimensions					Basical radial load		Speed limit	Weight	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+ NJP85/170MAP63
110	215	73	3	135,5	773	1188	2600	25,0	WJ+ WJP110/215M
	215	73	3	135,5	773	1188	2600	26,0	WJ+ WUJ110/215M
120	240	80	3	150	946	1484	2400	34,7	WJ+ WJP120/240M
	240	80	3	150	946	1484	2400	34,7	WJ+ WUJ120/240M
130	240	80	3	157	951	1620	2200	35,6	WJ+ WJP130/240M
	250	80	3	160	1028	1660	2200	37,5	WJ+ WJP130/250F
	250	80	3	160	1028	1660	2200	37,7	WJ+ WJP130/250M
	250	80	3	158	1028	1660	2200	37,8	WJ+ WJP130/250MPA
	260	86	3	164	1212	1932	2000	44,4	WJ+ WJP130/260M
140	300	102	4	180	1554	2460	1800	71,6	WJ+ WJP140/300M
	300	102	4	180	1554	2460	1800	71,6	WJ+ WUJ140/300M
160	320	102	4	200	1630	2676	1500	81,6	WJ+ WJP160/320FC4

Cylindrical roller bearings, single row

Non-standardized

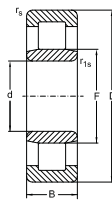


fig. 1

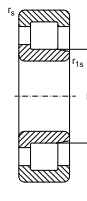


fig. 2

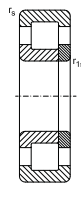


fig. 3

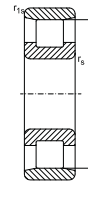


fig. 4

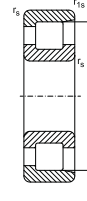


fig. 5

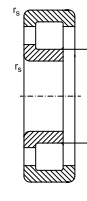


fig. 6

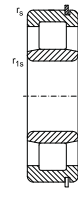
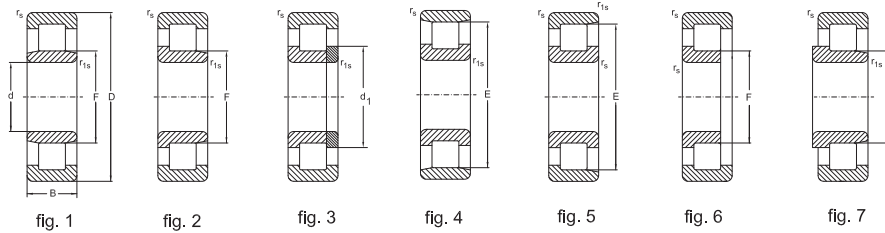


fig. 7

Dimensions					Fig. Basic radial load		Speed limit		Weight		Designation	
d	D	B	r _s	r _{is} 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	NF304M
25	62	17	1,1	1,1	34	2	41,2	37	10000	13000	0,243	NJ305EC3VB133
	62	20	1	0,6	37,5	7	48,9	49,9	9000	11000	0,255	NU2206ENRMA/X
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	NUP5806NA
	72	19	1,1	1,1	62	4	38,7	35,2	8500	10000	0,346	N306F2
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	NF5306NV
35	80	21	1,5	1,1	68,2	5	47,3	44,1	7700	8700	0,485	NF307
40	80	30,2	1,1	1,7	49,93	1	86,7	104	7000	8500	0,738	NU5208M
	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	30,2	1,1	1,7	55,52	1	90,6	113	6300	7500	0,790	NU5209M
	85	19	1,1	1,1	75	5	46	46,9	7500	9000	0,445	NF209M
	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	NUPJ309E
	100	25	1,5	1,5	58,5	13	96,9	97,7	6000	7000	0,895	NUPJ309ENMAZS
	100	36	2	1,5	86,5	5	103	110	6000	7000	1,29	NF2309M
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	NF210M
	90	20	1,1	1,1	59,5	6	63,7	68,3	6700	8000	0,490	NUPJ210EMA
	90	23	0,5	0,5	57,8	3	91,1	98,4	2500	3200	0,632	NUP2210
	90	30,2	1,1	1,7	60,45	1	94,3	121	6000	7000	0,854	NU5210M
	110	44,5	2	2	62	3	124	163	5300	6300	2,28	NUP5410MA
	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	NF211M
	100	33,3	1,5	1,5	66,9	1	110	143	5300	6300	1,17	NU5211M
	110	22	2,5	2,5	72	2	93,4	102	5000	6000	0,922	NJ5111E
	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	NUPJ311E
	120	29	2	2	70,5	13	138	150	4500	5600	1,47	NUPJ311ENMA
	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	NF311M
	140	57	2	2	117,2	4	265	317	4300	5000	4,74	N5611MBW33
57.15	114,30	28	1,5	1,5	99,6	5	84,5	88,7	5000	6000	1,45	NF5211MB

Cylindrical roller bearings, single row

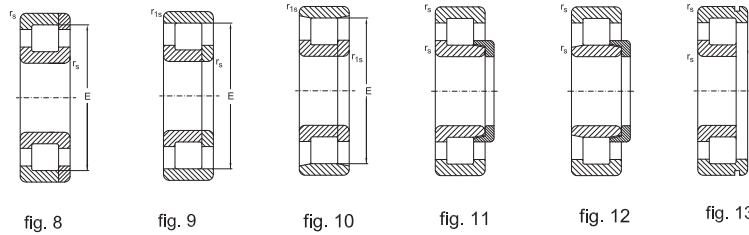
Non-standardized



Dimensions					Fig. Basic radial load		Speed limit		Weight		Designation	
d	D	B	r _s	r _{1s} min	E, F	dyn. 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	NJ212E/X
	110	36,5	1,5	2,2	72,39	1	141	181	5000	6000	1,55	NU5212M
	130	31	2,1	2,1	133	5	121	123	4500	5300	1,85	NF312
65	120	23	1,5	1,5	105,6	5	80,5	89,7	5300	6300	1,05	NF213
	120	38,1	1,5	3	80,42	1	158	204	4500	5300	1,95	NU5213M
70	125	39,7	1,5	3	84,76	1	158	217	4300	5000	2,16	NU5214M
	125	24	1,5	1,5	83,5	3	118	136	5000	6000	1,17	NUP214EW7
	125	31	1,5	1,5	83,5	3	143	174	4800	5600	1,52	NUP2214EW7
	150	35	2,1	2,1	89	6	203	220	4000	4800	2,80	NUPJ314E
	150	35	2,1	2,1	89	13	203	220	4000	4800	2,80	NUPJ314EN
	150	35	2,1	2,1	89	13	203	220	4000	4800	2,80	NUPJ314ENMA
	150	35	2,1	2,1	89	13	203	220	4000	4800	2,80	NUPJ314ENMAZS
	150	35	2,1	2,1	89	6	203	220	4000	4800	2,73	NUPJ314EMA
	150	35	2,1	2,1	90	6	151	175	3800	4500	2,73	NUPJ314MA
	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
	130	41,3	1,5	3	89	1	183	253	4000	4800	2,33	NU5215M
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	NP216EM
	140	26	2	2	127,3	6	139	166	4300	5000	1,54	NUPJ216E
	140	44,4	2	3	95,28	1	208	290	3800	4500	2,95	NU5216M
85	150	49,2	2	3,5	102	1	239	326	3600	4300	3,88	NU5217M
90	160	30	2	2	143	5	149	174	3800	4500	2,36	NF218
	160	52,4	2	3,5	107,22	1	267	367	3400	4000	5,90	NU5218M
	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	NUPJ318M
95	170	55,6	2,5	3,5	113,52	1	313	429	3200	3800	5,65	NU5219M

Cylindrical roller bearings, single row

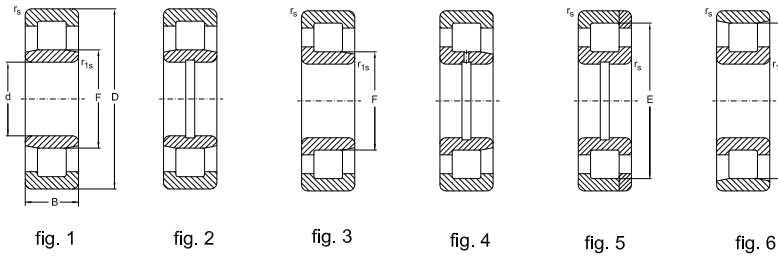
Non-standardized



Dimensions						Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	r _s	r _{s1}	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	N5319MBP5
99,5	180	46	2,1	2,1	120	2	270	360	3000	3600	5,32	NJ2220MF2
100	180	60,3	2,1	4,5	121	1	347	498	3000	3600	7,01	NU5220M
	180	34	2,1	4,5	160	8	183	217	3400	4000	3,44	NP220M
	215	47	3	3	185,5	9	309	354	3000	3600	8,525	NP320M
	215	73	3	3	127,5	1	570	717	2600	3200	12,0	NU2320EMW33
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	NU2320MAW33
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	NU2320MW33
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	NU2320W33
	215	73	3	3	127,5	12	568	714	2600	3200	12,0	NUJ2320EM
	215	47	3	3	185,5	10	308	352	2800	2400	8,67	NT5220MNA
	215	47	4	4	127	11	384	432	3100	3900	10,530	MR320-129
105	190	65,1	2	4,5	126,52	1	409	586	2800	3400	8,35	NU5221M
112	170	38	2	1	127	1	181	264	3000	3600	3,15	NU5120
115	250	53	2,1	2,1	148,5	3	414	472	2400	2800	13,2	NJ5123M
120	215	76,2	2,1	5,3	145,14	1	536	812	2600	3000	12,5	NU5224M
130	165	22	1	1	155,55	6	78,1	146	3300	4100	1,205	N5126MB
	165	22	2	1	155,5	6	78,1	146	3300	4100	1,2	2002826LM
	200	33	2	1,1	148	1	163	221	3000	3600	3,91	NU1026MC4TR
	230	79,38	3	5,3	155	1	577	863	2400	2800	14,6	NU5226M
	280	58	4	4	166,7	1	642	775	2300	2900	20,208	MUC326-121
140	250	82,55	3	5,3	168,46	1	662	1004	2200	2600	18,2	NU5228M

Cylindrical roller bearings, single row

Non-standardized



Dimensions						Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	r _s	r _{1s}	E, F	dyn. C _r	stat. C _{0r}	Grease	Oil			
mm				min		kN						
150	225	45	2,1	1,5	168,5	1	338	527	2200	2600	6,49	NU2030EMC3ZS
	320	65	4	4	190	1	800	986	2100	2600	30,262	MUC330-119
152,4	203,2	25,4	3	3	192,675	4	158	236	2400	3000	2,12	60RIN247
160	240	25	1,5	1,5	216	6	169	259	2200	2600	4,31	NG160M
	290	58,42	1,5	5	255,62	6	500	680	1800	2200	11,8	N5132MW33
	290	98,42	1,5	7,5	193,62	1	904	1456	1800	2200	30,1	NU5232M
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	NG180M
	320	52	4	4	282	8	516	717	1800	2200	18,8	NF236M
190	290	60	2,1	2,1	214	1	616	561	1700	2000	14,8	NU2038EMC3ZS
203,2	273,5	41,275	2,5	2,5	217	4	286	455	2100	2600	6,709	CE4823
220	340	56	3	3	250	3	650	1047	1300	1600	19,3	NJ1044B/M/R204
	400	65	4	4	270	16	778	1113	1400	1700	41,6	NUJ244M
240	319,975	48	2	1,5	300	6	405	736	1500	1800	10,7	N5248MBP5NA
	320	48	2 ¹⁾	2	261	1	361	684	1500	1800	11,2	NU2948MAP63
285,75	387,35	57,15	3	3	361,95	4	623	1213	1400	1700	19,9	N11250M
285,75	387,4	69,85	5,6	6,4	366,699	6	953	1768	1500	1700	23,8	483057MW513
285,75	387,35	69,85	2,5	2,5	368	6	748	1533	1500	1700	24,7	491457M
292,1	387,35	50,8	3	3	311,5	2	557	960	1500	1900	15,985	AD41105
	387,35	50,8	3		368,3	5	557	960	1500	1900	16,830	ADD41105
300	380	48	1,5	2,1	321	2	479	988	1400	1600	14,3	NJ2860EMA
305	460	65	5	5	422	7	884	1418	1400	1700	38,775	N10/305NA
330,2	438,15	69,85	6	6	352,425	1	989	1935	1000	1300	29,8	NU131725MA
381	508	63,5	4	4	406,5	3	951	1688	900	1100	37,0	NJ5176MW33
406,4	501,65	76,2	4	3	480	6	977	2639	900	1100	37,0	N5181MW33

Cylindrical roller bearings, single row

Non-standardized

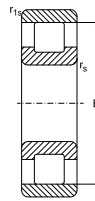


fig. 7

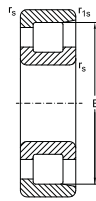


fig. 8

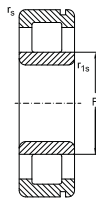


fig. 9

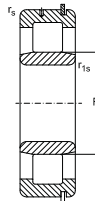


fig. 10

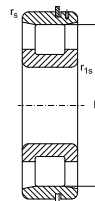


fig. 11

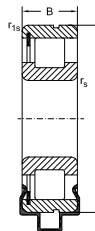


fig. 12

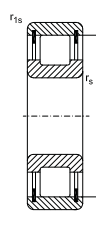


fig. 13

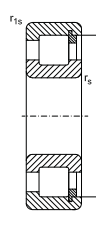


fig. 14

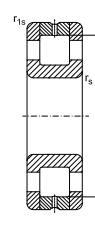


fig. 15

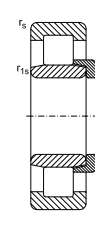


fig. 16

Dimensions					Fig. Basic radial load		Speed limit		Weight		Designation	
d	D	B	r _s	r _{1s} min	E, F	C _r dyn.	C _{0r} stat.	Grease	Oil			
mm						kN						
25	62	17	1,1	1,1	53	13	39,3	37,5	3800	4500	0,277	N2R305V
	67	15	0,6	0,6	31,5	10	29,3	27,7	10400	13000	0,317	NU5305ENR
	67	15	1	0,6	53,5	11	23,4	21,5	10400	13000	0,267	N5805NR
	67	15	1	0,6	53,5	11	23,4	21,5	10400	13000	0,267	N5805NRC3NA
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	N5806NRP6
	67	15	1	0,6	53,5	11	23,4	21,5	10000	12500	0,270	N5806NRP6F2
	67	16	1	0,6	53,5	11	23,4	21,5	10000	12500	0,274	N5806NRP6NA
	80	21	1	1	67,8	13	73,9	84,5	3000	3600	0,578	N2R5206V
	62	19	1	1	54,5	13	51,4	57,7	3700	4700	0,266	N2R5906V
32	72	19	2	1,5	61,8	12	55,5	56,8	8000	9500	0,370	NF5306NV
34,991	72	20,638	1,6	4	62,471	14	67,6	77,6	7000	8500	0,40	482307V
35	72	23	0,6	1,6	64,7	13	68,7	75,7	7000	8500	0,32	N2R2207V
35	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	NUC5107NM
40	80	18	1,4	1	71,5	13	61	62,6	2800	3400	0,403	N2R5108V
	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	N2R209V
	85	23	1,1	1,1	74,2	13	80	96,5	2400	2800	0,60	N2R2209V
	100	25	1,6	1,6	88,25	13	110	111	2200	2600	0,94	N2R309V
50	80	15	1	1	72,5	13	41,5	51,2	2800	3500	0,267	N2R5510V
55	140	57	2	2	117,2	15	175	392	1400	2000	4,80	N2P5611MBW33
65	140	33	3	1,5	121,3	13	152	163	3000	4300	2,43	N2R5613VC4
	140	33	3	1,5	121,3	14	197	231	1400	2000	2,59	NFR5113VC4
70	150	35	2,1	2,1	129,3	13	173	188	3400	4000	2,95	N2R314

Cylindrical roller bearings, single row

Non-standardized

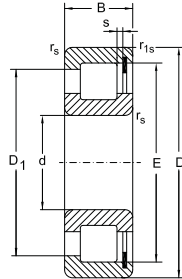


fig. 1

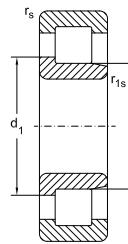


fig. 2

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	140	24	1,1	0,6	132	224	1000	2000	NCF2920V
	150	37	1,5	1	212	310	1000	2000	NCF3020V
	180	60,3	2,1	2,1	414	631	1200	1500	NJ5220VC3
	180	60,3	2,1	2,1	414	631	1200	1500	NJ5220VH
	215	73	3		655	830	800	1600	NJ2320VH
	125	13	1	0,6	33,6	55,3	4400	5500	NJ1820VH
110	150	24	1,1	0,6	137	245	950	1900	NCF2922V
	170	45	2	2	275	400	900	1800	NCF3022V
	240	80	3		830	1060	700	1400	NJ2322VH
120	165	27	1,1	0,6	173	300	850	1700	NCF2924V
	180	46	2	2	290	430	800	1600	NCF3024V
	260	86	3		950	1220	630	1200	NJ2324VH
130	180	30	1,5	1	204	360	800	1600	NCF2926V
	200	52	2	1	415	620	750	1500	NCF3026V
	230	64	3	3	591	853	600	1200	NJ130X230X64V
	280	93	4		1100	1430	560	1000	NJ2326VH
140	190	30	1,5	1	212	380	750	1500	NCF2928V
	210	53	2	1	440	680	670	1300	NCF3028V
	300	102	4		1250	1630	530	950	NJ2328VH
150	210	36	2	1,1	290	500	670	1300	NCF2930V
	225	56	2,1	1,1	455	710	630	1200	NCF3030V
	320	108	4		1500	2000	500	900	NJ2330VH
160	220	36	2	1	300	540	630	1200	NCF2932V
	240	60	2,1	1,1	520	800	600	1100	NCF3032V
	290	48	1,5	6,5	514	654	2200	2800	100641
	340	114	4		1630	2200	450	800	NJ2332VH
170	230	36	2	1,1	310	570	600	1100	NCF2934V
	260	67	2,1	1,1	670	1060	560	1000	NCF3034V
	360	120	4		1760	2400	450	800	NJ2334VH
180	250	42	2	2	390	695	560	1000	NCF2936V
	280	74	2,1	1,1	780	1250	500	900	NCF3036V
	380	126	4		1900	2700	400	700	NJ2336VH
190	260	42	2	2	405	735	530	950	NCF2938V
	290	75	2,1	1,1	800	1290	480	850	NCF3038V
	400	132	5		2080	2900	400	700	NJ2338VH
200	280	48	2,1	2,1	527	956	480	850	NCF2940V
	310	82	2,1	1,1	915	1530	450	800	NCF3040V
	420	138	5		2320	3250	380	670	NJ2340VH
420	520	60	2,1	2,1	945,6	2329	950	1200	NCF2884V

Dimensions			Fig.	Weight			
d	E	F		D ₁	d ₁	s	
mm				kN			
100	128,1	108,1	1				1,15
	139,65	109,65	1	123,1	113,1		2,06
	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	137,7	117,7	2	132,7	122,7	0,75	1,24
	156,13	120,13	1	149,1	127,5	5,5	3,48
	171,35	133,35	2	194,2	147		17,8
120	153,8	129,8	1	147,8	135,8	1,25	1,70
	167,57	131,57	1	160,5	139,2	5,5	3,74
	231,4	147,4	2	214	162,5		22,3
130	166,5	140,5	1	160	147	1,25	2,29
	183,81	139,81	1	175	148,6	5,5	5,41
		152	2	196,8	163,2		11,11
	247,95	157,95	2	229,9	174,1		27,9
140	175	149	1	168,5	155,5	1,25	2,45
	197,82	153,82	1	189,1	162,7	5,5	5,77
	264,46	168,46	2	245,3	184,7		34,9
150	194,9	162,9	1	186,9	170,9	2,25	3,81
	206,82	160,82	1	197,6	170	7	7,02
	286,5	182,5	2	265,7	201,2		41,6
160	205	173	1	197	181	2,25	4,02
	224,8	174,8	1	214,8	184,8	7	8,43
		193,634	2				14,789
	308,55	196,55	2	286	216,7		48,8
170	215,5	183,5	1	207,5	191,5	2,25	4,23
	242,87	186,87	1	231,7	198	7	11,7
	319,56	203,56	2	296,4	224,5		59,2
180	213,5	193,5	1	222	203	3,25	6,6
	260,22	200,22	1	248,4	212,4	7	15,5
	337,74	221,74	2	314,6	242,6		69,6
190	243,5	206,5	1	235	215	2,5	6,48
	269,76	209,76	1	257,8	221,8	9	16,3
	352,62	224,6	2	327	247,6		80,0
200	262,4	220,4	1	253	230,9	3,4	9,01
	287,75	223,75	1	275,1	236,7	9	21,0
	374,66	238,65	2	347,5	263,2		91,6
420	499	447	1	488,6	457,4	3	28,5

Cylindrical roller bearings, single row

Non-standardized

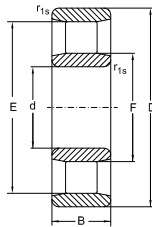


fig. 1

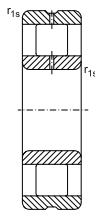


fig. 2

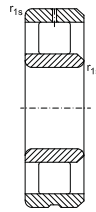


fig. 3

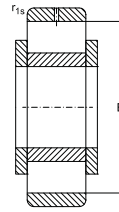


fig. 4

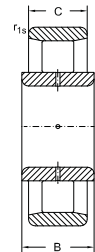


fig. 5

Dimensions								Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	C	r _s	r _{1s} min	E	F	dyn. C _r	stat. 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	NUNB5210MW44
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	NUN5212FC3
	96	51,6	43,6	1,3	1,3	86	68	5	160	146	4300	6000	1,38	NUNB5212FC3
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	NUN5716F2
85	150	49,2		2	2	133,4	101,6	1	272	359	2800	3800	3,82	NUN3217W20
95	170	55,6		3	2,1	151,1	113,5	1	363	536	2600	3400	5,16	NUN2R3219F2
	170	55,6		3	2,1	151,1	113,5	1	363	536	2600	3400	5,67	NUN3219W20F2
101,6	139	76,2		2	1,5	139,6	114,2	1	358	685	2800	3800	4,74	NUN5320W33F2
152,4	209,55	53,975		1,25	2,5	165	165	3	345	626	2600	3300	5,700	B6460
180	310	149					215	1	1512	2670	2000	2500	51,95	NUN5136M
193,675	263,525	101,6		4,5	4,5	241,3	215,9	1	495	1310	400	600	17,6	SCS1700
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	NUN5169M

Cylindrical roller bearings, single row Combined roller thrust ball bearings

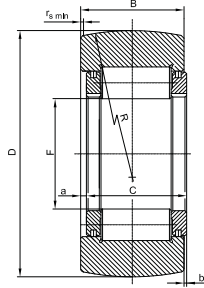


fig. 1

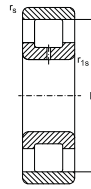


fig. 2

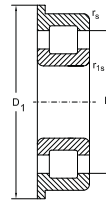


fig. 3

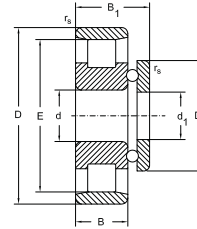


fig. 4

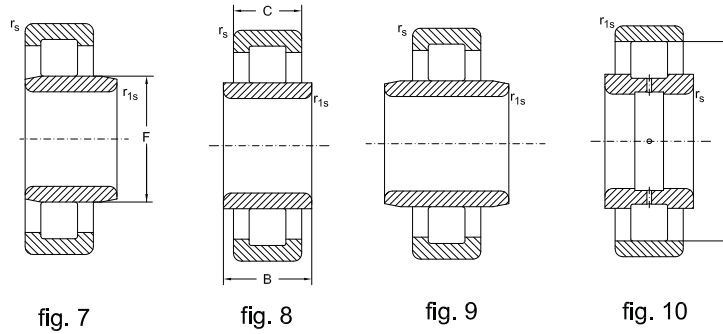
Dimensions						Fig. Basic radial load		Weight	Designation
d	D	D ₁	B	r _s	r _{1s} min	E, F	dyn. C _r	stat. C _{0r}	
mm						kN			
20	52	21	1,1	0,3	25,77	2	49,7	45,3	0,21 ZRL2443
75	160	68,26	1,5	3	95,91	1	394,2	530	7,2 NU5315M
80	170	68,26	1,5	3	101,62	1	406	548	8 NU5316M
90	190	73,02	3	4	114,02	1	509	686	10,5 NU5318M
120	180	46	2	1,1	132,7	1	221	337	4,37 NU5024M
130	200	52	3	4	147,62	1	326	540	6,15 NU5026M
140	210	23	3	5	157,56	1	311	521	6,48 NU5028M
150	225		3	6	168,68	1	359	620	8,02 NU5030M
160	240	60	3	6	179,93	1	448	773	9,8 NU5032M
170	260	67	3	6	194,95	1	623	1040	13,1 NU5034M
180	280	74	3	6	205,59	1	677	1185	17,5 NU5036M
	320	108	1,5	7,5	216,07	1	1057	1711	38,50 NU5236M
190	290	75	3	6	217,8	1	723	1301	18,57 NU5038M
	170	60	1	6	80,03	1	219,2	292,4	7,8 482916VHS0

Dimensions						Fig. Basic radial load		Weight	Designation		
d	D	D ₁	B	r _s	r _{1s} min	E, F	C _r	stat. C _{0r}			
mm							kN				
200	310		82	3	6	227,68	1	878	1554	23,8	NU5040M
	310,11		51	3,5	10	224,437	2	511	753	15,1	100642F2
	360		120,7	1,5	7,5	242	1	1259	2089	55,6	NU5240M
220	340		90	3	6	251,41	1	996	1886	31,8	NU2044M
	350		98,4	3	6	253,9	1	1141	2091	38,1	NU5144M
240	360		98,4	3,5	6	271,4	1	980	1902	34,5	NU5048M
	390		108	2,5	2,5	277,8	1	1247	2225	48,5	NU5148M
266,63	342,99		51,593	2	2	282,575	1	527	1032	12,2	ZB10500
324,9	457,2		51,15	5	5	368,135	1	812	1557	26,1	NU3315MR279-340W33
406,36	501,904		57,15	3	3	481,177	2	763	1754	25,4	200TWB1466
	501,688 511,3		38,1	3	3	481,177	3	502	1025	17,5	201TWB1466

Dimensions								Fig. Basic radial load		Basic axial load		Weight Designation		
d	d ₁	D	D ₁	B	B ₁	r _{1s} min	E,F	dyn. C _a	stat. C _{0a}	dyn. C _a	stat. C _{0a}			
mm								kN						
139,725	136,525	228,6	184,125	31,75	57,277	2,5	207,75	4	216	354	122	107	7,233	53RRT01
177,85	174,625	292,1	231,750	44,45	73,15	3	258,1	4	308	541	163	156	15,693	68RRT01

Cylindrical roller bearings, single row

Non-standardized



Dimensions						Fig. Basic radial load dyn. stat.		Speed limit		Weight	Designation		
d	D	B	C	r _s	r _{1s} min	E,F	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	NUB204E
25	52	18	15	1	0,6	31,5	8	29,3	27,7	12000	15000	0,140	NUB205E
	62	24	17	1,1	1,1	34	8	41,2	37	10000	13000	0,243	NUB305E
30	62	20	16	1	0,6	37,5	8	39,7	37,9	10000	13000	0,24	NUB206E
40	80	23	18	1,1	1,1	49,5	8	53,1	52,1	8000	9500	0,47	NUB208E
	80	23	18	1,1	1,1	49,5	8	53,1	52,1	8000	9500	0,47	NUB208EK
45	85	23	19	1,1	1,1	54,5	8	61,7	64,6	7500	9000	0,46	NUB209E
50	90	23	20	1,1	1,1	59,5	8	63,7	68,3	6700	8000	0,52	NUB210E
	90	40	20	2	1,5	60,4	8	47,8	50,4	6000	7000	0,641	NUB5110NA
50,8	110	45,3	44,5	2	2	65,5	10	164	195	5600	6700	2,11	NB5210W44S3
60	110	28	22	1,5	1,5	72	8	94	102,3	5600	6700	0,93	NUB212E
65	120	31	23	1,5	1,5	78,5	8	108	119	5300	6300	1,18	NUB213E
	120	48	23	1,5	1,5	79,6	8	105	115	4800	5600	1,39	NUB5313NA
	140	49	33	2,1	2,1	83,5	8	134	137	4000	4800	2,52	NUB5213NA
	140	66	33	2	2	83,5	9	135	139	4800	6000	2,82	NUB5413NA
75	130	31	25	1,5	1,5	88,5	8	130	156	4800	5600	1,39	NUB215E
	160	55	37	2,1	2,1	95	8	239	261	3800	4600	3,7	NUB315E
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	NUB217E
170	310	76	52	4	4	208	8	499	677	1300	1800	21,4	NUB234F2MAC3
	310	116	86	4	4	208	8	784	1141	1700	2000	31,9	NUB2234MC3
200	340	136	112	2,1	5	233	7	1162	1867	1900	2400	44,54	AD3140SM17

Split cylindrical roller bearings, single row

Non-standardized

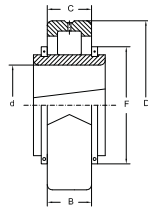


fig. 1

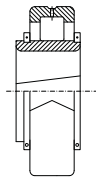


fig. 2

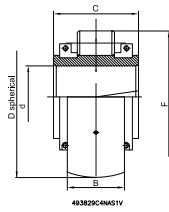


fig. 3

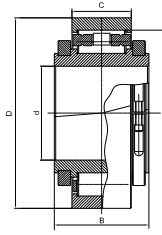


fig. 4

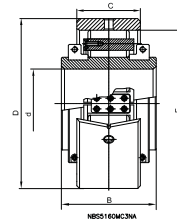


fig. 5

Dimensions					Fig.	Basical radial load		Speed limit	Weight	Designation
d	D	B	C	F		dyn. C_r	stat. C_{0r}	Grease		
mm						kN				
127	254	114,3	63,5	193	1	570	745	850	22,3	NUBS5125MA
130	222,25	98,5	54	180	4	367	503	2400	12,3	NBS5126M
145	250	80	117,5	225	3	665	1402		18,9	493829C4NAS1V
220	393,757	156	90,5	324,2	2	1156	1680	530	73,6	NUBS5144MA
300	438	143	74,5	388	5	850	1549	1200	58,7	NBS5160MC3NA



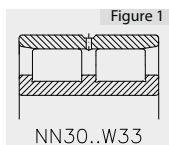


Double Row Cylindrical Roller Bearings

Double row cylindrical roller bearings are frequently used as non - locating bearings arrangements. They provide very rigid and stiff bearing arrangement. They have low cross section and high load carry capacity. NN type and NNU type are widely used for applications requiring thin-walled bearings, such as the main shafts of machine tools, rolling machine rollers, and in printing equipment

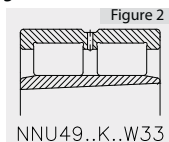
NN 30 Series: (see table1 figure 1)

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.



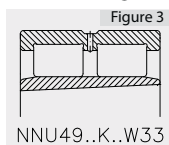
NNU 49 series: (see table1 figure 2)

The NN49 series have outer ring with 3 integral shoulders around the raceway and a plain inner ring.



NNCL Series: (see table1 figure 3)

NNCL 49 series have an inner ring with three flanges and a plain outer ring. The outer ring features two retaining rings sitting in circumferential grooves on either side of the raceway diameter to retain the outer ring and bearing assembly.

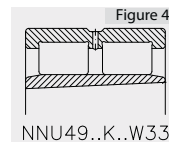


NNCL 49 series are unable to accommodate any axial forces. These bearings allow a compensation for changes in length caused by thermal expansion of the shaft due to the outer ring's positional movement. This makes them optimum nonlocating bearings.

NNCF 50 Series: (see table1 figure 4)

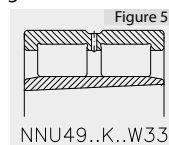
NNCF 50 series also feature three flanges on the inner ring but only one flange on the outer ring. On the outer ring side opposite to the flange

they feature a retaining ring sitting in a circumferential groove to fix the outer. This bearing type is able to accommodate minor axial forces in one direction only and allows a compensation of length changes caused by thermal expansion of the shaft and the outer ring's positional movement



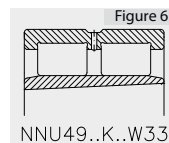
NNC 49 Series: (see table1 figure 5)

NNC 49 series double row cylindrical roller bearings have three flanges on their inner ring and an outer ring with a flange on one side and a loose rib on the opposite side. This allows them to accommodate minor axial forces in both directions. Thus they may be used as locating bearings.



NNF 50 Series: (see table1 figure 6)

NNF design bearings (fig) in the NNF 50 and 3194(00) series are always sealed on both sides and filled with grease. The two-piece inner ring has three integral flanges and is held together by a retaining ring. The outer ring has an integral central flange. The bearings can be used to locate a shaft axially in both directions. Because of the large distance between the two rows of rollers, the bearings are also able to accommodate tilting moments.



The bearings have a contact seal on both sides. The seals are retained on the inner ring shoulders, to provide efficient sealing at this position. The outer sealing lip exerts a slight pressure on the outer ring raceway. The operating temperature range for the seals is -40 to +80 °C.

Sealed NNF design bearings are filled with greases. They are maintenance-free, but if they operate in a moist or contaminated environment, or if speeds are moderate to high, they must be relubricated

Misalignment

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

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

For non-locating bearings

$$P = F_r$$

If double row full complement cylindrical roller bearings with flanges on both inner and outer rings are used to locate a shaft in one or both directions, the equivalent dynamic bearing load should be calculated using.

$$P = F_r \quad \text{when } F_a/F_r \leq 0,15$$

$$P = 0,92 F_r + 0,4 F_a \quad \text{when } F_a/F_r > 0,15$$

Since axially loaded double row full complement cylindrical roller bearings only operate satisfactorily when they are subjected to a simultaneously acting radial load, the ratio F_a/F_r should not exceed 0,25.

Equivalent static bearing load

"For Single and Double row cylindrical roller bearings:"

$$P_0 = F_r$$

Abutment and fillet dimensions for Double row cylindrical roller bearings

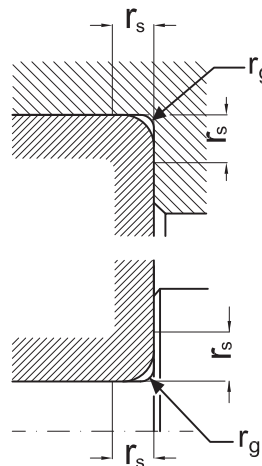
The bearing rings must only contact adjacent parts with their side faces. The bearing corners must not touch the corner fillet radii or either the shaft or housing corners.

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**.

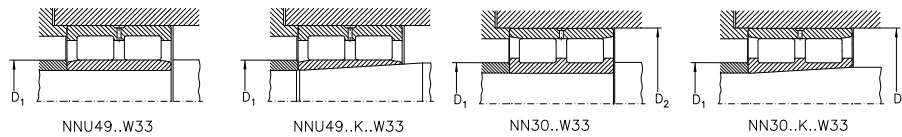
Abutment and fillet dimensions for Double Row Cylindrical Roller Bearings

Dimensions are in [mm]



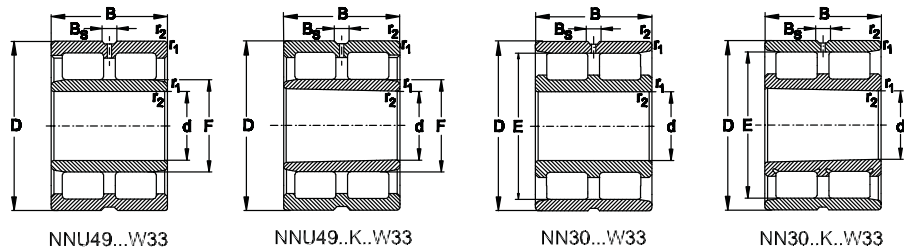
Abutment and fillet dimension for Double row Cylindrical Roller Bearings

All dimensions are in [mm]



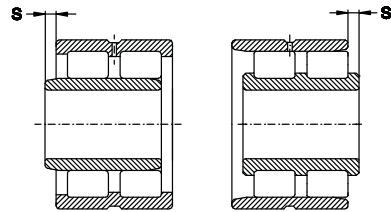
Shaft diameter d mm	for Bearings series				
	NNU 49, NNU 49 K		NN 30, NN 30 K		
	Type	D ₁ max	Type	D ₁ min	D ₂ min max
30	-	-	NN 3006	35	49 50
35	-	-	NN 3007	40	56 57
40	-	-	NN 3008	45	62 63
45	-	-	NN 3009	50	69 70
50	-	-	NN 3010	55	74 75
55	-	-	NN 3011	61	82 84
60	-	-	NN 3012	66	87 89
65	-	-	NN 3013	71	92 94
70	-	-	NN 3014	76	102 104
75	-	-	NN 3015	81	107 109
80	-	-	NN 3016	86	115 119
85	-	-	NN 3017	91	120 124
90	-	-	NN 3018	98	129 133
95	-	-	NN 3019	103	134 137
100	NNU 4920	112	NN 3020	108	139 142
105	NNU 4921	117	NN 3021	114	148 151
110	NNU 4922	122	NN 3022	119	157 161
120	NNU 4924	133	NN 3024	129	167 171
130	NNU 4926	145	NN 3026	139	184 191
140	NNU 4928	155	NN 3028	149	194 201
150	NNU 4930	167	NN 3030	160	208 215
160	NNU 4932	177	NN 3032	170	222 230
170	NNU 4934	187	NN 3034	180	239 250
180	NNU 4936	200	NN 3036	190	258 270
190	NNU 4938	210	NN 3038	200	268 280
200	NNU 4940	223	NN 3040	210	285 300
220	NNU 4944	243	NN 3044	232	313 328
240	NNU 4948	263	NN 3048	252	334 348
260	NNU 4952	289	NN 3052	275	368 385
280	NNU 4956	309	NN 3056	295	388 405
300	NNU 4960	335	NN 3060	315	422 445
320	NNU 4964	335	NN 3064	335	442 465

Double Row Cylindrical Roller Bearings



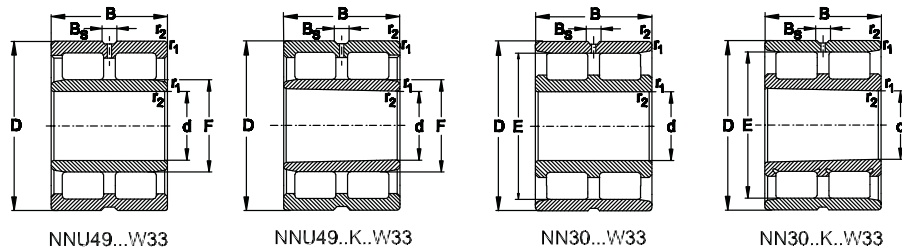
Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
30	55	19	1	29	34	16000	19000	NN 3006 M.W33
	55	19	1	29	34	16000	19000	NN 3006 K.M.W33
35	62	20	1	39,3	50	14000	17000	NN 3007 M.W33
	62	20	1	39,3	50	14000	17000	NN 3007 K.M.W33
40	68	21	1	45	58,5	12000	15000	NN 3008 M.W33
	68	21	1	45	58,5	12000	15000	NN 3008 K.M.W33
45	75	23	1	54	72	11000	14000	NN 3009 M.W33
	75	23	1	54	72	11000	14000	NN 3009 K.M.W33
50	80	23	1	57	80	10000	13000	NN 3010 M.W33
	80	23	1	57	80	10000	13000	NN 3010 K.M.W33
55	90	26	1,1	72	100	9000	11000	NN 3011 M.W33
	90	26	1,1	72	100	9000	11000	NN 3011 K.M.W33
60	95	26	1,1	75	110	8500	10000	NN 3012 M.W33
	95	26	1,1	75	110	8500	10000	NN 3012 K.M.W33
65	100	26	1,1	76,5	118	8000	9500	NN 3013 M.W33
	100	26	1,1	76,5	118	8000	9500	NN 3013 K.M.W33
70	110	30	1,1	98	151	7000	8500	NN 3014 M.W33
	110	30	1,1	98	151	7000	8500	NN 3014 K.M.W33
75	115	30	1,1	100	156	6700	8000	NN 3015 M.W33

Double Row Cylindrical Roller Bearings



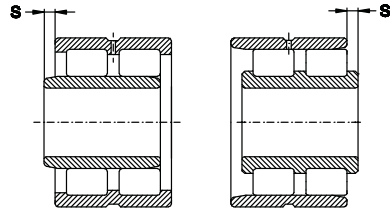
Bearing dimensions					Weight
d	E	F	B _s	s	
mm					[kg]
30	48,5	-	4,8	1,4	0,12
	48,5	-	4,8	1,4	0,12
35	55	-	4,8	1,4	0,26
	55	-	4,8	1,4	0,26
40	61	-	4,8	1,4	0,32
	61	-	4,8	1,4	0,32
45	67,5	-	4,8	1,7	0,41
	67,5	-	4,8	1,7	0,41
50	72,5	-	4,8	1,7	0,43
	72,5	-	4,8	1,7	0,43
55	81	-	4,8	1,9	0,65
	81	-	4,8	1,9	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



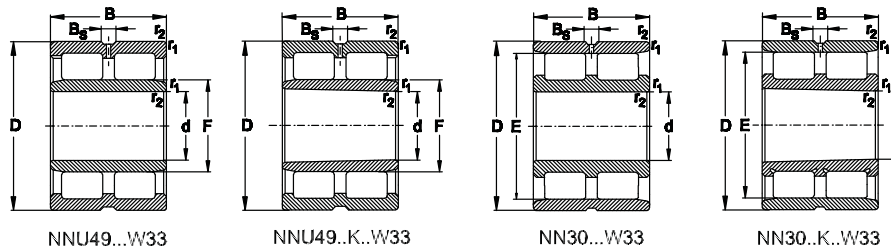
Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
75	115	30	1,1	100	156	6700	8000	NN 3015 K.M.W33
80	125	34	1,1	120	186	6300	7500	NN 3016 M.W33
	125	34	1,1	120	186	6300	7500	NN 3016 K.M.W33
85	130	34	1,1	125	200	6000	7000	NN 3017 M.W33
	130	34	1,1	125	200	6000	7000	NN 3017 K.M.W33
90	140	37	1,5	141	224	5600	6700	NN 3018 M.W33
	140	37	1,5	141	224	5600	6700	NN 3018 K.M.W33
95	145	37	1,5	146	236	5300	6300	NN 3019 M.W33
	145	37	1,5	146	236	5300	6300	NN 3019 K.M.W33
100	140	40	1,1	129	255	5300	6300	NNU 4920 M.W33
	140	40	1,1	129	255	5300	6300	NNU 4920 K.M.W33
	150	37	1,5	152	264	5300	6300	NN 3020 M.W33
	150	37	1,5	152	264	5300	6300	NN 3020 K.M.W33
105	145	40	1,1	129	260	5300	6300	NNU 4921 M.W33
	145	40	1,1	129	260	5300	6300	NNU 4921 K.M.W33
	160	41	2	192	310	4800	5600	NN 3021 M.W33
	160	41	2	192	310	4800	5600	NN 3021 K.M.W33
110	150	40	1,1	132	270	5000	6000	NNU 4922 M.W33
	150	40	1,1	132	270	5000	6000	NNU 4922 K.M.W33

Double Row Cylindrical Roller Bearings



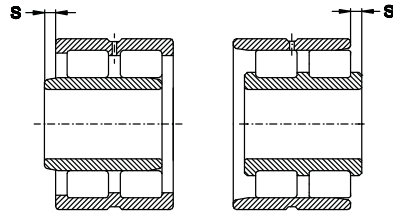
Bearing dimensions					Weight
d	E	F	B _s	s	
mm					[kg]
75	105	-	6,5	2,3	1,1
80	113	-	6,5	2,5	1,6
	113	-	6,5	2,5	1,6
85	118	-	6,5	2,5	1,6
	118	-	6,5	2,5	1,6
90	127	-	6,5	2,5	2,1
	127	-	6,5	2,5	2,1
95	132	-	6,5	2,5	2,3
	132	-	6,5	2,5	2,3
100	-	113	6,5	2	1,9
	-	113	6,5	2	1,9
	137	-	6,5	2,5	2,2
	137	-	6,5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



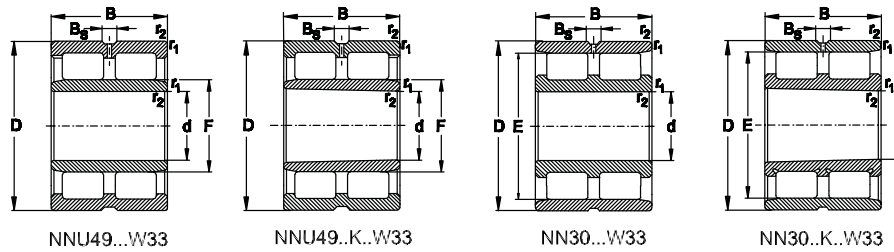
Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
110	170	45	2	226	365	4500	5300	NN 3022 M.W33
	170	45	2	226	365	4500	5300	NN 3022 K.M.W33
120	165	45	1,1	176	340	4500	5300	NNU 4924 M.W33
	165	45	1,1	176	340	4500	5300	NNU 4924 K.M.W33
	180	46	2	235	405	4300	5000	NN 3024 M.W33
	180	46	2	235	405	4300	5000	NN 3024 K.M.W33
130	180	50	1,5	193	390	4000	4800	NNU 4926 M.W33
	180	50	1,5	193	390	4000	4800	NNU 4926 K.M.W33
	200	52	2	294	510	3800	4500	NN 3026 M.W33
	200	52	2	294	510	3800	4500	NN 3026 K.M.W33
140	190	50	1,5	190	400	3800	4500	NNU 4928 M.W33
	190	50	1,5	190	400	3800	4500	NNU 4938 K.M.W33
	210	53	2	305	520	3600	4300	NN 3028 M.W33
	210	53	2	305	520	3600	4300	NN 3028 K.M.W33
150	210	60	2	326	655	3600	4300	NNU 4930 M.W33
	210	60	2	326	655	3600	4300	NNU 4930 K.M.W33
	225	56	2	339	600	3400	4000	NN 3030 M.W33
	225	56	2	339	600	3400	4000	NN 3030 K.M.W33
160	220	60	2	335	680	3400	4000	NNU 4932 M.W33
	220	60	2	335	680	3400	4000	NNU 4932 K.M.W33

Double Row Cylindrical Roller Bearings



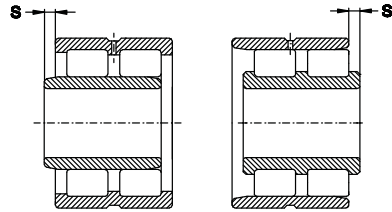
Bearing dimensions					Weight
d	E	F	B _s	s	
mm					[kg]
110	155	-	6,5	2,8	3,8
	155	-	6,5	2,8	3,8
120	-	134,5	6,5	1,5	2,76
	-	134,5	6,5	1,5	2,76
	165	-	6,5	3,1	4,1
	165	-	6,5	3,1	4,1
130	-	146	6,5	2	3,79
	-	146	6,5	2	3,79
	182	-	9,5	3,35	6,1
	182	-	9,5	3,35	6,1
140	-	156	6,5	2	4,11
	-	156	6,5	2	4,11
	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



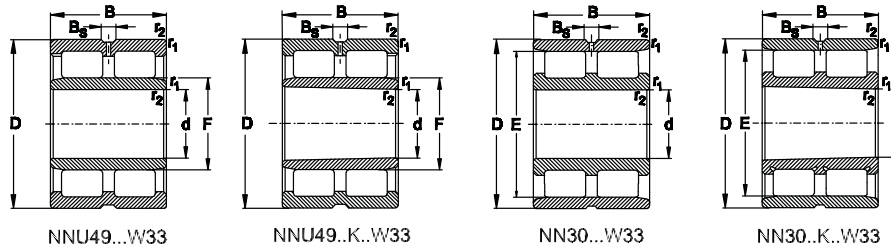
Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
160	240	60	2,1	388	670	3200	3800	NN 3032 M.W33
	240	60	2,1	388	670	3200	3800	NN 3032 K.M.W33
170	230	60	2	340	720	3200	3800	NNU 4934 M.W33
	230	60	2	340	720	3200	3800	NNU 4934 K.M.W33
	260	67	2,1	458	810	3000	3600	NN 3034 M.W33
	260	67	2,1	458	810	3000	3600	NN 3034 M.W33
180	250	69	2	405	877	3000	3600	NNU 4936 M.W33
	250	69	2	405	877	3000	3600	NNU 4936 K.M.W33
	280	74	2,1	576	1080	2800	3400	NN 3036 M.W33
	280	74	2,1	576	1080	2800	3400	NN 3036 K.M.W33
190	260	69	2	412	910	2800	3400	NNU 4938 M.W33
	260	69	2	412	910	2800	3400	NNU 4938 K.M.W33
	290	75	2,1	614	1088	2600	3200	NN 3038 M.W33
	290	75	2,1	614	1088	2600	3200	NN 3038 M.W33
200	280	80	2,1	490	1040	2600	3200	NNU 4940 M.W33
	280	80	2,1	490	1040	2600	3200	NNU 4940 K.M.W33
	310	82	2,1	715	1271	2400	3000	NN 3040 M.W33
	310	82	2,1	715	1271	2400	3000	NN 3040 K.M.W33
220	300	80	2,1	535	1321	2400	3000	NNU 4944 M.W33
	300	80	2,1	535	1321	2400	3000	NNU 4944 K.M.W33

Double Row Cylindrical Roller Bearings



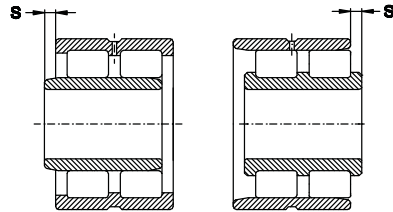
Bearing dimensions					Weight
d	E	F	B _s	s	
mm					[kg]
160	219	-	9,5	4,2	9,6
	219	-	9,5	4,2	9,6
170	-	188,5	6,5	2,3	6,85
	-	188,5	6,5	2,3	6,85
	236	-	9,5	4,5	13
	236	-	9,5	4,5	13
180	-	202	9,5	2,6	10,2
	-	202	9,5	2,6	10,2
	255	-	12,2	4,8	17
	255	-	12,2	4,8	17
190	-	212	9,5	2,6	10,6
	-	212	9,5	2,6	10,6
	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



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	NN 3044 M.W33
	340	90	3	890	1591	2200	2800	NN 3044 K.M.W33
240	320	80	2,1	556	1300	2200	2800	NNU 4948 M.W33
	320	80	2,1	556	1300	2200	2800	NNU 4948 K.M.W33
	360	92	3	850	1560	2000	2600	NN 3048 M.W33
	360	92	3	850	1560	2000	2600	NN 3048 K.M.W33
260	360	100	2,1	750	1700	2000	2600	NNU 4952 M.W33
	360	100	2,1	750	1700	2000	2600	NNU 4952 K.M.W33
	400	104	4	1060	2000	1900	2400	NN 3052 M.W33
	400	104	4	1060	2000	1900	2400	NN 3052 K.M.W33
280	380	100	2,1	765	1800	1900	2400	NNU 4956 M.W33
	380	100	2,1	765	1800	1900	2400	NNU 4956 K.M.W33
	420	106	4	1080	2080	1800	2200	NN 3056 M.W33
	420	106	4	1080	2080	1800	2200	NN 3056 K.M.W33
300	420	118	3	1188	2943	1700	2000	NNU 4960 M.W33
	420	118	3	1188	2943	1700	2000	NNU 4960 K.M.W33
	460	118	4	1270	2400	1600	1900	NN 3060 M.W33
	460	118	4	1270	2400	1600	1900	NN 3060 K.M.W33
320	440	118	3	1060	2550	1600	1900	NNU 4964 K.M.W33
	480	121	4	1320	2600	1600	1900	NN 3064 M.W33

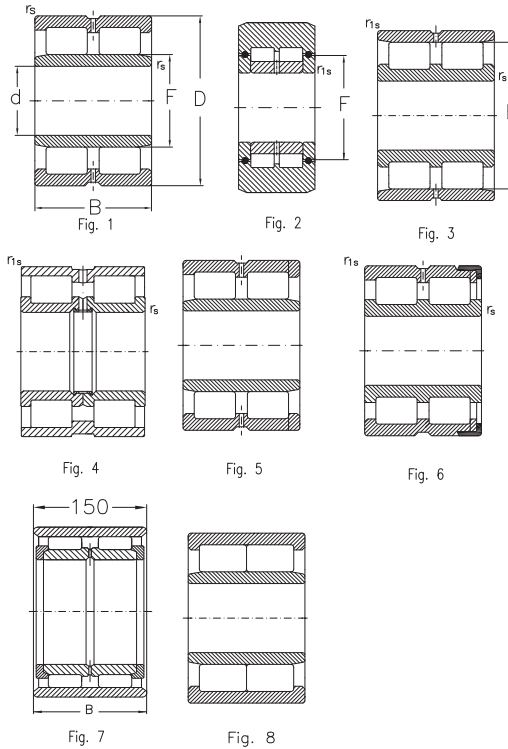
Double Row Cylindrical Roller Bearings



Bearing dimensions					Weight
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

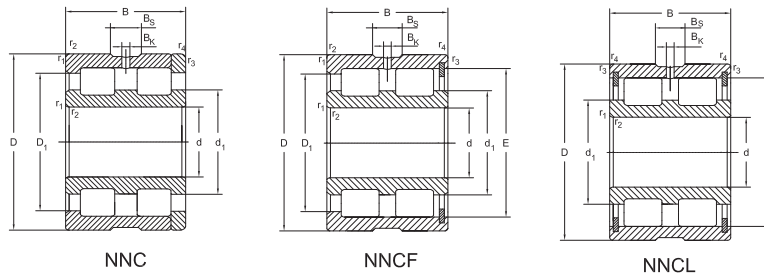
Cylindrical Roller Bearings, double row

Non-standardized



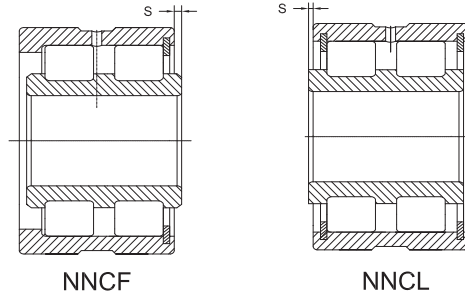
Dimensions						Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	r _s	r _{1s}	E, F	dyn.	stat.	Grease	Oil			
				min		C _r	C _{0r}					
mm						kN						
30	62	24	1	0,6	38	8	47,5	48,8	2400	3000	0,364	2NNU5106M
40	68	37	0,8	0,6	61	4	79	116	3200	4000	0,525	NNF5008VS3
	68	38	0,8	0,6	61	4	79	116	3200	4000	0,535	NNF5008VS3A1
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	NNC4918VW33
120	190	80	1,1	1,1	137	1	417	701	2400	3000	8,30	NNU5124M
130	180	50	1,5	1,5	165,4	5	252	526	900	1300	3,90	NNP4926VW33
	180	50	1,5	1,5	165,4	5	252	526	900	1300	3,90	NNP4926VW1
135	220	145	2	2	192	7	611	1360	2200	2600	21,2	2NUNJ5127MC3
	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	NNU5130VW44C3
169,5	280	105	4	4	197	8	800	2000	1700	2000	27,3	2NNU5134MNAC5
	280	105	3		197	1	955	1680	2200	2700	27,327	NNU5134MNA
	280	105	3		197	1	955	1680	2200	2700	27,327	NNU5134MNAC5
170	230	60	2	1,5	215	3	423	944	1800	2200	7,51	NN5234C3
177,8	258,175	196,469	4	5	198,5	1	1258	2650	1700	2000	35,5	NNU5136MC190W5
180	280	135	0,6	3,5	260,22	13	1350	2543	300		30,1	NNF5036V
220	300	80	2,1	2,1	276,5	4	665	1592	450	800	17	NNC4944VW33
260	320	60	2	2	304,7	6	500	1402	400	700	10,7	NNC4852VW33

Double Row Full Complement Cylindrical Roller Bearings



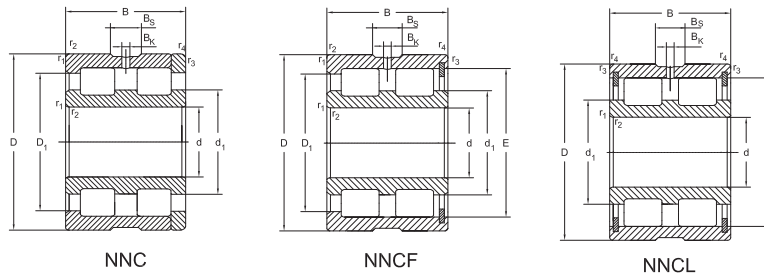
Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	$n_{g_{grease}}$	$n_{g_{oil}}$	
mm				kN		[min ⁻¹]		
25	47	30	0,6	55	76,4	3800	7000	NNCF 5005 V
30	55	34	1	73,7	105	3200	6000	NNCF 5006 V
35	62	36	1	88	131	2800	5300	NNCF 5007 V
40	68	38	1	105	159	2400	4800	NNCF 5008 V
45	75	40	1	128	195	2000	4300	NNCF 5009 V
50	80	40	1	132	206	1900	4000	NNCF 5010 V
55	90	46	1,1	176	294	1600	3400	NNCF 5011 V
60	85	25	1	76,5	134	1700	3400	NNC 4912 V
	85	25	1	76,5	134	1700	3400	NNCF 4912 V
	85	25	1	76,5	134	1700	3400	NNCL 4912 V
	95	46	1,1	183	305	1600	3400	NNCF 5012 V
65	100	46	1,1	194	331	1400	3000	NNCF 5013 V
70	100	30	1	103	188	1400	3000	NNC 4914 V
	100	30	1	103	188	1400	3000	NNCF 4914 V
	100	30	1	103	188	1400	3000	NNCL 4914 V
	110	54	1,1	220	361	1300	2800	NNCF 5014 V
80	110	30	1	110	210	1200	2600	NNC 4916 V
	110	30	1	110	210	1200	2600	NNCF 4916 V

Double Row Full Complement Cylindrical Roller Bearings



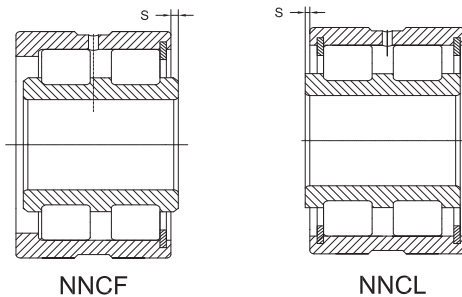
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
[kg]							
25	42,7	33,1	40,3	4,5	3	1	0,23
30	49,8	38,6	47	4,5	3	1	0,35
35	55,7	43,7	52,7	4,5	3	1	0,46
40	61,9	49,1	58,7	4,5	3	1	0,56
45	69,8	55,4	66,2	4,5	3	1	0,70
50	72,9	58,5	69,3	4,5	3	1	0,75
55	83,7	67,6	79,7	4,5	3,5	1	1,15
60	-	69,5	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



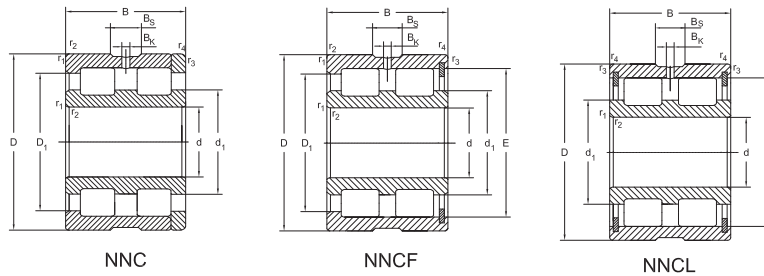
Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_{grease}	n_{oil}	
mm				kN		[min ⁻¹]		
80	110	30	1	110	210	1200	2600	NNCL 4916 V
	125	60	1,1	286	469	1100	2400	NNCF 5016 V
90	125	35	1,1	146	292	1100	2300	NNC 4918 V
	125	35	1,1	146	292	1100	2300	NNCF 4918 V
	125	35	1,1	146	292	1100	2300	NNCL 4918 V
	140	67	1,5	369	635	1000	2200	NNCF 5018 V
100	140	40	1,1	190	390	950	2000	NNC 4920 V
	140	40	1,1	190	390	950	2000	NNCF 4920 V
	140	40	1,1	190	390	950	2000	NNCL 4920 V
	150	67	1,5	391	690	950	2000	NNCF 5020 V
110	150	40	1,1	197	420	900	1900	NNC 4922 V
	150	40	1,1	197	420	900	1900	NNCF 4922 V
	150	40	1,1	197	420	900	1900	NNCL 4922 V
	170	80	2	528	957	850	1800	NNCF 5022 V
120	165	45	1,1	220	465	800	1700	NNC 4924 V
	165	45	1,1	220	465	800	1700	NNCF 4924 V
	165	45	1,1	220	465	800	1700	NNCL 4924 V
	180	80	2	561	1050	800	1700	NNCF 5024 V
130	180	50	1,5	255	540	750	1600	NNC 4926 V

Double Row Full Complement Cylindrical Roller Bearings



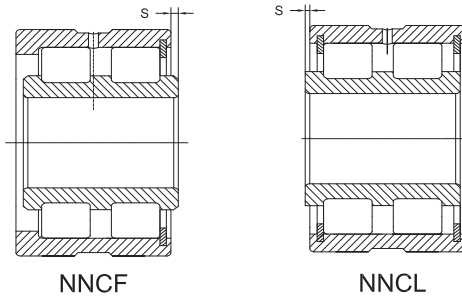
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
80	101,2	90,5	98	5	3,5	1	0,88
	117,2	94,8	112	5	3,5	2,5	2,60
90	-	103,5	111,5	5	3,5	-	1,4
	115,5	103,5	111,5	5	3,5	1,5	1,37
	115,5	103,5	111,5	5	3,5	1,5	1,37
	130,3	106	125	5	3,5	2,5	3,75
100	-	116,5	125,5	5	3,5	-	2,1
	130	116,5	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



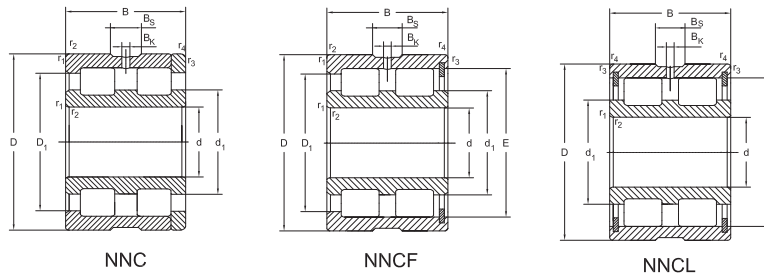
Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
130	180	50	1,5	255	540	750	1600	NNCF 4926 V
	180	50	1,5	255	540	750	1600	NNCL 4926 V
	200	95	2	704	1380	700	1500	NNCF 5026 V
140	190	50	1,5	265	576	700	1500	NNC 4928 V
	190	50	1,5	265	576	700	1500	NNCF 4928 V
	190	50	1,5	265	576	700	1500	NNCL 4928 V
	210	95	2	737	1500	670	1400	NNCF 5028 V
150	190	40	1,1	230	560	720	1500	NNC 4830 V
	190	40	1,1	230	560	720	1500	NNCF 4830 V
	190	40	1,1	230	560	720	1500	NNCL 4830 V
	210	60	2	383	843	680	1400	NNC 4930 V
	210	60	2	383	843	680	1400	NNCF 4930 V
	210	60	2	383	843	680	1400	NNCL 4930 V
	225	100	2,1	842	1680	630	1300	NNCF 5030 V
160	200	40	1,1	238	600	680	1400	NNC 4832 V
	200	40	1,1	238	600	680	1400	NNCF 4832 V
	200	40	1,1	238	600	680	1400	NNCL 4832 V
	220	60	2	399	906	650	1300	NNC 4932 V
	220	60	2	399	906	650	1300	NNCF 4932 V
	220	60	2	399	906	650	1300	NNCL 4932 V

Double Row Full Complement Cylindrical Roller Bearings



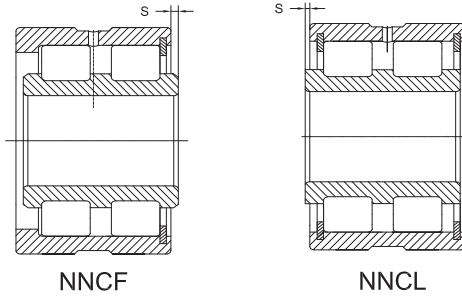
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
130	166	149,5	160,5	6	3,5	4	4,0
	166	149,5	160,5	6	3,5	4	4,0
	183,5	153	176	6	3,5	2,5	11,0
140	-	160	171	6	3,5	-	4,4
	176,4	160	171	6	3,5	4	4,2
	176,4	160	171	6	3,5	4	4,2
	195,5	165	188	7	4	3	11,5
150	-	165	174	7	4	-	3
	178,7	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



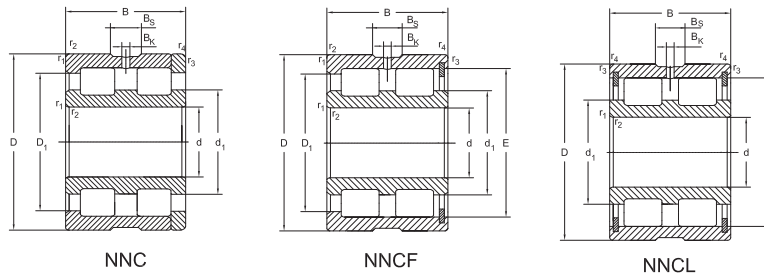
d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
160	240	109	2,1	1010	1950	600	1200	NNCF 5032 V
170	215	45	1,1	258	631	640	1300	NNC 4834 V
	215	45	1,1	258	631	640	1300	NNCF 4834 V
	215	45	1,1	258	631	640	1300	NNCL 4834 V
	230	60	2	408	950	600	1200	NNC 4934 V
	230	60	2	408	950	600	1200	NNCF 4934 V
	230	60	2	408	950	600	1200	NNCL 4934 V
	260	122	2,1	1140	2170	560	1100	NNCF 5034 V
180	225	45	1,1	266	664	610	1200	NNC 4836 V
	225	45	1,1	266	664	610	1200	NNCF 4836 V
	225	45	1,1	266	664	610	1200	NNCL 4836 V
	250	69	2	547	1220	570	1100	NNC 4936 V
	250	69	2	547	1220	570	1100	NNCF 4936 V
	250	69	2	547	1220	570	1100	NNCL 4936 V
	280	136	2,1	1320	2580	560	1100	NNCF 5036 V
190	240	50	1,5	305	760	560	1150	NNC 4838 V
	240	50	1,5	305	760	560	1150	NNCF 4838 V
	240	50	1,5	305	760	560	1150	NNCL 4838 V
	260	69	2	562	1290	550	1100	NNC 4938 V
	260	69	2	562	1290	550	1100	NNCF 4938 V

Double Row Full Complement Cylindrical Roller Bearings



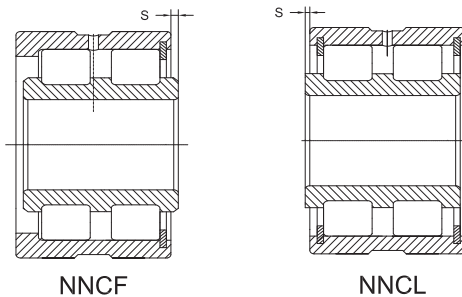
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
[kg]							
160	225	185	215	7	4	3	17
170	-	187,5	196,5	7	4	-	4,2
	201,7	187,5	196,5	7	4	3	4,0
	201,7	187,5	-	7	4	3	4,0
	-	192,5	205,5	7	4	-	7,6
	212,2	192,5	205,5	7	4	4	7,5
	212,2	192,5	205,5	7	4	4	7,5
	243	198	232	7	4	5	23,0
180	-	196	207	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



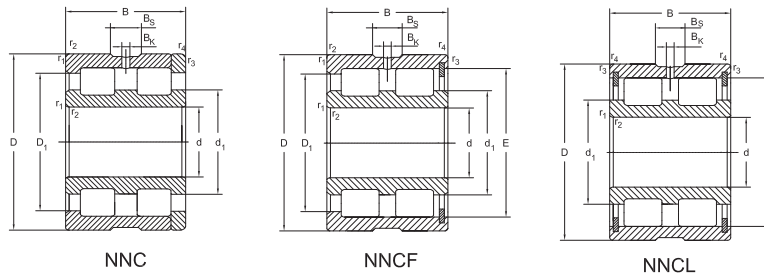
d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
190	260	69	2	562	1290	550	1100	NNCL 4938 V
	290	136	2,1	1380	2690	530	1000	NNCF 5038 V
200	250	50	1,5	315	799	550	1100	NNC 4840 V
	250	50	1,5	315	799	550	1100	NNCF 4840 V
	250	50	1,5	315	799	550	1100	NNCL 4840 V
	280	80	2,1	661	1495	530	1000	NNC 4940 V
	280	80	2,1	661	1495	530	1000	NNCF 4940 V
	280	80	2,1	661	1495	530	1000	NNCL 4940 V
	310	150	2,1	1570	3130	500	950	NNCF 5040 V
220	270	50	1,5	330	878	500	1000	NNC 4844 V
	270	50	1,5	330	878	500	1000	NNCF 4844 V
	270	50	1,5	330	878	500	1000	NNCL 4844 V
	300	80	2,1	690	1610	500	950	NNC 4944 V
	300	80	2,1	690	1610	500	950	NNCF 4944 V
	300	80	2,1	690	1610	500	950	NNCL 4944 V
	340	160	3	1870	3680	450	850	NNCF 5044 V
240	300	60	2	497	1292	480	900	NNC 4848 V
	300	60	2	497	1292	480	900	NNCF 4848 V
	300	60	2	497	1292	480	900	NNCL 4848 V
	320	80	2,1	725	1762	450	850	NNC 4948 V

Double Row Full Complement Cylindrical Roller Bearings



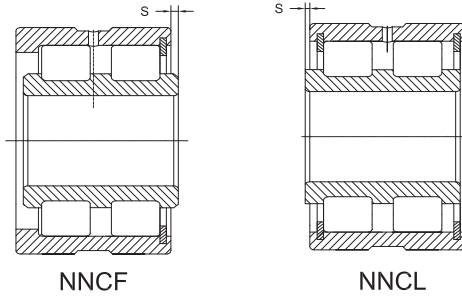
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing [kg]
190	241,3	217,5	233	7	4	4	11,3
	270	222	258	8	4	6	31,5
200	-	219,5	230	7	4	-	6
	235,9	219,5	230	7	4	4	5,8
	235,9	219,5	-	7	4	4	5,8
	-	233	251	8	4	-	16
	260	233	251	8	4	5	15,9
	260	233	251	8	4	5	15,9
	288	236	276	8	4	7	41,0
220	-	240,5	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



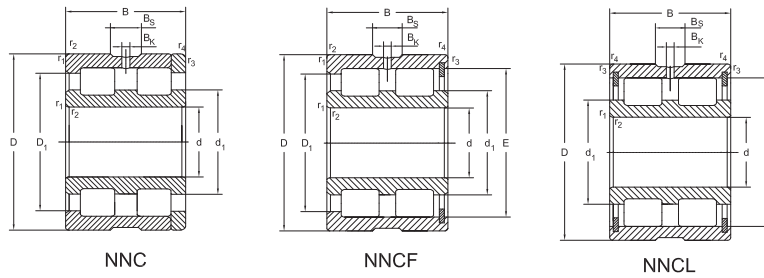
Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
240	320	80	2,1	725	1762	450	850	NNCF 4948 V
	320	80	2,1	725	1762	450	850	NNCL 4948 V
	360	160	3	1980	4050	450	800	NNCF 5048 V
260	320	60	2	521	1406	430	820	NNC 4852 V
	320	60	2	521	1406	430	820	NNCF 4852 V
	320	60	2	521	1406	430	820	NNCL 4852 V
	360	100	2,1	1070	2520	400	750	NNC 4952 V
	360	100	2,1	1070	2520	400	750	NNCF 4952 V
	360	100	2,1	1070	2520	400	750	NNCL 4952 V
	400	190	4	2640	5340	380	700	NNCF 5052 V
280	350	69	2	680	1853	400	750	NNC 4856 V
	350	69	2	680	1853	400	750	NNCF 4856 V
	350	69	2	680	1853	400	750	NNCL 4856 V
	380	100	2,1	1120	2710	380	700	NNC 4956 V
	380	100	2,1	1120	2710	380	700	NNCF 4956 V
	380	100	2,1	1120	2710	380	700	NNCL 4956 V
	420	190	4	2700	5610	360	670	NNCF 5056 V
300	380	80	2,1	801	2146	380	700	NNC 4860 V
	380	80	2,1	801	2146	380	700	NNCF 4860 V
	380	80	2,1	801	2146	380	700	NNCL 4860 V

Double Row Full Complement Cylindrical Roller Bearings



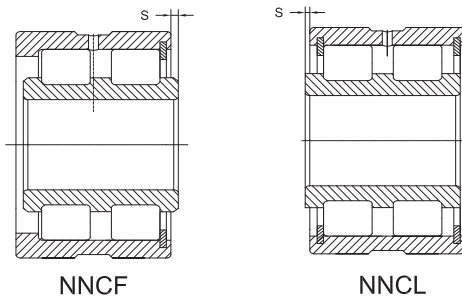
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
240	300,1	273	291	8	4	5	18,5
	300,1	273	291	8	4	5	18,5
	335,6	278	322	9,4	5	7	56,0
260	-	283,5	297,5	8	4	-	11,1
	304,7	283,5	297,5	8	4	4	10,8
	304,7	283,5	-	8	4	4	10,8
	-	297	320	9,4	5	-	33,1
	331,5	297	320	9,4	5	6	32,2
	331,5	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



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]		
300	420	118	3	1560	3630	340	650	NNC 4960 V
	420	118	3	1560	3630	340	650	NNCF 4960 V
	420	118	3	1560	3630	340	650	NNCL 4960 V
	460	218	4	3410	7180	320	600	NNCF 5060 V
320	400	80	2,1	832	2300	340	640	NNC 4864 V
	400	80	2,1	832	2300	340	640	NNCF 4864 V
	400	80	2,1	832	2300	340	640	NNCL 4864 V
	440	118	3	1600	3835	320	600	NNC 4964 V
	440	118	3	1600	3835	320	600	NNCF 4964 V
	440	118	3	1600	3835	320	600	NNCL 4964 V
	480	218	4	3470	7450	300	560	NNCF 5064 V
340	420	80	2,1	850	2415	320	600	NNC 4868 V
	420	80	2,1	850	2415	320	600	NNCF 4868 V
	420	80	2,1	850	2415	320	600	NNCL 4868 V
	460	118	3	1640	4035	300	560	NNC 4968 V
	460	118	3	1640	4035	300	560	NNCF 4968 V
	460	118	3	1640	4035	300	560	NNCL 4968 V
	520	243	5	4180	9200	280	530	NNCF 5068 V
360	440	80	2,1	880	2570	300	560	NNC 4872 V
	440	80	2,1	880	2570	300	560	NNCF 4872 V

Double Row Full Complement Cylindrical Roller Bearings

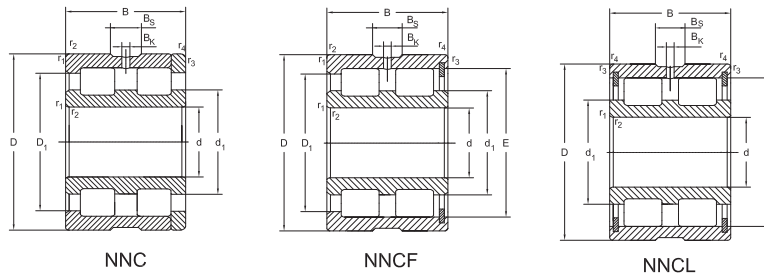


NNCF

NNCL

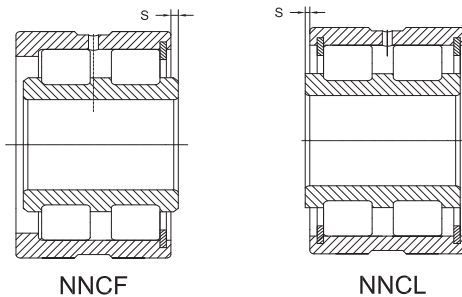
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
300	-	346,5	375,5	9,4	5	-	53
	390,2	346,5	375,5	9,4	5	6	52,8
	390,2	346,5	375,5	9,4	5	6	52,8
	432	355	413	9,4	5	9	130
320	-	353,5	371,5	9,4	5	-	24
	380,3	353,5	371,5	9,4	5	6	23,8
	380,3	353,5	-	9,4	5	6	23,8
	-	353,5	399	9,4	5	-	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



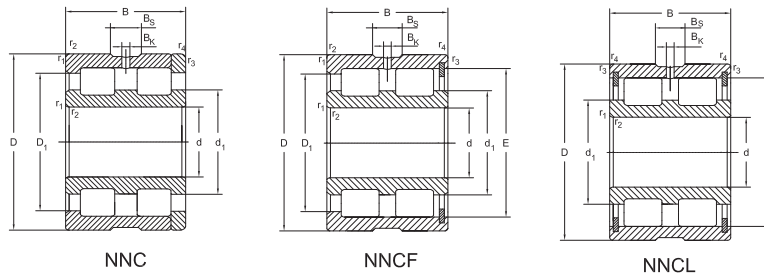
d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
360	440	80	2,1	880	2570	300	560	NNCL 4872 V
	480	118	2,5	1690	4240	300	550	NNC 4972 V
	480	118	2,5	1690	4240	300	550	NNCF 4972 V
	480	118	2,5	1690	4240	300	550	NNCF 4972 V
	540	243	5	4290	9570	260	500	NNCF 5072 V
380	480	100	2,1	1293	3618	280	530	NNC 4876 V
	480	100	2,1	1293	3618	280	530	NNCF 4876 V
	480	100	2,1	1293	3618	280	530	NNCL 4876 V
	520	140	4	2124	5460	260	500	NNC 4976 V
	520	140	4	2124	5460	260	500	NNCF 4976 V
	520	140	4	2124	5460	260	500	NNCL 4976 V
	560	243	5	4400	9940	240	480	NNCF 5076 V
400	500	100	2,1	1311	3748	270	500	NNC 4880 V
	500	100	2,1	1311	3748	270	500	NNCF 4880 V
	500	100	2,1	1311	3748	270	500	NNCL 4880 V
	540	140	4	2185	5730	240	480	NNC 4980 V
	540	140	4	2185	5730	240	480	NNCF 4980 V
	540	140	4	2185	5730	240	480	NNCL 4980 V
	600	272	5	5500	12300	220	450	NNCF 5080 V
420	520	100	2,1	1353	3942	250	470	NNC 4884 V

Double Row Full Complement Cylindrical Roller Bearings



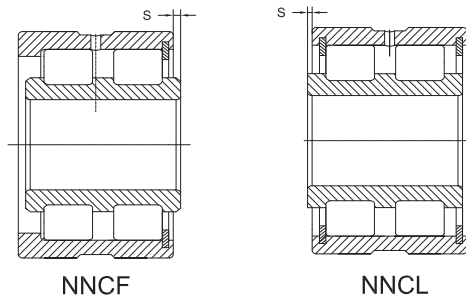
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
360	420,2	393	-	9,4	5	6	26,5
	-	399	436,5	9,4	5	-	61
	446	399	436,5	9,4	5	6	60,5
	446	399	436,5	9,4	5	6	60,5
	504	417	483	9,4	5	11	195
380	-	421,5	444,5	9,4	5	-	45
	456,0	421,5	444,5	9,4	5	6	44,6
	456,0	421,5	-	9,4	5	6	44,6
	-	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



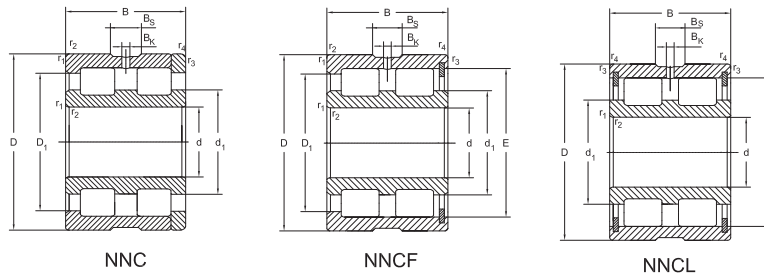
d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
420	520	100	2,1	1353	3942	250	470	NNCF 4884 V
	520	100	2,1	1353	3942	250	470	NNCL 4884 V
	560	140	4	2235	6000	220	450	NNC 4984 V
	560	140	4	2235	6000	220	450	NNCF 4984 V
	560	140	4	2235	6000	220	450	NNCL 4984 V
	620	272	5	5610	12800	200	430	NNCF 5084 V
440	540	100	2,1	1387	4136	240	450	NNC 4888 V
	540	100	2,1	1387	4136	240	450	NNCF 4888 V
	540	100	2,1	1387	4136	240	450	NNCL 4888 V
	600	160	4	2990	7570	200	430	NNC 4988 V
	600	160	4	2990	7570	200	430	NNCF 4988 V
	600	160	4	2990	7570	200	430	NNCL 4988 V
	650	280	6	6160	14100	190	400	NNCF 5088 V
460	580	118	3	1560	4614	230	420	NNC 4892 V
	580	118	3	1560	4614	230	420	NNCF 4892 V
	580	118	3	1560	4614	230	420	NNCL 4892 V
	620	160	4	3020	7770	190	400	NNC 4992 V
	620	160	4	3020	7770	190	400	NNCF 4992 V
	620	160	4	3020	7770	190	400	NNCL 4992 V
	680	130	6	6440	14700	180	380	NNCF 5092 V

Double Row Full Complement Cylindrical Roller Bearings



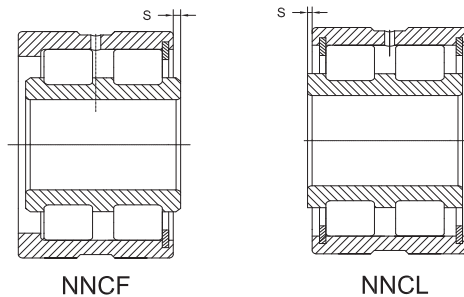
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
[kg]							
420	492,5	458	481	9,4	5	6	48,8
	492,5	458	-	9,4	5	6	48,8
	-	470,5	512	9,4	5	-	100
	522,5	470,5	512	9,4	5	7	99,0
	522,5	470,5	512	9,4	5	7	99,0
	579	483	555	9,4	5	11	280
440	-	480	503	9,4	5	-	51,5
	541,6	480	503	9,4	5	6	50,9
	514,6	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



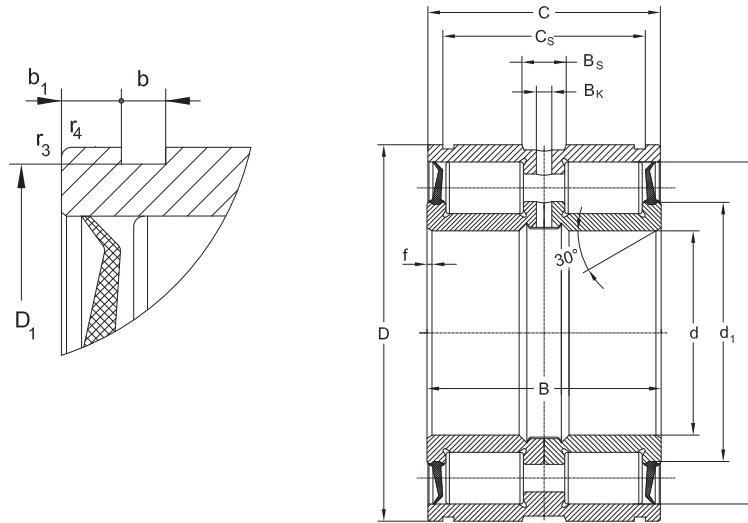
Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
480	600	118	3	1597	4838	210	400	NNC 4896 V
	600	118	3	1597	4838	210	400	NNCF 4896 V
	600	118	3	1597	4838	210	400	NNCL 4896 V
	650	170	5	3270	8420	180	360	NNC 4996 V
	650	170	5	3270	8420	180	360	NNCF 4996 V
	650	170	5	3270	8420	180	360	NNCL 4996 V
	700	300	6	6710	15300	170	360	NNCF 5096 V
500	620	118	3	1625	4987	200	380	NNC 48/500 V
	620	118	3	1625	4987	200	380	NNCF 48/500 V
	620	118	3	1625	4987	200	380	NNCL 48/500 V
	670	170	5	3350	8850	170	360	NNC 49/500 V
	670	170	5	3350	8850	170	360	NNCF 49/500 V
	670	170	5	3350	8850	170	360	NNCL 49/500 V
	720	300	6	6820	15900	170	360	NNCF 50/500 V
530	650	118	3	5285	5285	180	340	NNC 48/530 V
	650	118	3	2285	5285	180	340	NNCF 48/530 V
	650	118	3	5285	5285	180	340	NNCL 48/530 V
	710	180	4	10100	10100	160	340	NNC 49/530 V
	710	180	4	10100	10100	160	340	NNCF 49/530 V
	710	180	4	10100	10100	160	340	NNCL 49/530 V

Double Row Full Complement Cylindrical Roller Bearings



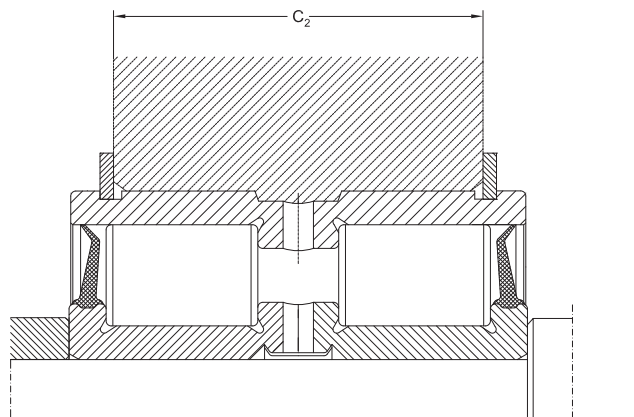
Dimensions							Weight
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
[kg]							
480	-	530	555	9,4	5	-	80
	567,3	530	555	9,4	5	7	89,8
	567,3	530	-	9,4	5	7	89,8
	-	537	592	9,4	5	-	170
	605,5	537	592	9,4	5	8	166
	605,5	537	592	9,4	5	8	166
	657	548	630	9,4	5	14	380
500	-	547	571	9,4	5	-	82,5
	583,5	547	571	9,4	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



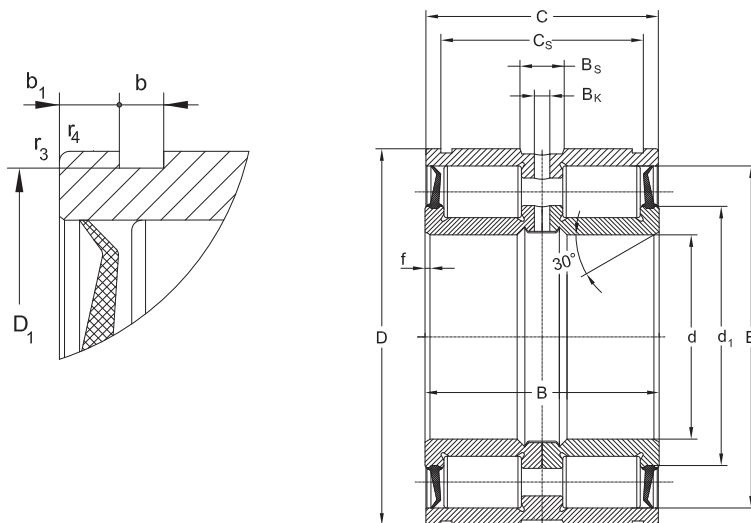
d	Dimensions					Basical radial load		Speed Ratings	Designation
	D	B	C	C_s	r_3, r_4 min.	dyn. C_r	stat. C_{0r}		
mm						kN		$[\text{min}^{-1}]$	
25	47	30	29	24,7	0,3	44,5	65,3	3000	NNF 5005.2LS.V
30	55	34	33	28,2	0,3	48,5	70	2600	NNF 5006.2LS.V
35	62	36	35	30,2	0,3	66	95,8	2200	NNF 5007.2LS.V
40	68	38	37	32,2	0,6	79	121	2000	NNF 5008.2LS.V
45	75	40	39	34,2	0,6	95,1	150	1800	NNF 5009.2LS.V
50	80	40	39	34,2	0,6	101	162	1700	NNF 5010.2LS.V
55	90	46	45	40,2	0,6	119	195	1500	NNF 5011.2LS.V
60	95	46	45	40,2	0,6	123	210	1400	NNF 5012.2LS.V
65	100	46	45	40,2	0,6	128	224	1300	NNF 5013.2LS.V
70	110	54	53	48,2	0,6	190	337	1200	NNF 5014.2LS.V
80	125	60	59	54,2	0,6	233	420	1000	NNF 5016.2LS.V
90	140	67	66	59,2	0,6	297	552	900	NNF 5018.2LS.V
100	150	67	66	59,2	0,6	314	580	850	NNF 5020.2LS.V
110	170	80	79	70,2	0,6	380	699	750	NNF 5022.2LS.V

Sealed Double Row Full Complement Cylindrical Roller Bearings



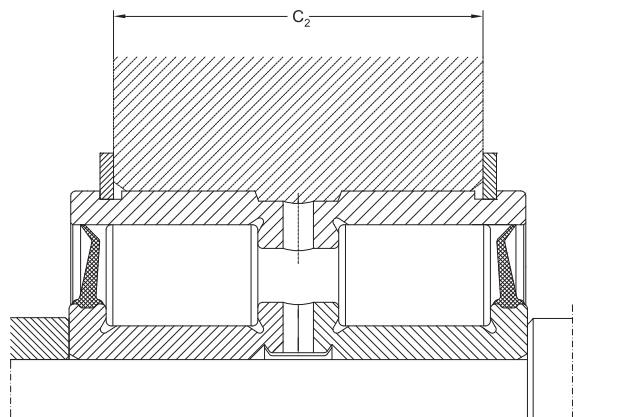
Dimensions										Weight	
d	d ₁ ≈	D ₁ ≈	E	b	b ₁	B _s ≈	B _k	f	C ₂ ± 0,1	Adequate snap ring according to DIN 471	Bearing [kg]
25	33	44,8	40,4	1,8	2,15	4,5	3	0,5	21	47x1,75	0,23
30	39	52,8	47,9	2,1	2,4	4,5	3	0,5	24	55x2	0,35
35	45	59,8	54,5	2,1	2,4	4,5	3	0,5	26	62x2	0,45
40	50,5	65,8	61	2,7	2,4	4,5	3	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

Sealed Double Row Full Complement Cylindrical Roller Bearings



Dimensions						Basic radial load		Speed Ratings	Designation
d	D	B	C	C_s	r_3, r_4 min.	dyn. C_r	stat. C_{0r}		
mm						kN		$[\text{min}^{-1}]$	
120	180	80	79	71,2	0,6	402	745	700	NNF 5024.2LS.V
130	200	95	94	83,2	0,6	572	1050	630	NNF 5026.2LS.V
140	210	95	94	83,2	0,6	594	1140	600	NNF 5028.2LS.V
150	225	100	99	87,2	0,6	693	1310	560	NNF 5030.2LS.V
160	240	109	108	95,2	0,6	721	1410	500	NNF 5032.2LS.V
170	260	122	121	107,2	0,6	935	1800	480	NNF 5034.2LS.V
180	280	136	135	118,2	0,6	1080	2130	450	NNF 5036.2LS.V
190	290	136	135	118,2	0,6	1100	2210	430	NNF 5038.2LS.V
200	310	150	149	128,2	0,6	1340	2870	400	NNF 5040.2LS.V
220	340	160	159	138,2	1	1510	3130	360	NNF 5044.2LS.V
240	360	160	159	138,2	1	1570	3310	340	NNF 5048.2LS.V

Sealed Double Row Full Complement Cylindrical Roller Bearings



Dimensions										Weight	
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]
110	132	167	154,5	4,2	4,4	6	3,5	1,8	62	170x4	6,45
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





Four Row Cylindrical Roller Bearings

DAS LAGER four-row cylindrical roller bearings are used almost exclusively for the roll necks of rolling mill stands, calenders and roller presses. Their friction is low compared with other roller bearings. As they are normally mounted with an interference fit on the roll neck, they are particularly suitable for rolling mill applications where the rolling speed is high.

The low bearing cross section allows for relatively large roll neck diameters in comparison with the roll diameter. Since very many rollers can be incorporated, the radial load carrying capacity is exceptionally high.

DAS LAGER four-row cylindrical roller bearing are only able to accommodate radial loads. They are therefore mounted together with deep groove or angular contact ball bearings, or with tapered roller bearings, either radial or thrust designs, which take up the axial loads.

Internal clearance

DAS LAGER four-row cylindrical roller bearing are normally produced with the C3 or C4 radial internal clearance required for rolling mill bearings. Bearings mounted with a loose fit on the roll necks generally have C2 radial internal clearance.

The clearance values, where standardized, conform to ISO 5753:1991 and are given in the following tables for bearings with cylindrical bore and bearings with tapered bore. They are valid for unmounted bearings under zero measuring load.

Radial internal clearance of DAS LAGER cylindrical roller bearings with cylindrical bore:																	Table 1
Bore diameter		Radial Internal Clearance															
d		C1		SPC2		C2		Normal		C3		C4		C5			
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.		
mm		µm															
-	24	-	-	-	-	0	25	20	45	35	60	50	75	65	90		
24	30	5	15	10	25	0	25	20	45	35	60	50	75	70	95		
30	40	5	15	12	25	5	30	25	50	45	70	60	85	80	105		
40	50	5	18	15	30	5	35	30	60	50	80	70	100	95	125		
50	65	5	20	15	35	10	40	40	70	60	90	80	110	110	140		
65	80	10	25	20	40	10	45	40	75	65	100	90	125	130	165		
80	100	10	30	25	45	15	50	50	85	75	110	105	140	155	190		
100	120	10	30	25	50	15	55	50	90	85	125	125	165	180	220		
120	140	10	35	30	60	15	60	60	105	100	145	145	190	200	245		
140	160	10	35	35	65	20	70	70	120	115	165	165	215	225	275		
160	180	10	40	35	75	20	75	75	125	120	170	170	220	250	300		
180	200	15	45	40	80	35	90	90	145	140	195	195	250	275	330		
200	225	15	50	45	90	45	105	105	165	160	220	220	280	305	365		
225	250	15	50	50	100	45	110	110	175	170	235	235	300	330	395		
250	280	20	55	55	110	55	125	125	195	190	260	260	330	370	440		
280	315	20	60	60	120	55	130	130	205	200	275	275	350	410	485		
315	355	20	65	65	135	65	145	145	225	225	305	305	385	455	535		
355	400	25	75	75	150	100	190	190	280	280	370	370	460	510	600		
400	450	25	85	85	170	110	210	210	310	310	410	410	510	565	665		
450	500	25	95	95	190	110	220	220	330	330	440	440	550	625	735		
500	560	25	105	105	210	120	240	240	360	360	480	480	600	690	810		
560	630	25	115	115	230	140	260	260	380	380	500	500	620	780	900		
630	710	30	130	130	260	145	285	285	425	425	565	565	705	865	1005		
710	800	35	145	145	290	150	310	310	470	470	630	630	790	975	1135		
800	900	40	160	160	320	180	350	350	520	520	690	690	860	1095	1265		
900	1000	-	-	-	-	200	390	390	580	580	770	770	960	1215	1405		
1000	1120	-	-	-	-	220	430	430	640	640	850	850	1060	1355	1565		
1120	1250	-	-	-	-	230	470	470	710	710	950	950	1190	1510	1750		
1250	1400	-	-	-	-	270	530	530	790	790	1050	1050	1310	1680	1940		
1400	1600	-	-	-	-	330	610	610	890	890	1170	1170	1450	1920	2200		
1600	1800	-	-	-	-	380	700	700	1020	1020	1340	1340	1660	2160	2480		
1800	2000	-	-	-	-	400	760	760	1120	1120	1480	1480	1840	2390	2760		

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.

Radial internal clearance of DAS LAGER cylindrical roller bearings with tapered bore															
Bore diameter		Radial Internal Clearance													
d		C1		SPC2		C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm													
-	24	-	-	-	-	15	40	30	55	40	65	50	75	70	95
24	30	15	25	25	35	20	45	35	60	45	70	55	80	75	100
30	40	15	25	25	40	20	45	40	65	55	80	70	95	90	115
40	50	17	30	30	45	25	55	45	75	60	90	75	105	105	135
50	65	20	35	35	50	30	60	50	80	70	100	90	120	125	155
65	80	25	40	40	60	35	70	60	95	85	120	110	145	145	180
80	100	35	55	45	70	40	75	70	105	95	130	120	155	175	210
100	120	40	60	50	80	50	90	90	130	115	155	140	180	200	240
120	140	45	70	60	90	55	100	100	145	130	175	160	205	225	270
140	160	50	75	65	100	60	110	110	160	145	195	180	230	255	305
160	180	55	85	75	110	75	125	125	175	160	210	195	245	280	330
180	200	60	90	80	120	85	140	140	195	180	235	220	275	305	360
200	225	60	95	90	135	95	155	155	215	200	260	245	305	340	400
225	250	65	100	100	150	105	170	170	235	220	285	270	335	375	440
250	280	75	110	110	165	115	185	185	255	240	310	295	365	415	485
280	315	80	120	120	180	130	205	205	280	265	340	325	400	465	540
315	355	90	135	135	200	145	225	225	305	290	370	355	435	515	595
355	400	100	150	150	225	165	255	255	345	330	420	405	495	580	670
400	450	110	170	170	255	185	285	285	385	370	470	455	555	650	750
450	500	120	190	190	285	205	315	315	425	410	520	505	615	720	830
500	560	130	210	210	315	230	350	350	470	455	575	560	680	800	920
560	630	140	230	230	345	260	380	380	500	500	620	620	740	900	1020
630	710	160	260	260	390	295	435	435	575	565	705	695	835	1005	1145
710	800	180	290	290	435	325	485	485	645	630	790	775	935	1125	1285
800	900	200	320	320	480	370	540	540	710	700	870	860	1030	1265	1435
900	1000	-	-	355	540	410	600	600	790	780	970	960	1150	-	-
1000	1120	-	-	395	600	455	665	665	875	865	1075	1065	1275	-	-
1120	1250	-	-	440	670	490	730	730	970	960	1200	1200	1440	-	-
1250	1400	-	-	490	740	550	810	810	1070	1070	1330	1330	1590	-	-
1400	1600	-	-	560	840	640	920	920	1200	1200	1480	1480	1760	-	-
1600	1800	-	-	630	950	700	1020	1020	1340	1340	1660	1660	1980	-	-
1800	2000	-	-	700	1060	760	1120	1120	1480	1480	1840	1840	2200	-	-

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.

Working temperature:

DAS LAGER multi-row cylindrical roller bearings are subjected to a special heat treatment as standard so that they can be operated at temperatures up to +150°C without any inadmissible dimensional changes occurring. To order, and against a surcharge, bearings can be dimensionally stabilised for operating temperatures up to +200°C (designation suffix S1) or up to +250°C (designation suffix S2). An advantage of this special heat treatment is that the bearings can be mounted with a greater degree of interference than is possible with

standard bearings. For further information please contact the DAS LAGER application engineering service.

Cages :

DAS LAGER four-row cylindrical roller bearings, depending on size and also application, are produced with the following cages:

Two or three double pronged machined brass cages

Two double row window-type brass cages

Four pronged machined brass cages

Minimum load :

In order to guarantee satisfactory operation, DAS LAGER multi-row cylindrical roller bearings, 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 rollers and cage, and the friction in the

lubricant, can have a detrimental effect on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and the raceways.

The requisite minimum load to be applied to multi-row cylindrical roller bearings can be estimated using:

$$F_{rm} = k_r \left(6 + \frac{nd_m}{87500} \right) \left(\frac{d_m}{100} \right)^2$$

where		
F_{rm}	=	minimum radial load, kN
k_r	=	minimum load factor (see product tables)
n	=	operating speed, r/min
d_m	=	mean diameter of
	=	0,5(d + D), mm

When starting up at low temperatures or when the lubricant is highly viscous, even greater loads may be required. The weights of the components supported by the bearing, together with the external forces, generally exceed the requisite minimum load. If this is not the case, the ADAS LAGER multi-row cylindrical roller bearing must be subjected to an additional radial load.

Equivalent dynamic bearing load: $P = F_r$

Equivalent static bearing load: $P_0 = F_r$

Mounting instructions Knowledge and experience are of particular importance where DAS LAGER four-row cylindrical roller bearings are concerned. The individual components must be mounted in the correct order. Parts which belong together are marked with letters. In addition, all components of the bearing are marked with the same serial number, so that there is no risk of mixing components if several bearings are to be mounted at the same time.

However, the inner rings and inner ring pairs are fully interchangeable and need not to have the same serial number as the outer ring(s).

In the majority of applications the load is of constant direction, so that approximately only a quarter of the outer ring is under load. For this reason, the side faces of the outer rings are divided into four zones indicated by I to IV. The markings for load zone I are also joined by a line across the outside surface of the outer rings.

When the bearing is mounted for the first time it is usual to position zone I in the direction of action of the load. Depending on the operating conditions, the outer rings should be turned through 90° after a period of service so that a new zone comes under load.

Detailed mounting instructions are also supplied with all bearings.

Designations :

The designation suffixes used to identify certain features of DAS LAGER multi-row cylindrical roller bearings are explained in the following.

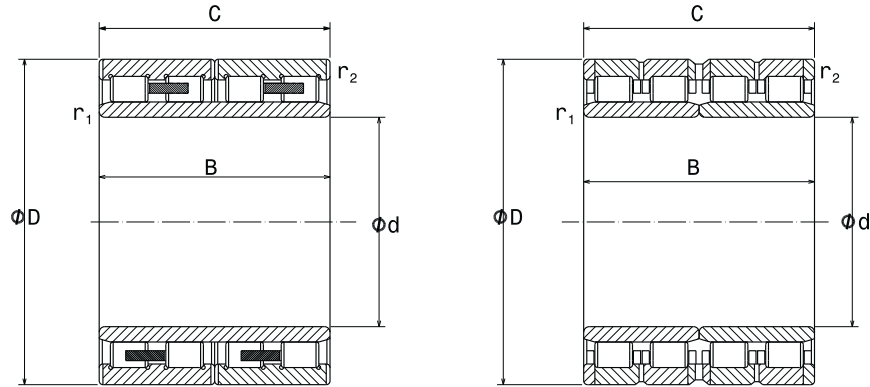
A, B, C, D, E Modifications to the original design. Combinations of these letters are also used, e.g. DC.

The actual modification is specific to the individual bearing and is given on the drawing.

C2	Radial internal clearance smaller than Normal
C3	Radial internal clearance greater than Normal
C4	Radial internal clearance greater than C3
DA1	Inner and outer rings of case-hardened steel
DA2	Outer ring of case-hardened steel
DA3	Inner ring of case-hardened steel
DA4	Inner and outer rings and rollers of case-hardened steel
DB1	Bainite hardened inner and outer rings
DB2	Bainite hardened outer ring
DB3	Bainite hardened inner ring
K	Tapered bore, taper 1:12
K30	Tapered bore, taper 1:30
M	Machined brass cage
P5	Dimensional and running accuracy to ISO tolerance class 5 (better than P6)
P6	Dimensional and running accuracy to ISO tolerance class 6 (better than Normal)
DJ202	Bearing set of double row bearings
W33	Annular groove and three lubrication holes in outer ring

Four Row Cylindrical Roller Bearings

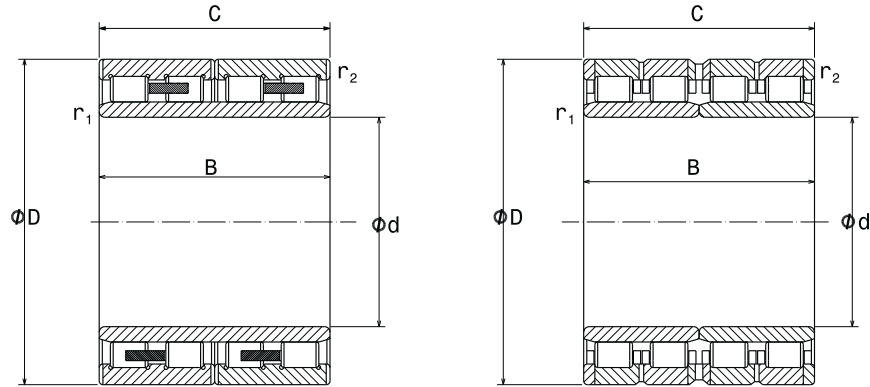
Non-standardized



Principal dimensions (mm)				Basic load ratings (kN)		Weight	Designation
d	D	B	C	Cr	C0r	(kg)	
105	150	71	71	242	451	4,10	DLG 319148 B
125	180	100	90	408	836	7,9	BC4B 319768
127	174.625	150.812	150.812	596	1254	10,5	DLG 315643/DJ202
139,7	215	195	187	1150	2423	24,0	BC4B 459696
145	210	155	155	752	1482	18,0	DLG 314625
145	225	156	156	852	1577	23,0	DLG 313924 A
150	230	156	156	852	1577	24,0	DLG 313891 A
151,5	230	168	168	998	2090	24,0	DLG 314024 C
160	230	130	130	742	1273	17,0	DLG 314190
160	230	168	168	852	2090	23,5	DLG 315189 A
165,1	225.425	168.275	168.275	1045	2128	20,0	DLG 315642/DJ202
170	240	130	130	867	1739	19,0	BC4B 635122
180	260	168	168	1216	2375	29,5	DLG 313812
181	260	180	180	920	2470	28,0	BC4B 452683 A
181,5	260	168	168	1064	2423	27,5	DLG 314023 A
182	260	183	168	1083	2470	28,0	DLG 312942
190	260	168	168	1083	2470	27,0	DLG 313651
190	270	200	200	1435	3183	37,5	DLG 314199 B
190	280	200	200	1435	3183	40,0	DLG 313583
190	280	200	200	1634	3183	41,5	DLG 314049 A
192	270	170	170	1112	2565	28,5	DLG 313153
200	270	170	170	1112	2565	28,5	DLG 314553
200	280	170	170	1311	2850	33,5	DLG 314385
200	280	200	200	1435	3183	39,0	DLG 313893
200	290	192	192	1463	3040	42,5	DLG 313811
200	310	230	230	1910	3563	63,0	DLG 313639 A/DJ202
205	310	225	225	1843	4085	58,0	DLG 313584 K
220	310	192	192	1596	3468	46,0	DLG 313839
220	310	225	225	1843	4085	54,5	DLG 313894 B
220	330	230	230	1948	3800	68,5	DLG 314889/DJ202
230	330	206	206	1777	3800	58,0	DLG 313824
231	330	235	220	1634	4085	59,0	DLG 312943 C
240	330	220	220	1634	4085	58,0	DLG 313921
260	370	220	220	2052	4418	77,5	DLG 313823
260	400	290	290	3344	6745	135	DLG 313427 B
266,25	400	285	285	2423	6460	120	BC4B 457929 VCA
280	390	220	220	2128	4750	82,5	DLG 313822
280	390	275	275	2926	6840	100	DLG 314719 C

Four Row Cylindrical Roller Bearings

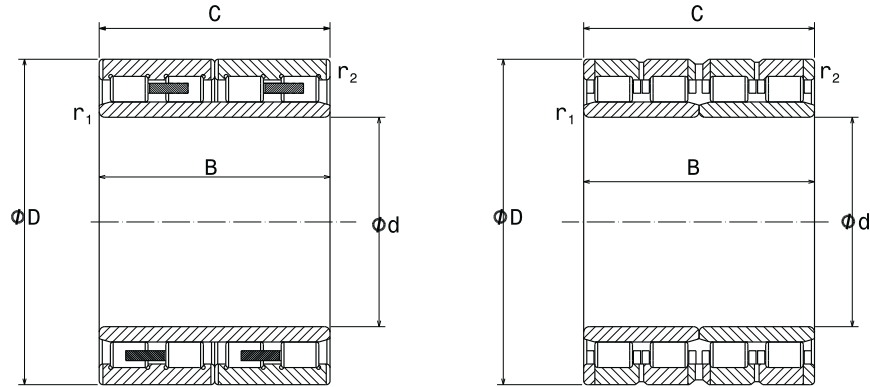
Non-standardized



Principal dimensions (mm)				Basic load ratings (kN)		Weight	Designation
d	D	B	C	Cr	C0r	(kg)	
280	400	285	285	2983	6983	120	DLG 314070/DJ202
280	410	300	300	3344	7125	130	DLG 314897/DJ202
280	420	250	250	3031	6460	125	NNUD 6056 MAS
300	420	300	300	3553	8360	130	DLG 314484 D
300	420	320	300	3553	8360	135	DLG 319129
320	460	240	240	2774	6840	140	BC4B 322216 B/DA3VJ212
320	480	350	350	4703	10260	220	DLG 314274 B
320	480	350	350	4342	10450	215	BC4B 316345 A
330	460	340	340	3971	9690	175	DLG 313445 C
340	450	250	250	2423	5700	115	BC4-8050
340	480	350	350	4342	10450	205	DLG 314485 C
340	480	370	350	4342	10450	200	DLG 319040 A
340	520	300	300	4076	8550	215	DLG 315767 K
340	560	380	380	6479	12255	350	DLG 313404 A
350	500	380	380	4703	10830	240	DLG 314563/DJ202
350	520	300	300	4076	8550	220	BC2B 319878/DJ202
350	520	300	300	4076	8550	220	BC4B 326909/DA3
355,6	482,6	269,87	269,87	2822	6080	150	BC4-8022/DA1
356,67	550	400	400	5016	14250	335	BC4B 457939 VAA
360	500	250	250	3401	6983	145	BC2B 320075/DJ202
360	500	250	250	3297	8075	140	BC2B 322217/DJ202
360	510	400	380	4969	11590	260	DLG 316890 B
360	540	325	335	4446	8693	260	NNUD 6072 MA/P64
365	540	300	300	4760	10450	230	DLG 313041 C
370	520	380	380	5225	12540	255	DLG 314486 A
380	520	280	280	2717	6840	185	NNU 4976 B/DRW33
380	540	300	300	4760	10450	220	DLG 313030 A
380	540	400	380	5434	13015	295	DLG 315606
380	540	400	400	5434	13015	295	BC4B 313511 B
380	540	400	380	5748	13300	300	BC4B 320989/DA3
380	560	300	300	4703	9168	260	BC4B 322189
382,5	590	450	450	6584	15485	425	DLG 319352
390	540	320	320	5016	11590	230	BC4B 322498
390	550	310	310	4864	10640	240	DLG 313190 A
399,93	590	440	440	8151	19380	420	DLG 313038 A
400	560	300	300	4446	9690	245	BC4-8059
400	560	410	410	5957	14820	315	DLG 313015 DC
400	590	440	440	7002	15770	415	DLG 315802/DJ202

Four Row Cylindrical Roller Bearings

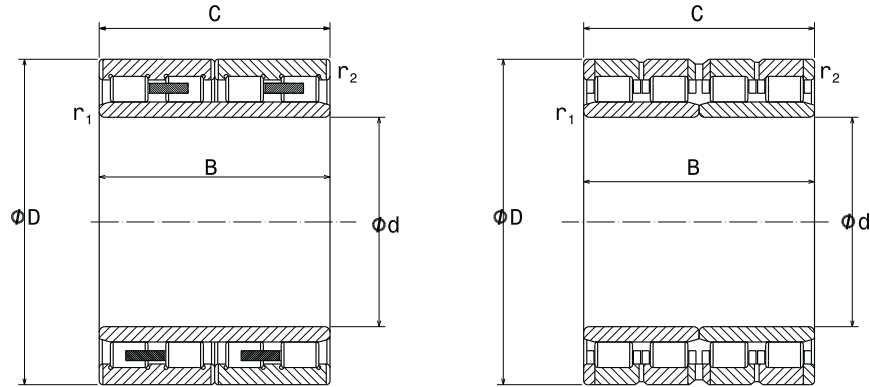
Non-standardized



Principal dimensions (mm)				Basic load ratings (kN)		Weight	Designation
d	D	B	C	Cr	C0r	(kg)	
410	560	400	400	6118	15200	290	DLG 316689
410	560	400	400	5225	15200	295	BC4B 322038/DA2
410	560	420	400	5643	13870	275	BC4B 320612
410	600	440	440	7268	16435	425	DLG 313877 B
412.335	650	488	488	7999	18050	575	DLG 314964
412.335	650	488	480	7106	20140	565	BC4B 467373 VCA
412,5	630	450	450	6270	18050	490	BC4B 457945 VCA
420	580	260	260	4180	9168	210	BC2B 320074 A/DJ202
420	580	320	320	4446	10260	250	DLG 313555 B/DJ202
420	580	320	320	4446	10260	250	DLG 313555 C/DJ202
420	600	440	440	6850	16720	400	DLG 313513
420	620	400	400	6584	14820	430	DLG 314391/DJ202
431,5	571,5	300	300	4237	9690	210	BC4B 326361 B/DA1
431,8	571,5	310	310	4237	9690	200	BC4-8037/DA1VA907
440	620	450	450	7420	18620	440	DLG 314554 B
440	620	470	450	6850	16720	420	BC4B 320608
440	650	355	355	5957	13870	400	DLG 313032
440	650	355	355	6375	13300	420	DLG 316899 A
440	660	340	340	6375	13015	430	DLG 635043
447.295	635,176	463,55	463,55	7838	19000	460	DLG 314792 A
450	590	300	300	3715	11400	245	DLG 315811 E
459,95	760	600	600	13300	28975	1160	DLG 312980 D
460	650	355	355	5957	13870	380	DLG 313031 A
460	650	424	424	7420	17385	450	DLG 315196 A
460	650	460	424	7420	17385	490	BC4B 322993 A/HA7
460	650	470	470	8360	21280	510	DLG 314560
460	650	470	470	8360	21280	520	DLG 319155
460	680	400	400	7686	16435	640	BC4B 322374
474,6	600	368	368	5225	13870	235	BC4-8000/DA1
474,6	600	377	377	5225	13870	235	BC4-8031/DA1VA907
475	600	368	368	4864	12730	225	BC4-8004/DA1VA907
475	600	368	368	5225	13870	235	BC4B 326261/DA1
475	600	392	392	5225	13870	240	BC4-8003/DA1VA907
480	650	450	450	7838	20140	440	DLG 316690 B
480	680	420	420	7999	18335	515	DLG 319320
480	680	500	500	9044	22800	585	DLG 313516 D
480	680	500	500	8674	20900	605	DLG 316624
485	740	540	540	10450	27075	830	DLG 315523

Four Row Cylindrical Roller Bearings

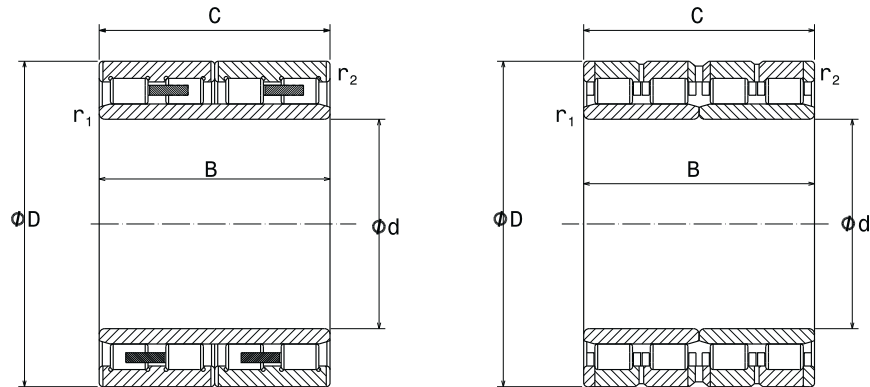
Non-standardized



Principal dimensions (mm)				Basic load ratings (kN)		Weight	Designation
d	D	B	C	Cr	C0r	(kg)	
487,98	637,045	350	350	5643	14535	300	BC2B 326196/DA1DJ202
500	650	260	260	3819	9690	225	DLG 319254/DJ202
500	670	450	450	7838	20900	460	DLG 316083 A
500	670	479	450	7838	20900	485	BC4-8010/DA4
500	670	480	450	7838	20900	485	BC4B 322039/DA1
500	670	480,5	450	7838	20900	465	BC4-8051/HA
500	670	517	450	7838	20900	475	BC4-8011/DA4
500	670	518,5	450	7838	20900	475	BC4-8052/HA
500	680	450	450	7838	20900	500	BC4B 316515
500	710	480	480	8360	20520	610	DLG 316968 A
500	720	400	400	7524	16720	530	BC4B 322066
500	720	530	530	10260	27075	730	DLG 314441 B
510	680	500	500	8522	24700	522	BC4B 319411
511.584	780	580	580	11305	32965	915	BC4B 457956 VCE
529,91	870	670	670	14915	31825	1660	DLG 312844/DJ202
530	760	520	520	11115	27075	775	DLG 314886 A
530	780	500	500	8883	19380	805	DLG 315040/DJ202
530	780	570	570	12160	30875	960	DLG 314517 A
536.176	762,03	558,8	558,8	10830	27550	830	DLG 313535 B
536.176	762,03	558,8	558,8	10830	27550	840	DLG 313535 D
550	740	510	510	9595	25650	615	DLG 316691
550	800	520	520	11115	25175	895	DLG 316115/DJ202
551.667	830	580	580	11685	30875	1070	BC4B 457960 VCA
559,84	920	710	710	19095	43225	2000	DLG 313189 A
560	820	600	600	13490	32300	1080	BC4B 322930/DA4
571,1	812,97	594	594	12730	31825	1000	DLG 313499 B
571,1	812,97	594	594	12730	31825	1000	DLG 313499 DA
571.627	870	640	640	12730	38475	1335	BC4B 319446
571.667	870	640	640	17005	47500	1170	BC4B 457962 VCA
580	780	520	486	9405	25650	700	BC4-8012/DA4
580	780	521	486	9405	25650	700	BC4B 326140/DA4
580	780	521,5	486	9405	26125	700	BC4-8053/DA4
580	780	558	486	9405	25650	715	BC4-8013/DA4
580	780	559,5	486	9405	26125	715	BC4-8054/DA4
600	820	575	575	12350	34200	910	DLG 315175 A
600	820	575	575	12350	34200	935	DLG 315175 C
600	870	540	540	12540	29925	1100	DLG 315068 A
600	870	578	540	12540	29925	1150	BC4B 322497/DA4

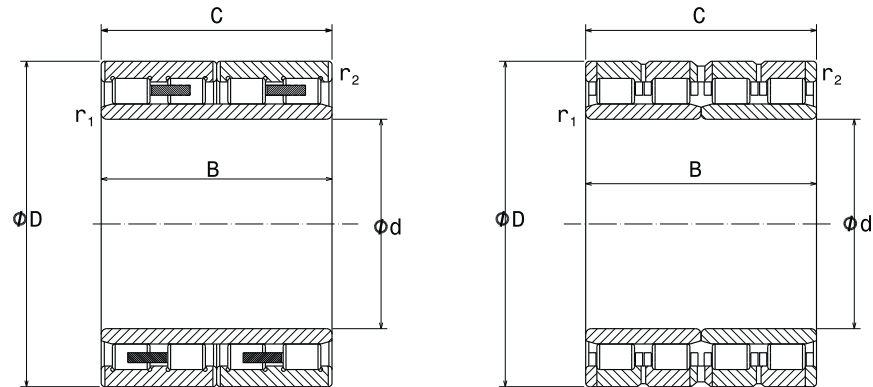
Four Row Cylindrical Roller Bearings

Non-standardized



Principal dimensions (mm)				Basic load ratings (kN)		Weight	Designation
d	D	B	C	Cr	C0r	(kg)	
600	870	640	640	14345	38000	1300	DLG 314317 A
600	870	640	640	14915	38000	1340	DLG 315513
606.667	920	640	640	15675	42750	1525	DLG 315526
610	820	430	430	8883	22420	650	DLG 315257 A
620	820	475	475	9595	25175	700	BC4-8041/DA4
628	922	600	600	15675	37050	1420	DLG 315071 A
633.334	960	680	680	13775	42750	1675	BC4B 457969
634,5	901,87	674	674	15960	42750	1400	DLG 313705 B
650	900	650	650	16340	39425	1260	BC4-8002/HA6
650	920	670	670	16340	44175	1450	DLG 313007 C
658	1075	650	650	19475	40850	2490	BC4B 320525
660	820	440	440	7106	21660	530	DLG 239509 FA
660	880	450	450	6850	22420	785	DLG 313477 B/DJ202
680	980	640	640	16340	41800	1590	DLG 313154 C
690	980	715	715	18810	51300	1780	DLG 313008 A
700	930	620	620	14345	40850	1180	DLG 316967
710	1000	715	715	19095	53200	1860	DLG 313403 C
730	960	620	620	14630	42750	1220	DLG 315982
730	1030	750	750	19855	55575	2040	DLG 314518 B
748	1135	690	690	20900	48450	2635	BC4B 420625
750	1000	500	500	11685	31825	1150	DLG 314420/DJ202
750	1000	670	670	16720	47500	1480	DLG 315973
750	1090	615	615	17385	39425	1860	NNUD 60/750 M
750	1090	750	750	20520	48450	2420	BC4-8066/DA3
759	1210	740	740	25650	59850	3500	DLG 313685 A
759	1210	740	740	24225	80750	3480	DLG 313685 B
760	1080	790	790	22610	62225	2440	DLG 312979 D
761.425	1.079.602	787,4	787,4	22610	62225	2400	DLG 312967 E
773.334	1120	800	800	22610	62225	2715	BC4B 319991/DA4
800	1080	700	700	18810	55575	1950	DLG 315599 A
811.692	1180	850	850	23845	64600	2980	BC4B 457984 VCA
820	1100	745	720	18810	54150	2000	BC4B 316341/DA4
820	1130	800	800	22990	64600	2540	BC4-8014/DA4
820	1130	800	800	22990	64600	2540	BC4B 320455
820	1130	825	800	22990	64600	2570	DLG 319313
850	1150	840	840	24225	71250	2570	DLG 315826 A
850	1150	840	840	24225	71250	2660	DLG 315826 B
862,98	1.219.302	876,3	889	28785	82175	3470	DLG 312966 D

Non-standardized

[illegible]

Cylindrical roller bearings, double row and three row

Non-standardized

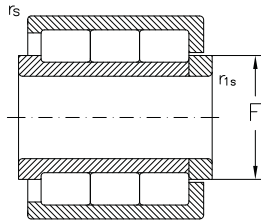


Fig. 9

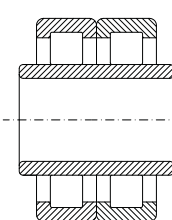


Fig. 10

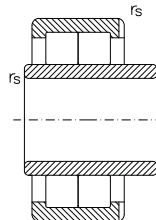


Fig. 11

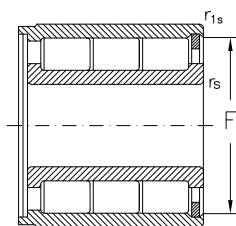


Fig. 12

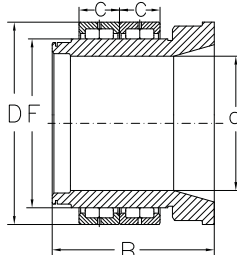


Fig. 13

Dimensions							Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	C	r _s	r _{1s} min	E,F	dyn. C _r	stat. C _{0r}	Grease	Oil			
mm							kN						
65,019	110	140		1,5	1	86,9	13	208	474	5700	7200	4,121	CR0113.13V
105	190	80	75	1,5	1,5	124	9	367	1020	850	1200	10,9	3NNUPB5121VC4
120	215	130	98	2,1	2,1	143,5	10	584	905	1000	2600	16,6	2NUB5224MAP54S1
130	182	81,5		2	2	170,4	12	495	1083	1200	1500	6,020	3NN5226VP5
205	310	110	66	2,1	2,1	240	11	500	1610	560	800	26,2	NNUB5141VC3
260	400	247	145	5	5	296	11	1675	3300	950	1300	83,5	NNUB5252MC3W8

Cylindrical roller bearings, double row

Non-standardized

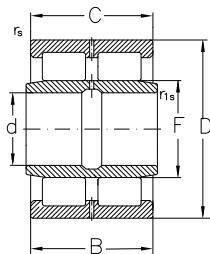


Fig. 1

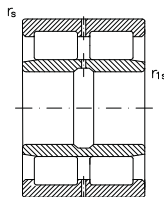


Fig. 2

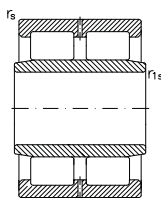


Fig. 3

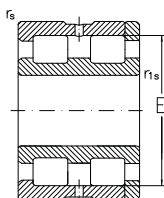
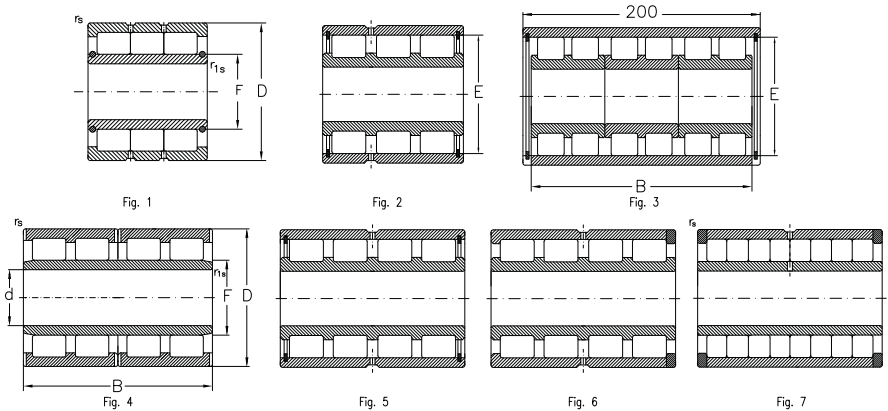


Fig. 4

Dimensions							Fig. Basic radial load		Weight Designation		
d	D	B	C	r _s	r _{is} min	E,F	C _r	stat. C _{0r}			
mm							kN				
114,3	177,8	152,4	153,16	1,5	1,5	139,7	1	712	1793	15,2	480523MPAW26
139,7	203,2	146,05		1,5	1,5	156,97	2	634	1462	16,5	TNU7MR101-152
146,05	209,55	161,93		2	2	165,35	1	672	1880	20,392	493629M
158,75	231,78	161,93	162,24	2	2	184,15	1	884	2246	24,540	493732M
177,8	244,475	161,92		2	2	196,748	2	845	2335	24	TNU-F800MR152-203
177,8	257,175	196,85	162,31	2,1	2,1	203,2	2	1027	3015	36,561	TNUF1000MR127-178
187,325	266,70	217,5	217,88	2,1	2,1	211	3	1258	3743	41,448	TNU-1000HDL
206,38	285,75	222,25		2,1	2,1	230,149	2	1344	4115	46	TNU10/11MR178-228

Cylindrical roller bearings, three row and four row

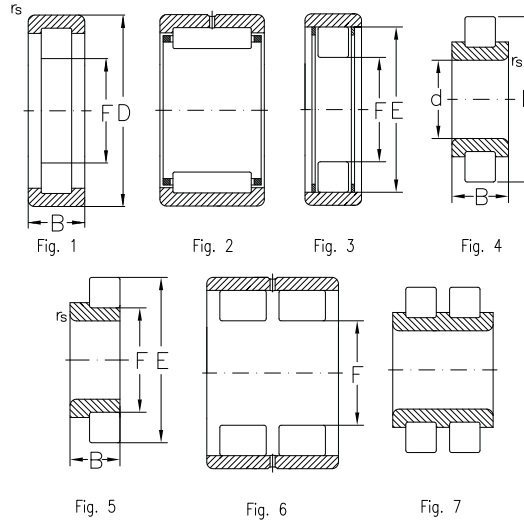
Non-standardized



Dimensions						Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	r _s	r _{1s}	E, F	dyn. C _r	stat. C _{0r}	Grease	Oil			
mm				min		kN						
80	125	80	1,1		94,5	7	353	833	1700	2100	4,094	NNU6016VC3
90	125	68	1,5	1,5	115	5	856	596	1500	1900	2,66	4NN5118VW33
140	215	100	3	3	160,1	1	751	1576	2200	2600	13,7	3NNU5128V
160	230	168	1,5	1,5	179	4	300	539	2400	3000	23,570	4NNU5232PMC3
	230	168	1,5	1,5	179	4	300	539	2400	3000	23,6	4NNU5232PMW8
	240	130	2	2	180	4	739	1473	1900	2200	22,0	4NNU5132PFC3W8
170	230	180	2	2	215	3	995	2832	750	900	22	3NN5234VC3
180	260	168	2,1	2,1	202	4	1105	2563	1700	2000	29,5	4NNU5136PFC3W8
	260	168	2,1	2,1	202	4	1105	2563	1700	2000	29,75	4NNU5136PMC3W8
190	260	101	2	2	240,5	2	771	1924	750	900	16,2	3NN5138VW33C3
	270	200	2,1	2,1	212	4	1330	3296	1600	2000	36,3	4NNU5138PMW8
200	280	152	2,1	2,1	259,2	5	1190	3015	700	850	32,5	4NN5240VW33C3
	280	152	2,1	2,1	259,2	6	1190	3015	700	850	32,5	4NNP5240VW33C3
	290	192	2,1	2,1	226	4	1205	2761	1500	1800	44,0	4NNU5140PFC3W8
230	330	206	2,1	2,1	260	4	1625	4014	1300	1600	63,0	4NNU5146PFC3W8
	330	206	2,1	2,1	260	4	1625	4014	1300	1600	63,0	4NNU5146PMC4
260	370	220	3	3	292	4	2018	5241	300	500	77,8	4NNU5152M

Cylindrical roller bearings without inner ring

Non-standardized



Dimensions						Fig. Basic radial load		Speed limit		Weight		Designation
d	D	B	r _s	r _{is}	E, F min	dyn. C _r	stat. C _{0r}	Grease	Oil			
mm						kN						
19,05	31,75	25,4	0,3		2	28	34	11000	18000	0,079		RNA193225A
	52	15	0,7	25	3	28,6	23,9	7000	14000	0,212		RNU2R304F2
22		22,5	1	0,3	38,75	7	34	35	3000	6000	0,107	RNN5204V
25	37	30	0,3		2	36	51	9500	16000	0,098		RNA6904
	41,275	31,8	0,6	28	1	48	92	2300	5600	0,165		RNU5105V
28,58	41,28	31,75	0,3		2	44	67	8000	1300	0,134		RNA294132
30		26	0,6	60	4	77,4	84,1	5000	10000	0,361		RN5506M
	78	14	2,5	40,025	1	28,8	31,1	5000	10000	0,333		RNU5208
40		35,5	2,5	0,5	62	7	101	136	1700	3400	0,334	RNN5408V
50		40	2,5	1	75,25	7	134	204	2900	3600	0,620	RNN5110V
	100	21	1		66,92	1	70,4	82,6	3500	7000	0,554	RNU5311
	100	33,33	1,5		66,95	1	99,2	129	3500	7000	0,912	RNU5411M
	100	33,33	1		66,95	3	99,2	129	3500	7000	0,818	RNU2R5411
60		28,53	2	0,3	127	5	177	182	2400	4800	1,86	RNUPJ5112M
	102	61	1,5		60	1	234	356	2300	2900	2,189	RNU5212V
	120	38,1	1		80,48	3	140	187	2600	5300	1,32	RNU2R5513
	120	38,1	1		80,48	1	140	187	2600	5300	1,53	RNU5513MA
	140	44,45	2		95,36	1	136	259	2400	4500	2,25	RNU5116M
	170	55,56	2		113,6	1	327	453	1900	3800	4,51	RNU5119M
	215	76,2	2		145,23	1	569	878	1500	3000	9,66	RNU5124M
	317,55	220	1		228,6	6	1655	4043	1000	2000	56,0	R2NUN4246MW7



Support rollers

Depending on their design Support Rollers are radial needle roller or cylindrical roller bearings with an extra radially thick outer ring. Depending on their design, 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 rollers 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.

If support rollers outer ring is cylindrical. It's indicated by the suffix "X" (See table 1)

Design:

DAS LAGER Support rollers are available in several different design variants as standard.

Support Rollers without axial guidance

Support rollers without flange rings are designed for applications where associated components limit axial movement of the outer ring. Based on needle roller bearings, these support rollers are available with or without an inner ring. Support rollers with an inner ring have an inner ring that is slightly wider than the outer ring to avoid axial clamping of the outer ring. Support rollers without an inner ring are intended for arrangements where the pin or shaft is hardened and ground.

STO and RSTO Type Support Rollers: (See table 1)

STO design support rollers have an inner ring, while RSTO design support rollers do not have an inner ring. Both designs are only available as open support rollers (without seals). The components can be mounted separately, but the outer ring and the needle roller and cage assembly must always be kept together as supplied.

NA22..2RS and RNA22..2RS: (See table 1)

NA 22...2RS type support rollers have an inner ring, while RNA 22...2RS type support rollers don't have an inner ring.

The inner ring of NA 22...2RS type support rollers can be mounted separately from the outer ring, roller and cage assembly.

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.



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.

STO...ZZ Type: (See Table 2)

STO...ZZ - 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 clamping of loose side washers during mounting.

The side plates of STO...ZZ - type support rollers must not have any axial play when they are mounted.

NATR and NATR..PP Type: (See Table 2)

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).

NATV and NATV..PP Type: (See Table 2)

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 : (See Table 3)

The base internal design of NUTR - type support rollers is similar to that of double row full complement cylindrical roller bearings without an integral flange between the two roller sets.

The outer ring has two integral flanges to axially guide the roller sets. A loose flange ring on both sides of the inner ring provides axial guidance for the outer ring via the roller sets.

This enables NUTR .. A design support rollers to accommodate relatively heavy axial loads that are induced when operating in an inclined or tilted position.

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).

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.

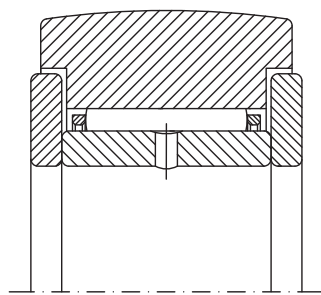
Both methods also act as a gap seal.

Due to their full complement design, NUTR -type support roller feature a maximum load rating but they must be more frequently re-lubrication.

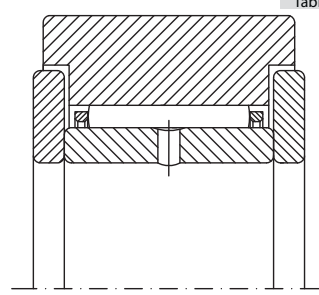
DAS LAGER's extra heavy duty NUTR -type support rollers with increased outer ring wall thickness are identified by the fact that their nominal diameters are included in their designation.

Examples:

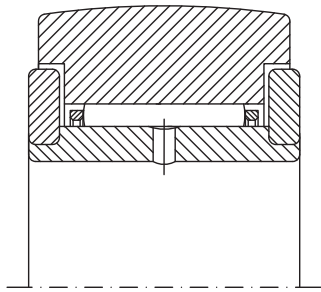
NUTR 2562 or NUTR 4090.



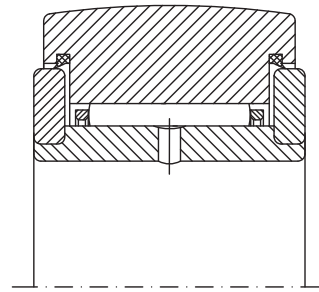
STO...2Z



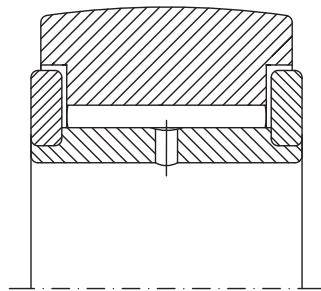
STO...2ZX



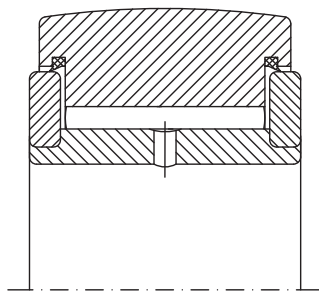
NATR



NATR...PP



NATV



NATV...PP

Table 2

Table 1

Nominal dimension		>	3	6	10	18	30	50
	[mm]	≤	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

Material of seals

Several types of DAS LAGER 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 **DAS LAGER 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 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.

DAS LAGER also produce roller with alternative grease fill according to customer's specification upon order request.

Cages

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

DAS LAGER support rollers are produced to normal tolerance class (**PN**) as standard, according to DIN 620 - standard.

The exceptions being the outer ring outer diameter tolerance of crowned outer rings and the width tolerance of supporting roller of series **STO ...2Z**, **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 ...2Z**, **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**.

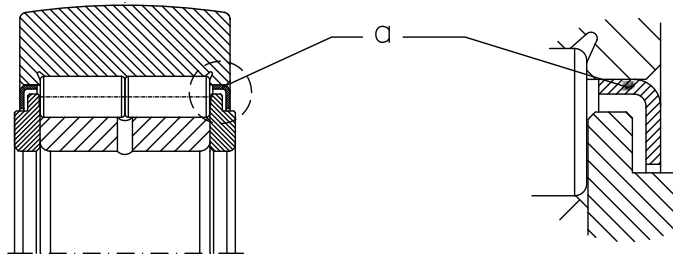
Values of ISO - tolerance field F6 and h12 are listed in the table 1. For detailed values of tolerances to DIN 620 see chapter "**Bearing tolerances**" page 27.

Internal Clearance

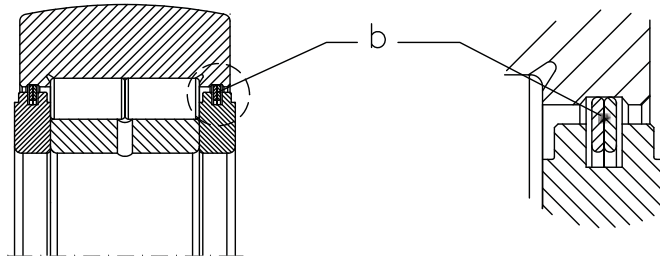
Support rollers are produced to normal internal clearance group (**CN**) as standard according to DIN 620.

Load carrying capability

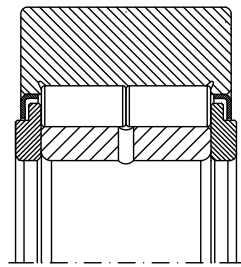
Unlike "normal" rolling element bearings, the outer ring of support rollers contact the adjacent parts with a very small contacting surface only.



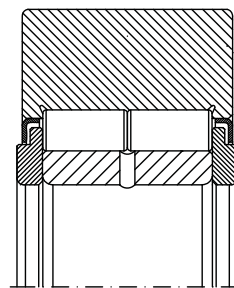
NUTR (a)



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.

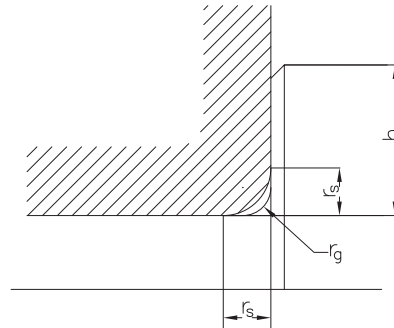
For support roller which are exposed to high axial loads, effective lateral support of their side washers is necessary.

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

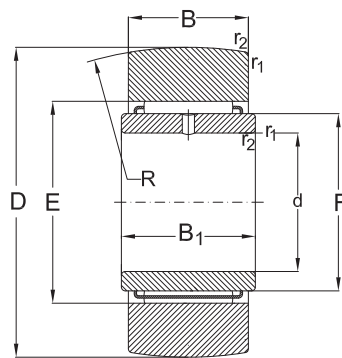
The bearing inner ring must contact adjacent surfaces with their side faces only. The fillet radius of inner ring corners must not touch the fillet radius of shaft shoulder.

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.

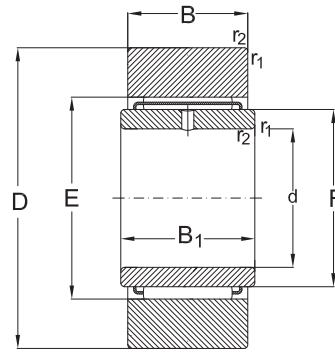


r_{smin}	r_{gmax}	h_{min}
0.6	0.6	2.1
1	1	2.8
1.1	1	3.5
1.5	1.5	4.5
2	2	5.5

Support Rollers without axial guidance



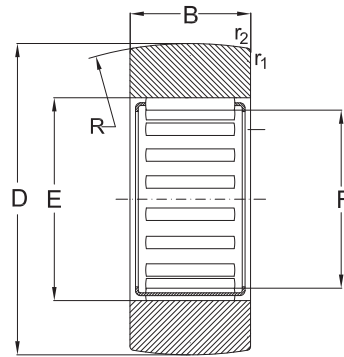
STO...



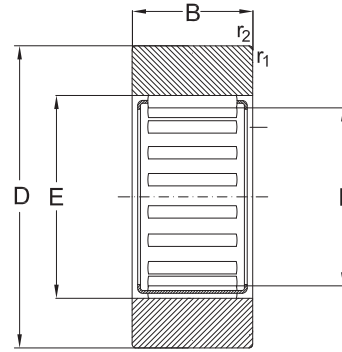
STO...X

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	RSTO 5 TN	RSTO 5 X.TN
19	-	9,8	-	0,3	500	RSTO 6	RSTO 6 X
	6	9,8	10	0,3	500	STO 6	STO 6 X
24	-	9,8	-	0,3	500	RSTO 8	RSTO 8 X
	8	9,8	10	0,3	500	STO 8	STO 8 X
30	-	11,8	-	0,3	500	RSTO 10	RSTO 10 X
	10	11,8	12	0,3	500	STO 10	STO 10 X
32	-	11,8	-	0,3	500	RSTO 12	RSTO 12 X
	12	11,8	12	0,3	500	STO 12	STO 12 X
35	-	11,8	-	0,3	500	RSTO 15	RSTO 15 X
	15	11,8	12	0,3	500	STO 15	STO 15 X
40	-	15,8	-	0,3	500	RSTO 17	RSTO 17 X
	17	15,8	16	0,3	500	STO 17	STO 17
47	-	15,8	-	0,3	500	RSTO 20	RSTO 20 X
	20	15,8	16	0,3	500	STO 20	STO 20 X

Support Rollers without axial guidance



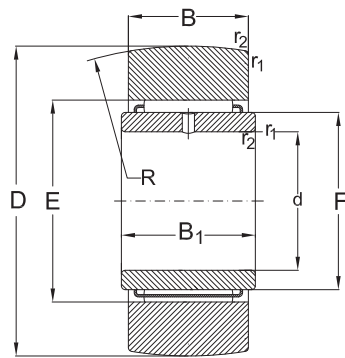
RSTO...



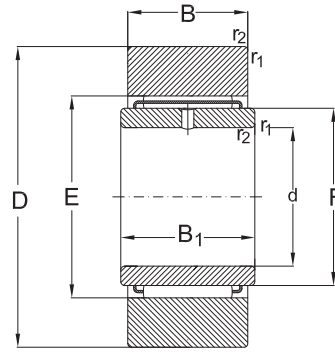
RSTO...X

Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
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		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

Support Rollers without axial guidance



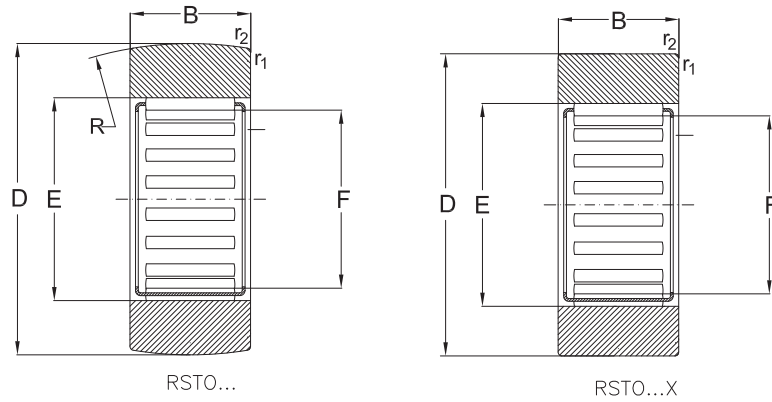
STO...



STO...X

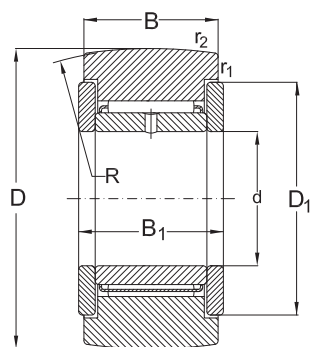
Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindrical outer ring
mm							
52	-	15,8	-	0,3	500	RSTO 25	RSTO 25 X
	25	15,8	16	0,3	500	STO 25	STO 25 X
62	-	19,8	-	0,6	500	RSTO 30	RSTO 30 X
	30	19,8	20	0,6	500	STO 30	STO 30 X
72	-	19,8	-	0,6	500	RSTO 35	RSTO 35 X
	35	19,8	20	0,6	500	STO 35	STO 35 X
80	-	19,8	-	1	500	RSTO 40	RSTO 40 X
	40	19,8	20	1	500	STO 40	STO 40 X
85	-	19,8	-	1	500	RSTO 45	RSTO 45 X
	45	19,8	20	1	500	STO 45	STO 45 X
90	-	19,8	-	1	500	RSTO 50	RSTO 50 X
	50	19,8	20	1	500	STO 50	STO 50 X

Support Rollers without axial guidance

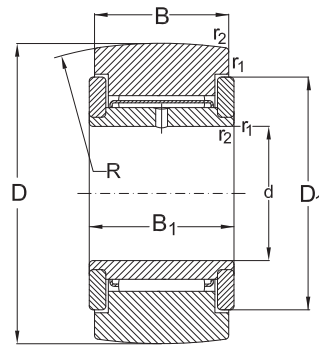


Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
F	E	B	dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min ⁻¹			kN		kN		kg
25	32	5300	19	26	14,3	15,6	15,6	22,4	0,15
30	37	4300	21,2	31,5	15	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



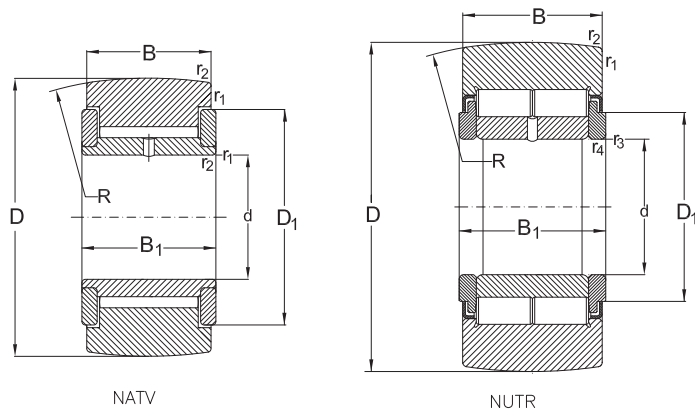
STO...2Z



NATR

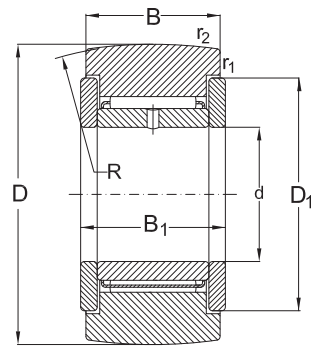
Dimensions						Designation		
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
16	5	11	12	0,1	-	500	NATR 5	NATR 5X
	5	11	12	0,1	-	500	NATV 5	NATV 5X
19	6	11	12	0,1	-	500	NATR 6	NATR 6X
	6	11	12	0,1	-	500	NATV 6	NATV 6X
	6	13,8	14	0,3	-	500	STO6.2Z	STO6.2ZX
24	8	14	15	0,3	-	500	NATR 8	NATR 8X
	8	14	15	0,3	-	500	NATV 8	NATV 8X
	8	13,8	14	0,3	-	500	STO8.2Z	STO8.2ZX
30	10	14	15	0,6	-	500	NATR 10	NATR 10X
	10	14	15	0,6	-	500	NATV 10	NATV 10X
	10	15,8	16	0,3	-	500	STO10.2Z	STO10.2ZX
32	12	14	15	0,6	-	500	NATR 12	NATR 12X
	12	14	15	0,6	-	500	NATV 12	NATV 12X
	12	15,8	16	0,3	-	500	STO12.2Z	STO12.2ZX
35	15	18	19	0,6	-	500	NATR 15	NATR 15X
	15	18	19	0,6	-	500	NATV 15	NATV 15X

Support Rollers with axial guidance

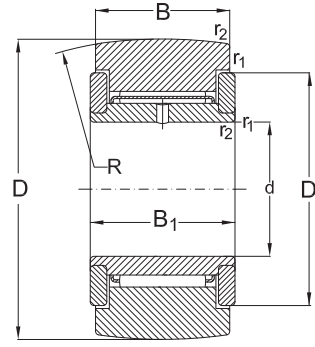


Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
D	D ₁		dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹	kN				kN		kg
16	12	22000	3,7	3,9	3,1	3,2	2,9	4,1	0,02
	12	11000	6	8,8	4,7	6,5	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

Support Rollers with axial guidance



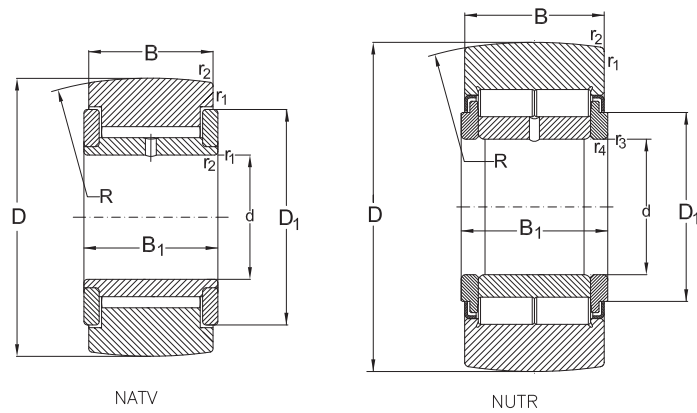
STO...2Z



NATR

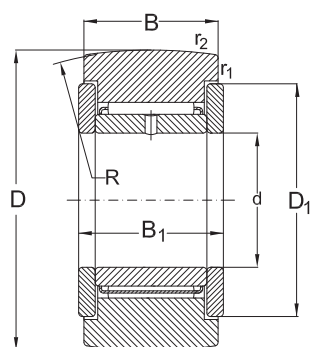
Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
35	15	18	19	0,6	0,3	500	NUTR 15	NUTR 15 X
	15	15,8	16	0,3	-	500	STO15.2Z	STO15.2Z X
40	17	20	21	1	-	500	NATR 17	NATR 17 X
	17	20	21	1	-	500	NATV 17	NATV 17 X
	17	20	21	1	0,3	500	NUTR 17	NUTR 17 X
	17	19,8	20	0,3	-	500	STO17.2Z	STO17.2Z X
42	15	18	19	0,6	0,3	500	NUTR 1542	NUTR 1542 X
47	20	24	25	1	-	500	NATR 20	NATR 20 X
	20	24	25	1	-	500	NATV 20	NATV 20 X
	17	20	21	1	0,3	500	NUTR 1747	NUTR 1747 X
	20	24	25	1	0,3	500	NUTR 20	NUTR 20 X
	20	19,8	20	0,3	-	500	STO20.2Z	STO20.2Z X
52	25	24	25	1	-	500	NATR 25	NATR 25 X
	25	24	25	1	-	500	NATV 25	NATV 25 X
	20	24	25	1	0,3	500	NUTR 2052	NUTR 2052 X
	25	24	25	1	0,3	500	NUTR 25	NUTR 25 X

Support Rollers with axial guidance

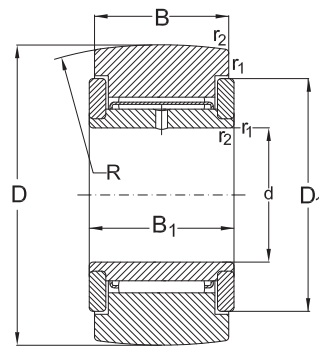


Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
D	D ₁		dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹			kN		kN		kg
	27	6700	17,2	35,5	12,3	23,2	14,6	20,8	0,11

Support Rollers with axial guidance



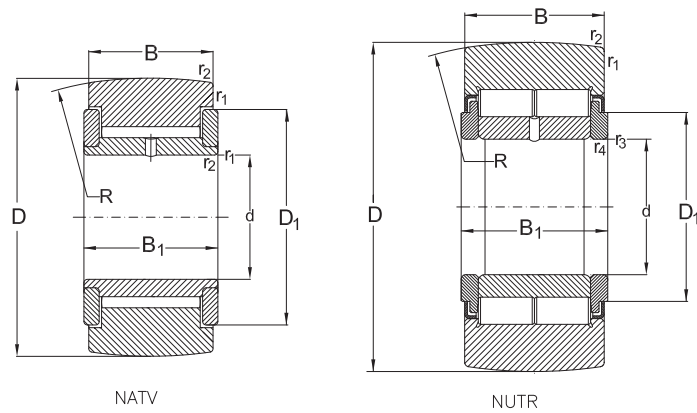
STO...2Z



NATR

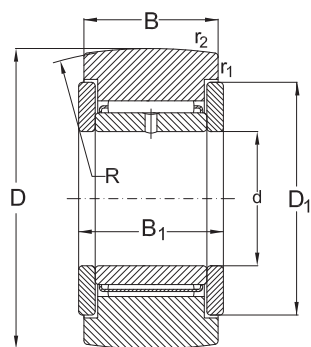
Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
52	25	19,8	20	0,3	-	500	STO25.2Z	STO25.2Z X
62	30	28	29	1	-	500	NATR 30	NATR 30 X
	30	28	29	1	-	500	NATV 30	NATV 30 X
	25	24	25	1	0,3	500	NUTR 2562	NUTR 2562 X
	30	28	29	1	0,3	500	NUTR 30	NUTR 30 X
	30	24,8	25	0,6	-	500	STO30.2Z	STO30.2Z X
72	35	28	29	1,1	-	500	NATR 35	NATR 35 X
	35	28	29	1,1	-	500	NATV 35	NATV 35 X
	30	28	29	1	0,3	500	NUTR 3072	NUTR 3072 X
	35	28	29	1,1	0,3	500	NUTR 35	NUTR 35 X
	35	24,8	25	0,6	-	500	STO35.2Z	STO35.2Z X
80	40	30	32	1,1	-	500	NATR 40	NATR 40 X
	40	30	32	1,1	-	500	NATV 40	NATV 40 X
	35	28	29	1,1	0,6	500	NUTR 3580	NUTR 3580 X
	40	30	32	1,1	0,6	500	NUTR 40	NUTR 40 X
	40	25,8	26	0,6	-	500	STO40.2Z	STO40.2Z X

Support Rollers with axial guidance

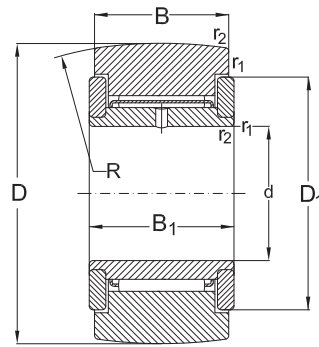


Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
D	D ₁		dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹	kN				kN		kg
35	20	5600	24,2	28,5	16,8	17,6	8,7	12,2	0,10
	30	7000	12,3	15,6	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

Support Rollers with axial guidance



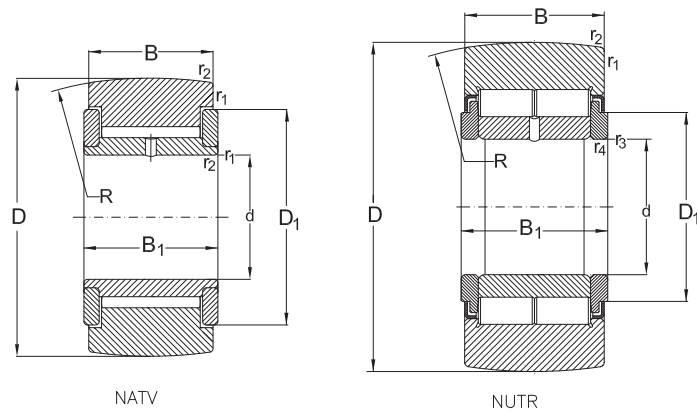
STO...2Z



NATR

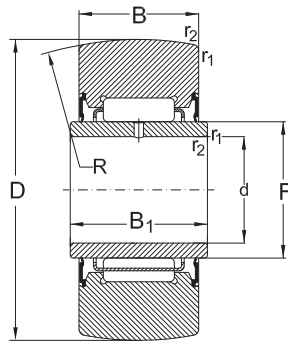
Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
85	45	30	32	1,1	-	500	NATR 45	NATR 45 X
	45	30	32	1,1	0,6	500	NUTR 45	NUTR 45 X
	45	25.8	26	0,6	-	500	STO45.2Z	STO45.2Z X
90	50	30	32	1,1	-	500	NATR 50	NATR 50 X
	50	30	32	1,1	-	500	NATV 50	NATV 50 X
	40	30	32	1,1	0,6	500	NUTR 4090	NUTR 4090 X
	50	30	32	1,1	0,6	500	NUTR 50	NUTR 50 X
100	45	30	32	1,1	0,6	500	NUTR 45100	NUTR 45100 X
110	50	30	32	1,1	0,6	500	NUTR 50110	NUTR 50110 X

Support Rollers with axial guidance

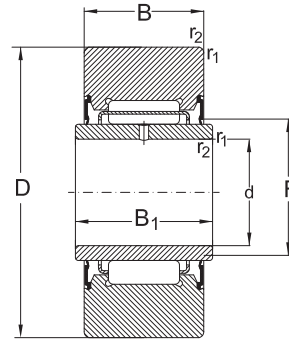


Dimensions		Speed rating	Load ratings				max. permissible radial load		Weight
D	D ₁		as bearing	as support roller			dyn.	stat.	
			dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{0LR}	F _{r max}	F _{0r max}	
mm		min ⁻¹	kN				kN		kg
52	31	3800	44,6	61	29,7	36	18	25,5	0,28
	42	4300	21,2	31,5	15,3	21,6	17	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

Sealed Support Rollers without axial guidance



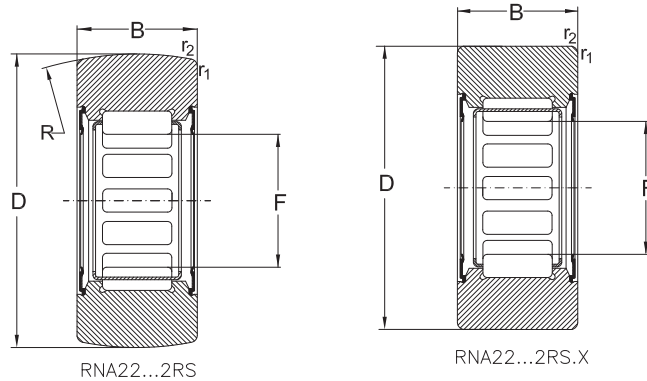
NA22...2RS



NA22...2RS.X

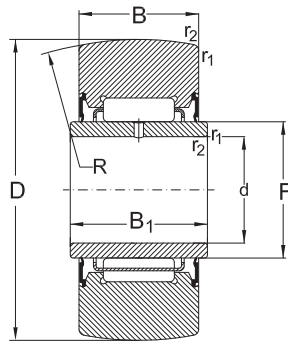
Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
19	-	-	11,8	0,3	-	500	R N A 22/6.2RS	RNA 22/6.2RS.X
	6	12	11,8	0,3	0,3	500	NA 22/6.2RS	NA 22/6.2RS.X
24	-	-	11,8	0,3	-	500	R N A 22/8.2RS	RNA 22/8.2RS.X
	8	12	11,8	0,3	0,3	500	NA 22/8.2RS	NA 22/8.2RS.X
30	-	-	13,8	0,6	-	500	R N A 2200.2RS	RNA 2200.2RS.X
	10	14	13,8	0,6	0,3	500	NA 2200.2RS	NA 2200.2RS.X
32	-	-	13,8	0,6	-	500	R N A 2201.2RS	RNA 2201.2RS.X
	12	14	13,8	0,6	0,3	500	NA 2201.2RS	NA 2201.2RS.X
35	-	-	13,8	0,6	-	500	R N A 2202.2RS	RNA 2202.2RS.X
	15	14	13,8	0,6	0,3	500	NA 2202.2RS	NA 2202.2RS.X
40	-	-	15,8	1	-	500	R N A 2203.2RS	RNA 2203.2RS.X
	17	16	15,8	1	0,3	500	NA 2203.2RS	NA 2203.2RS.X
47	-	-	17,8	1	-	500	R N A 2204.2RS	RNA 2204.2RS.X

Sealed Support Rollers without axial guidance

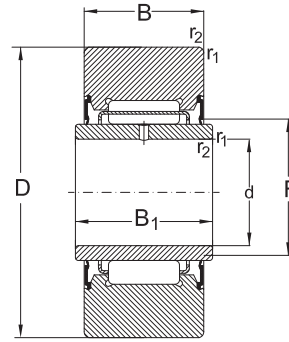


Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
D	F		dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{0LR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min^{-1}			kN		kN		kg
19	10	16000	4,5	4,1	3,5	3	1,9	2,8	0,01
	10	16000	4,5	4,1	3,5	3	1,9	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

Sealed Support Rollers without axial guidance



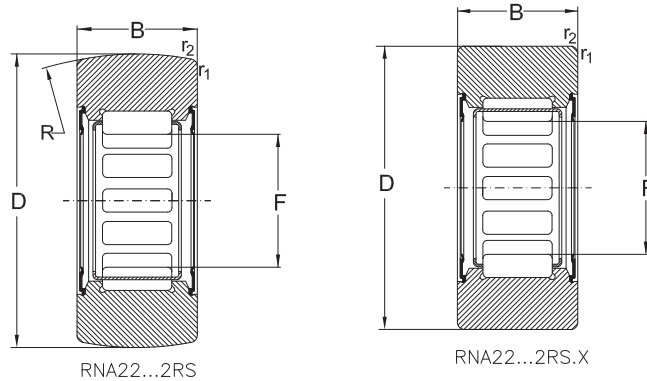
NA22...2RS



NA22...2RS.X

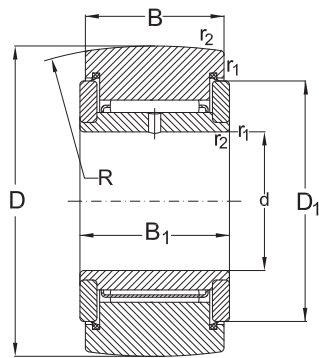
Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
52	20	18	17,8	1	0,3	500	NA 2204.2RS	NA 2204.2RS.X
	-	-	17,8	1	-	500	R N A 2205.2RS	RNA 2205.2RS.X
	25	18	17,8	1	0,3	500	NA 2205.2RS	NA 2205.2RS.X
62	-	-	19,8	1	-	500	R N A 2206.2RS	RNA 2206.2RS.X
	30	20	19,8	1	0,3	500	NA 2206.2RS	NA 2206.2RS.X
72	-	-	22,7	1,1	-	500	R N A 2207.2RS	RNA 2207.2RS.X
	35	23	22,7	1,1	0,6	500	NA 2207.2RS	NA 2207.2RS.X
80	-	-	22,7	1,1	-	500	R N A 2208.2RS	RNA 2208.2RS.X
	40	23	22,7	1,1	0,6	500	NA 2208.2RS	NA 2208.2RS.X
85	-	-	22,7	1,1	-	500	R N A 2209.2RS	RNA 2209.2RS.X
	45	23	22,7	1,1	0,6	500	NA 2209.2RS	NA 2209.2RS.X
90	-	-	22,7	1,1	-	500	R N A 2210.2RS	RNA 2210.2RS.X
	50	23	22,7	1,1	0,6	500	NA 2210.2RS	NA 2210.2RS.X

Sealed Support Rollers without axial guidance

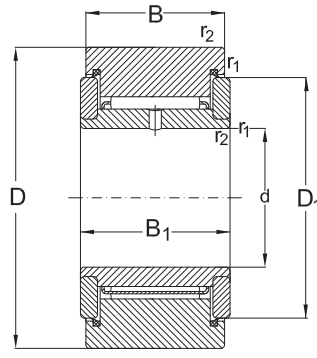


Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
D	F		dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{0LR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min ⁻¹			kN		kN		kg
52	25	7500	19,4	22,4	15,4	17,3	17,6	25,5	0,18
	30	6300	21,6	27,5	16,1	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



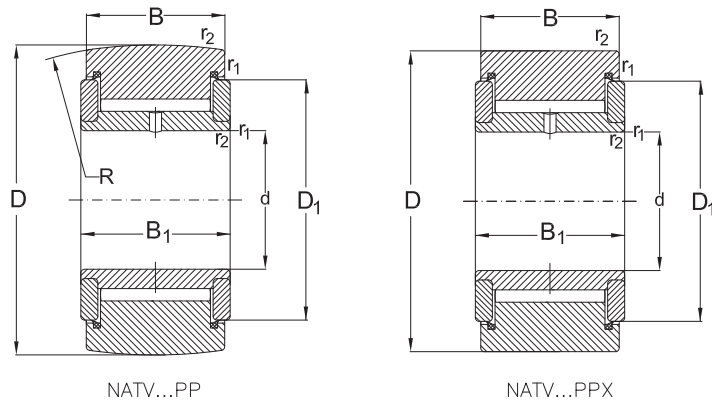
NATR...PP



NATR...PPX

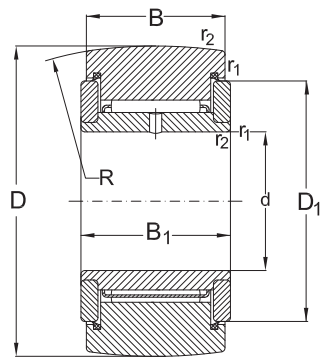
Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindrical outer ring
mm							
16	5	11	12	0,1	500	NATR 5 PP	NATR 5 PPX
	5	11	12	0,1	500	NATV 5 PP	NATV 5 PPX
19	6	11	12	0,1	500	NATR 6 PP	NATR 6 PPX
	6	11	12	0,1	500	NATV 6 PP	NATV 6 PPX
24	8	14	15	0,3	500	NATR 8 PP	NATR 8 PPX
	8	14	15	0,3	500	NATV 8 PP	NATV 8 PPX
30	10	14	15	0,6	500	NATR 10 PP	NATR 10 PPX
	10	14	15	0,6	500	NATV 10 PP	NATV 10 PPX
32	12	14	15	0,6	500	NATR 12 PP	NATR 12 PPX
	12	14	15	0,6	500	NATV 12 PP	NATV 12 PPX
35	15	18	19	0,6	500	NATR 15 PP	NATR 15 PPX
	15	18	19	0,6	500	NATV 15 PP	NATV 15 PPX
40	17	20	21	1	500	NATR 17 PP	NATR 17 PPX
	17	20	21	1	500	NATV 17 PP	NATV 17 PPX
47	20	24	25	1	500	NATR 20 PP	NATR 20 PPX
	20	24	25	1	500	NATV 20 PP	NATV 20 PPX

Sealed Support Rollers with axial guidance

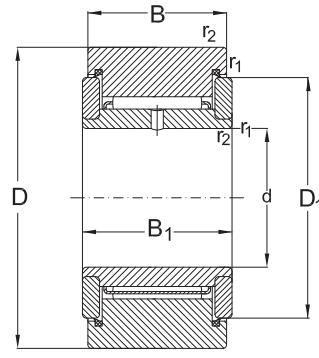


Dimensions		Speed rating	Load ratings				max. permissible radial load		Weight
D	F		as bearing		as support roller		dyn.	stat.	
			dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{OLR}	$F_{r \max}$	$F_{0r \max}$	
mm		min ⁻¹	kN				kN		kg
16	12	20000	3,7	3,9	3,1	3,2	2,9	4,2	0,01
	12	11000	6	8,8	4,7	6,5	4	5,7	0,02
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

Sealed Support Rollers with axial guidance



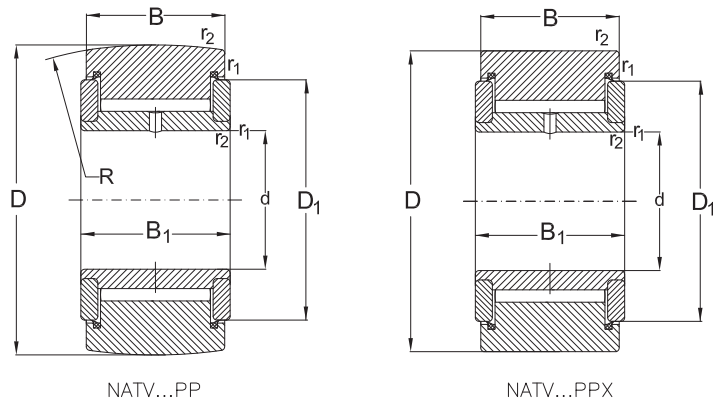
NATR...PP



NATR...PPX

Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindrical outer ring
mm							
52	25	24	25	1	500	NATR 25 PP	NATR 25 PPX
	25	24	25	1	500	NATV 25 PP	NATV 25 PPX
62	30	28	29	1	500	NATR 30 PP	NATR 30 PPX
	30	28	29	1	500	NATV 30 PP	NATV 30 PPX
72	35	28	29	1,1	500	NATR 35 PP	NATR 35 PPX
	35	28	29	1,1	500	NATV 35 PP	NATV 35 PPX
80	40	30	32	1,1	500	NATR 40 PP	NATR 40 PPX
	40	30	32	1,1	500	NATV 40 PP	NATV 40 PPX
85	45	30	32	1,1	500	NATR 45 PP	NATR 45 PPX
90	50	30	32	1,1	500	NATR 50 PP	NATR 50 PPX
	50	30	32	1,1	500	NATV 50 PP	NATV 50 PPX

Sealed Support Rollers with axial guidance



Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Weight
D	F		dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{0LR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min^{-1}			kN		kN		kg
52	37	5300	26	60	19,4	41,5	30,5	43	0,26
	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





Cam Rollers

Cam rollers are non-separable radial bearings. They are special variants of either radial deep groove ball bearings or double row angular contact ball bearings.

Cam rollers run either directly on a guide track or against a surface that has been machined for a guidance.

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.). Because of that cam rollers are produced and fitted with contacting seals.

Some types of the double row cam rollers are also available with shields.

Desing

Cam rollers are readily available in several design variants.

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 DAS LAGER 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 **DAS LAGER 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 **DAS LAGER double row cam rollers** (series **305** and **306**) is based on the double row angular contact ball bearings of the series **32..** (for series **305**) or **33..** (for series **306** cam rollers), respectively.

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, **DAS LAGER 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

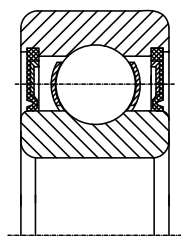
For the contacting seal of sealed **DAS LAGER - cam rollers** (suffix **.2RS**) a wear - resistant **synthetic rubber (NBR)** is used as standard material.

This seal material is suitable for operating temperatures of **-30°C** up to **+120°C**.

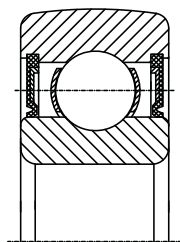
On request, the **DAS LAGER - cam rollers** are supplied with alternative seal materials, such as high - temperature **FPM** - contacting seals.

Grease filling

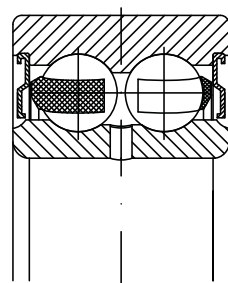
DAS LAGER cam rollers incorporating either seals or shields (suffixes) are supplied grease filled from the factory with a proven high quality, lithium soap based rolling bearing grease suitable for operating temperatures of **-30°C** up to **+110°C**.



3612...

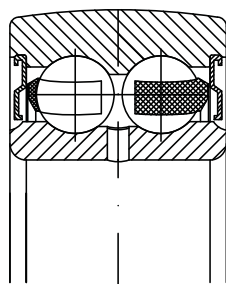


3612...R



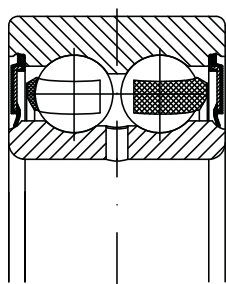
3057...2Z

3067...2Z



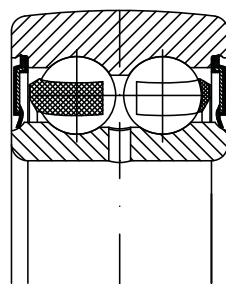
3058...2Z

3068...2Z



3057...2RS

3067...2RS



3058...2RS

3068...2RS

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.

Cam rollers are 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

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

DAS LAGER cam rollers are produced with **normal internal clearance** group (CN) as **standard** according to DIN 620.

DAS LAGER 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 $\leq F_{or, zul}$

(for **F_r**, zul see product tables)

Equivalent static bearing load

For Cam rollers:

$$P_0 = F_r$$

But, **P₀** must be $\leq F_{or, zul}$

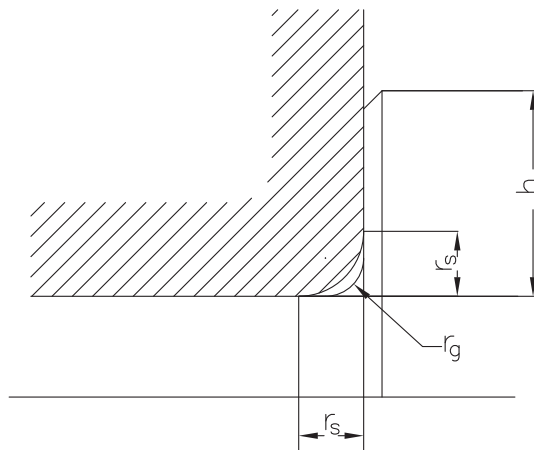
(for **F_{or}**, zul see product tables)

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.

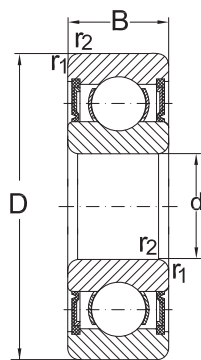
Therefore, the largest fillet radius (**r_f**) must be smaller than the minimum fillet dimension of the cam roller inner rings (**r_i**) as listed in the product tables.

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).

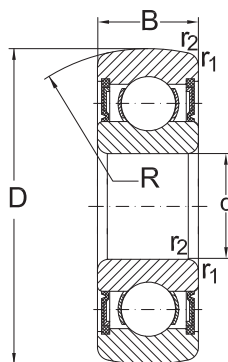


r _{smin}	r _{gmax}	h _{min}
0.6	0.6	2.1
1	1	2.8
1.1	1	3.5
1.5	1.5	4.5
2	2	5.5

Cam Rollers, Single Row



3612...



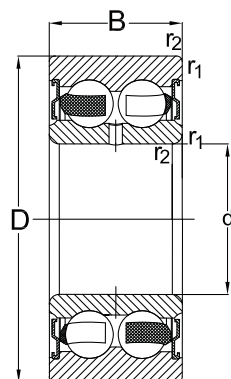
3612...R

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	361200R
35	12	10	400	0,6	361201	361201R
40	15	11	400	0,6	361202	361202R
47	17	12	400	0,6	361203	361203R
52	20	14	400	1	361204	361204R
62	25	15	400	1	361205	361205R
72	30	16	400	1	361206	361206R
80	35	17	400	1,1	361207	361207R
85	40	18	400	1,1	361208	361208R
90	45	19	400	1,1	361209	361209R

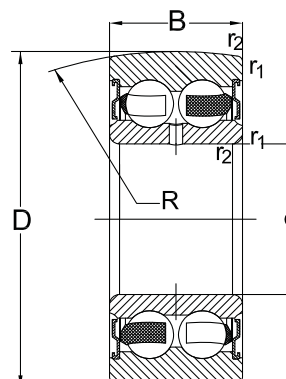
Cam Rollers, Single Row

Speed rating	Load ratings				Max. permissible radial load		Weight
	as bearing		as cam roller				
	dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
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



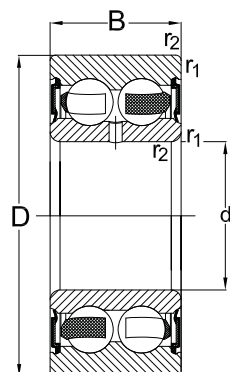
3057...2Z
3067...2Z



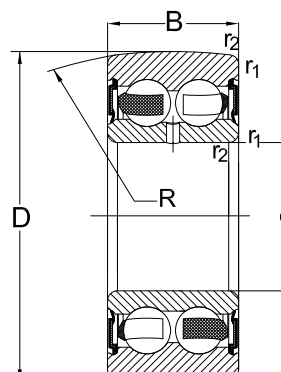
3058...2Z
3068...2Z

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	305702.2Z	305802.2Z
	15	19	400	1,0	306702.2RS	305802.2RS
52	20	20,6	400	1	306704.2Z	305804.2Z
	20	20,6	400	1	305704.2RS	305804.2RS
	17	22,2	400	1,0	306703.2Z	305803.2Z
	17	22,2	400	1,0	306703.2RS	305803.2RS
62	25	20,6	400	1	305705.2Z	305805.2Z
	25	20,6	400	1	305705.2RS	305805.2RS

Cam Rollers, Double Row



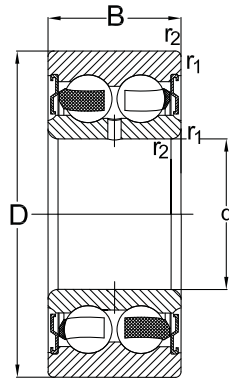
3057...2RS
3067...2RS



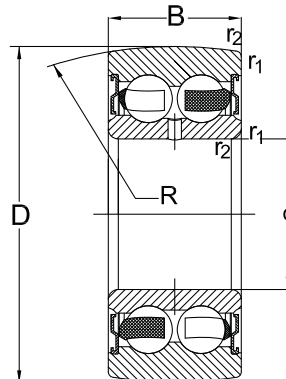
3058...2RS
3068...2RS

Speed rating	Load ratings				Max. permissible radial load		Weight
	dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
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



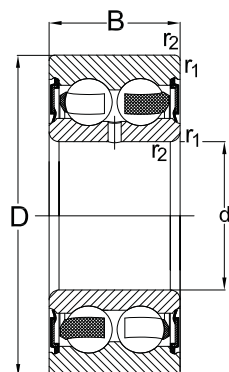
3057...2Z
3067...2Z



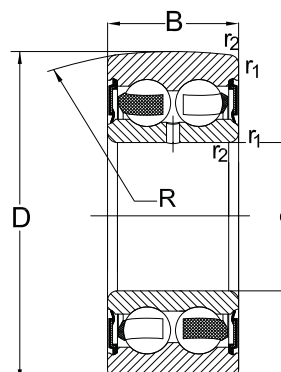
3058...2Z
3068...2Z

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

Speed rating	Load ratings				Max. permissible radial load		Weight
	dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
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



Needle Roller Bearings

Needle roller bearings are roller bearings with cylindrical rollers that are small in diameter. In spite of their low cross section, needle roller bearings have a high load carrying capacity and are therefore extremely suitable for bearing arrangements where radial space is limited.

Needle roller bearings are mostly used where minimal space to carry a given load at a desired speed.

They are widely used with high reliability in the fields of automobiles, industrial machinery, OA equipment, etc. as resource-saving type bearings that make the whole machine compact.

Radial Needle Roller and Cage Assemblies: (See Table 1)

Needle roller and cage assemblies are ready-to-mount, self-contained bearing components. They are an excellent choice for applications that require a very rigid bearing arrangement as well as a high load carrying capacity.

Radial needle roller and cage assemblies have a steel cage that provides both inward and outward retention for the needle rollers.

The design provides maximum cage strength consistent with inherently high load rating of needle roller bearings. Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Also available are needle roller and cage assemblies are manufactured with either one and two rows of needle rollers.

If the shaft and housing bore can serve as raceways, needle roller and cage assemblies require minimal radial space.

Drawn Cup Needle Roller Bearings With Open Ends: (See Table 1)

They are characterized by a very low sectional height and high load carrying capacity. Drawn cup needle roller bearings are typically used in applications where the housing bore cannot be used as a raceway for a needle roller and cage assembly, but where a very compact and economical bearing arrangement is required.

The drawn cup of hardened steel and the needle roller and cage assembly of these bearings form a non-separable unit. The space available for lubricant is large enough to enable long relubrication intervals.

Typically, drawn cup needle roller bearings have a single row of rollers. However, wide sizes incorporate two needle roller and cage assemblies immediately adjacent to each other with a lubrication hole in the outer ring.

Needle Roller Bearings With Rings: (See Table 1)

Needle roller bearings with rings have a low sectional height and a very high load carrying capacity for their size. They may be used with or without an inner ring, depending on the application.

Needle Roller Bearings with rings have an outer ring made by machining, heat treatment, and grinding. The outer ring has stable high rigidity and can be easily used even for light alloy housings.

These bearings are available in various types and optimally selectable for different conditions such as heavy loads, high-speed rotation and low-speed rotation. They are most suitable for general-purpose applications.

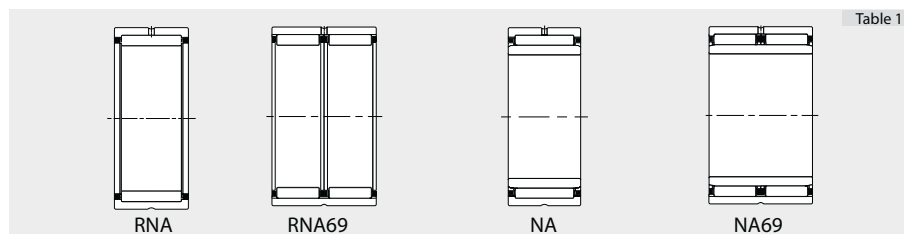


Table 1

Tolerans and Radial Clearance

DAS LAGER needle roller bearings bearings are usually manufactured to normal tolerance class with normal radial clearance(see Table 2).

They can also be manufactured to more accurate tolerance classes and with larger (C3NA and C4NA) or smaller (C1NA and C2NA) radial clearances.

Shaft tolerance classes for needle roller bearings without an inner ring

Nominal		Shaft tolerance		
inside diameter		operational clearance		
F _{sw}		lower	medium	higher
over	incl.			
-	65	k5	h5	g6
65	80	k5	h5	f6
80	160	k5	g5	f6
160	180	k5	g5	e6
180	200	j5	g5	e6
200	250	j5	f6	e6
250	315	h5	f6	e6
315	400	g5	f6	d6

Radial clearance for single and double row cylindrical needle roller bearings											
With interchangeable elements											
With cylindrical bore ¹⁾											
Table 2											
Bore diameter		Clearance group symbol									
d		C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm									
24	30	0	25	20	45	35	60	50	75	65	90
30	40	0	25	20	45	35	60	50	75	70	95
40	50	5	30	25	50	45	70	60	85	80	105
50	65	5	35	30	60	50	80	70	100	95	125
65	80	10	40	40	70	60	90	80	110	110	140
80	100	10	45	40	75	65	100	90	125	130	165
100	120	15	50	50	85	75	110	105	140	155	190
120	140	15	55	50	90	85	125	125	165	180	220
140	160	15	60	60	105	100	145	145	190	200	245
160	180	20	70	70	120	115	165	165	215	225	275
180	200	25	75	75	125	120	170	170	220	250	300
200	225	35	90	90	145	140	195	195	250	275	330
225	250	45	105	105	165	160	220	220	280	305	365
250	280	45	110	110	175	170	235	235	300	330	395
280	315	55	125	125	195	190	260	260	330	370	440
315	355	55	130	130	205	200	275	275	350	410	485
355	400	65	145	145	225	225	305	305	385	455	535
400	450	100	190	190	280	280	370	370	460	510	600
450	500	110	210	210	310	310	410	410	510	565	665
500	560	110	220	220	330	330	440	440	550	625	735
560	630	120	240	240	360	360	480	480	600	660	780
630	710	140	260	260	380	380	500	500	620	675	795
710	800	145	285	285	425	425	565	565	705	705	845
800	900	150	310	310	470	470	630	630	790	790	950
900	1000	180	350	350	520	520	690	690	860	860	1030
1000	1120	200	390	390	580	580	770	770	960	960	1150
1120	1250	220	430	430	640	640	850	850	1060	1060	1270
1250	1400	230	470	470	710	710	950	950	1190	1190	1430
1400	1600	270	530	530	790	790	1050	1050	1310	1310	1570
		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.

Minimum load

To achieve satisfactory operation, needle roller bearings must always be subjected to a requisite minimum load. Applying a requisite minimum load is especially important for bearings that operate at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under these conditions, not applying the correct minimum load can result in damaging sliding movement between the rollers and raceways caused by the inertial forces of the needle roller and friction in the lubricant.

The requisite minimum radial load to be applied to needle roller bearings can be estimated using

$$F_{rm} = 0,02 C_r$$

where

F_{rm} = minimum radial load [kN]

C_r = basic dynamic load rating [kN]

When starting up at low temperatures or when the lubricant is highly viscous, an even greater minimum load may be required. However, the weight of the components supported by the

Radial clearance for single and double row cylindrical needle roller bearings

With non-interchangeable elements
With cylindrical bore¹⁾

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.

bearing, together with the external forces, generally exceeds the requisite minimum load. If this is not the case, the needle roller bearing must be subjected to an additional radial load.

Equivalent dynamic bearing load

Needle roller and cage assemblies can only accommodate radial load. Therefore, the equivalent dynamic bearing load is equal to the calculated radial bearing load:

$$P_0 = F_r$$

where

P_0 = equivalent static bearing load [kN]

F_r = actual radial bearing load [kN]

Suffixes

TN Molded cage of reinforced engineered polymer

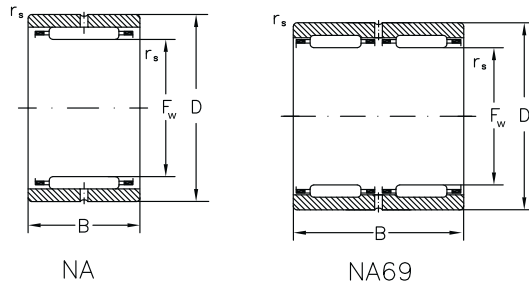
ZW Double Row

H Hardened steel cage

F Machined cage

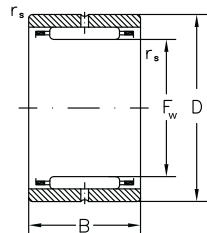
Needle roller bearings

Needle roller bearings without inner ring

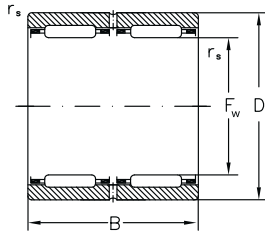


Dimensions				Basic radial load		Speed limit		Designation	Weight
F_w	D	C	r_s min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹		-	Kg
8	15	12	0,3	3,7	3,95	19000	32000	RNA081512	0,008
	15	16	0,3	4,95	5,65	19000	32000	RNA081516	0,012
9	16	12	0,3	4,3	4,8	18000	30000	RNA091612	0,010
	16	16	0,3	5,6	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	RNA121815TN	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



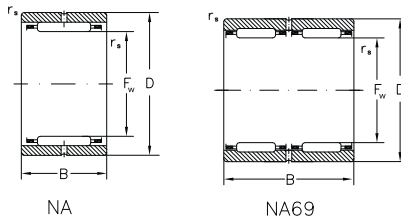
NA



NA69

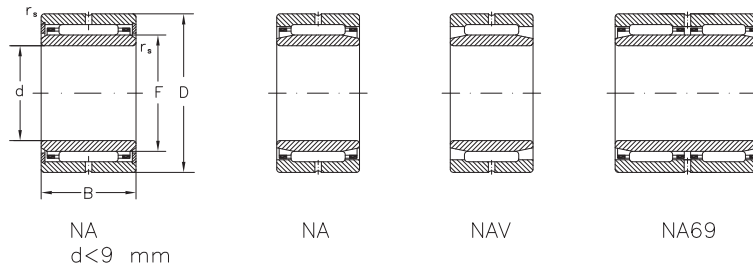
Dimensions				Basic radial load		Speed limit		Designation	Weight
F_w	D	C	r_s min.	dyn. C_r	stat. C_{or}	grease	oil		
mm				kN		min ⁻¹		-	Kg
14	22	13	0,3	8,25	9,1	15000	24000	RNA4900	0,017
	22	16	0,3	9,8	11,3	15000	24000	RNA142216	0,021
	22	20	0,3	11,8	15,4	15000	24000	RNA142220	0,028
16	24	13	0,3	9,1	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	RNA556825TN	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	RNA607225TN	0,160
	72	35	0,6	55,7	130	4500	6700	RNA607235	0,224

Needle roller bearings without inner ring



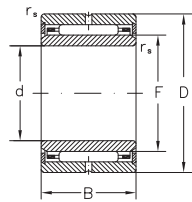
Dimensions				Basic radial load		Speed limit		Designation	Weight
F_w	D	C	r_s min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min^{-1}		-	Kg
63	80	25	0,6	59,3	101	4500	6700	RNA4911	0,278
	80	45	0,6	83,8	173	4500	6700	RNA6911	0,477
68	85	25	1	62	109	4000	6000	RNA4912	0,296
	85	45	1	89,1	175	4000	6000	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	RNA4914TN	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	1,1	150	386	1500	2400	RNA4830	1,68

Needle roller bearings

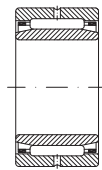


Dimensions					Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	F _w	dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		-	Kg
5	15	12	0,3	8	3,7	3,95	19000	32000	NA051512	0,013
	15	16	0,3	8	4,95	5,65	19000	32000	NA051516	0,016
6	16	12	0,3	9	4,3	4,8	18000	30000	NA061612	0,014
	16	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	NA4905V	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	NA4908V	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	NA506825TN	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

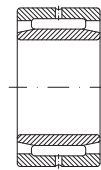
Needle roller bearings



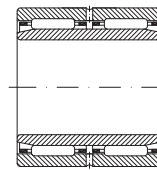
NA
d < 9 mm



NA



NAV



NA69

Dimensions					Basic radial load		Speed limit		Designation	Weight
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	NA557225TN	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	NA4911V	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	NA4912V	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	NA4914TN	0,725
	100	30	1	80	103	231	1200	2700	NA4914V	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	NA4617V	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 are separable radial bearings. They consist of the inner ring with roller set and cage assembly, (cone) and a loose outer ring (cup). This bearing contains tapered rollers for its rolling element which are guided by the inner ring backface rib on the roller large end face.

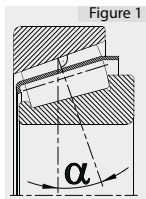
Since outer ring is separable from the inner ring assembly, the inner ring assembly can be installed on the shaft and the outer ring in the housing, individually.

This feature facilitates mounting of the bearing while making the design of the shaft and housing simpler. In addition, more options regarding the fitting practice employed are available than with any other type of bearing.

Generally the bearings of unitized design are supplied with a predetermined radial clearance which will vary according to fitting practice and application. Tapered roller bearings on the other hand can be adjusted at the time of installation by varying the axial location of either the inner ring assembly or outer ring.

Tapered roller bearings are suitable for both radial and thrust load but also accept combined loads and tilting moments. This type bearing is suitable for use under heavy load or impact load.

Tapered roller bearings transfer the loads acting on the bearing at a certain angle, the so called "contact angle α " towards the shafts centre line (see fig. 1).



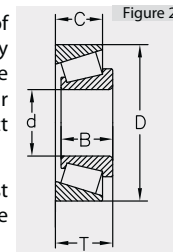
Mounted clearance is adjustable

In general, bearings of unitized design are supplied with a predetermined radial clearance which will vary according to fitting practice and application. Tapered roller bearings on the other hand can be adjusted at the time of installation by varying the axial location of either the inner ring assembly or outer ring.

The ability of tapered roller bearings to accommodate axial loads depends on their contact angle α . The larger angle is better thrust load capability. Most contact angle of tapered roller bearings are between 10° and 16° .

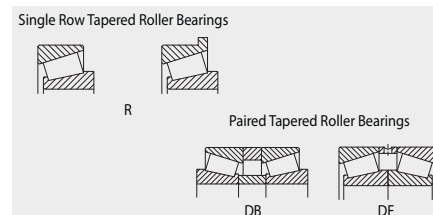
Tapered roller bearings of the series 313 are particularly suitable to accommodate axial loads due to their comparatively large contact angle (approximately 30°).

Taper roller bearing's most important dimensions are following: (see figure 2)

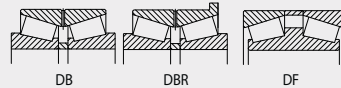


- D** The outside diameter of the outer ring, or cup, is known as the O.D. (D)
- C** The outer ring width (cup width) is C
- d** The inside diameter of the inner ring, or cone is called the bore (d)
- B** The cone width is B
- T** When cup and cone are mated (including rollers and cage), the overall dimension is called the overall bearing width (T).
- R** The maximum shaft radius (R). Cone radius
- r** The maximum housing radius (r). Cup radius

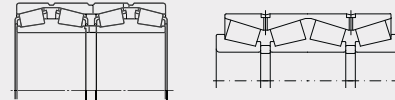
DAS LAGER can produce many different types of tapered roller bearings. Mainly they can group as follows.



Double Row Taper Roller Bearings



Four Row Taper Roller Bearings (See chapter four row taper roller bearings.)



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, double inner ring and two outer rings respectively or the rollers in back to back arrangement i.e. double outer ring and two inner rings.

The first design provides greater stiffness, can take tilting moments and shaft expansions can be compensated.

The bearings of the second design can be manufactured with tapered bore so that they can be frequently mounted / dismounted.

Double row tapered roller bearings can have or not distance rings with lubrication holes, mounted between the simple rings.

In case of bearings with distance rings, the bearing clearance or preload are pre-adjusted; in case of those without distance rings, bearing clearance and preload can and should be adjusted while mounting.

Double row tapered roller bearings with rollers in back-to-back arrangement can also be manufactured in the following two versions:

- with rib on the outer ring; the housing has no shoulder and the bearing is axially located by the rib;
- with two seals; this design is used in motor vehicles construction. The bearings are delivered filled with grease and relubrication is not needed.

Dimensions

Tapered roller bearings are manufactured with the following 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	$F_r/C_{Or} < 0,1$	2'
	$F_r/C_{Or} > 0,1$	4'
323, 34	$F_r/C_{Or} < 0,1$	1'30"
	$F_r/C_{Or} > 0,1$	3'
35, 36 seturi DB, DF	$F_r/C_{Or} < 0,1$	1'
	$F_r/C_{Or} > 0,1$	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.

On 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:

$$\text{axial clearance} = \frac{\text{radial clearance}}{2 \tan \alpha}$$

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

Bore diameter		Radial clearance symbol				Normal		C3		C4		C5	
d		C1	C2										
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm											
50	65	0	15	15	30	30	50	50	70	70	90	90	120
65	80	0	20	20	40	40	60	60	80	80	110	110	150
80	100	0	20	20	45	45	70	70	100	100	130	130	170
100	120	0	25	25	50	50	80	80	110	110	150	150	200
120	140	0	30	30	60	60	90	90	120	120	170	170	230
140	160	0	30	30	65	65	100	100	140	140	190	190	260
160	180	0	35	35	70	70	110	110	150	150	210	210	280
180	200	0	40	40	80	80	120	120	170	170	230	230	310
200	225	0	40	40	90	90	140	140	190	190	260	260	340
225	250	0	50	50	100	100	150	150	210	210	290	290	380
250	280	0	50	50	110	110	170	170	230	230	320	320	420
280	315	0	60	60	120	120	180	180	250	250	350	350	460
315	355	0	70	70	140	140	210	210	280	280	390	390	510
355	400	0	70	70	150	150	230	230	310	310	440	440	580
400	450	0	80	80	170	170	260	260	350	350	490	490	650
450	500	0	90	90	190	190	290	290	390	390	540	540	720
500	560	0	100	100	210	210	320	320	430	430	590	590	790
560	630	0	110	110	230	230	350	350	480	480	660	660	880
630	710	0	130	130	260	260	400	400	540	540	740	740	910
710	800	0	140	140	290	290	450	450	610	610	830	830	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 weight, 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:

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

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

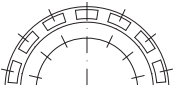
- for paired double or four row tapered roller bearings:

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

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

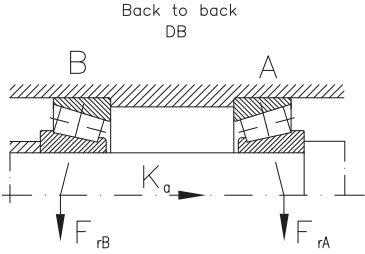
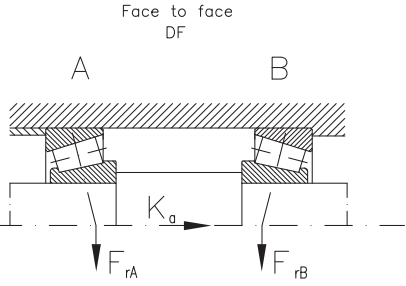
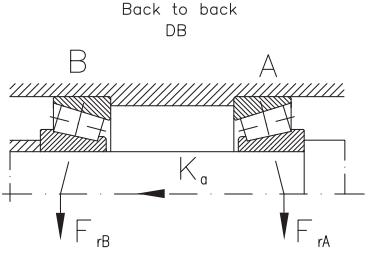
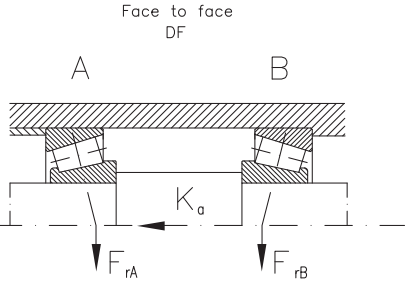
Abutment dimensions

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.

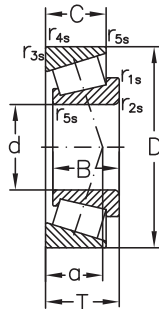
Cage design and some technical data					
Cage	Design bearing	Cage	Application	Max. value $D_m n$	
				oil	grease
Pressed sheet cage				- General application - Small and medium sized bearings $d \leq 250 \text{ mm}$	350x10 ³ 245x10 ³
Machined brass cage M				- General application - Median and large sized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

Calculating relations for axial loadings F_a

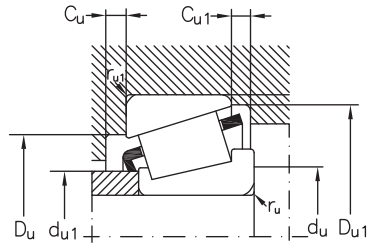
Table 4

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

Tapered roller bearings, single row

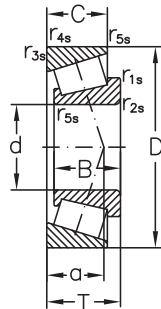


Dimensions					Designation					ISO series	Basic radial load. Factors				
d	D	B	C	T	r _{1s} min.	r _{2s} min.	r _{3s} min.	r _{4s} min.	r ₅	a	dyn. C _r	e	Y	stat C _{0r}	Y ₀
mm											kN	-		kN	-
15	42	13	11	14,25	1	1	0,3	9	30302A	2FB	21,3	0,28	2,1	19	1,1
17	40	12	11	13,25	1	1	0,3	10	30203A	2DB	18,1	0,35	1,7	17,7	
	47	14	12	15,25	1	1	0,3	10	30303A	2FB	26,7	0,28	2,1	23,8	1,1
	47	19	16	20,25	1	1	0,3	12	32303A	2FD	33	0,28	2,1	31,8	1,1
20	42	15	12	15	0,6	0,6	0,3	10	32004XA	3CC	26	0,37	1,6	28,5	0,9
	47	14	12	15,25	1	1	0,3	11	30204A	2DB	25,8	0,35	1,7	26,4	0,9
	52	15	13	16,25	1,5	1,5	0,6	11	30304A	2FB	32	0,3	2	321,1	
	52	21	18	22,25	1,5	1,5	0,6	14	32304A	2FD	42,5	0,3	2	471,1	
25	47	15	11,5	15	0,6	0,6	0,3	11	32005XA	4CC	25,7	0,43	1,4	30,9	0,8
	52	15	13	16,25	1	1	0,3	12	30205A	3CC	29,3	0,37	1,6	31,8	0,9
	52	18	15	19,25	1	1	0,3	16	32205A	2CD	34	0,33	1,8	41,8	
	62	17	15	18,25	1,5	1,5	0,6	13	30305A	2FB	42,4	0,3	2	40,9	
	62	17	13	18,25	1,5	1,5	0,6	20	31305A	7FB	36,1	0,83	0,7	38	
	62	24	20	25,25	1,5	1,5	0,6	15	32305A	2FD	57,5	0,3	2	59,9	1,1
30	55	17	13	17	1	1	0,3	13	32006XA	4CC	34	0,43	1,4	41,8	0,8
	62	16	14	17,25	1	1	0,3	14	30206A	3DB	38,2	0,37	1,6	41,8	0,9
	62	20	17	21,25	1	1	0,3	15	32206A	3DC	47,6	0,37	1,6	54,2	
	72	19	16	20,75	1,5	1,5	0,6	15	30306A	2FB	53,3	0,37	1,9	53,2	1,1
	72	19	14	20,75	1,5	1,5	0,6	22	31306A	7FB	44,9	0,31	0,7	47,5	0,4
	72	27	23	28,75	1,5	1,5	0,6	18	32306A	2FD	72,7	0,83	1,9	80,8	1,1
35	62	18	14	18	1	1	0,3	15	32007XA	4CC	40,8	0,31	1,3	51,3	0,7
	72	17	15	18,25	1,5	1,5	0,6	15	30207A	3DB	48,6	0,46	1,6	53,2	0,9
	72	23	19	24,25	1,5	1,5	0,6	17	32207A	3DC	62,7	0,37	1,6	74,1	0,9
	80	21	18	22,75	2	1,5	0,6	16	30307A	2FB	68,5	0,37	1,9	69,8	1,1
	80	21	15	22,75	2	1,5	0,6	25	31307A	7FB	58,5	0,31	0,7	63,7	
	80	31	25	32,75	2	1,5	0,6	20	32307A	2FE	90,4	0,83	1,9	101	1,1
40	68	19	14,5	19	1	1	0,3	15	32008XA	3CD	50,2	0,31	1,6	67,5	0,9
	80	18	16	19,75	1,5	1,5	0,6	16	30208A	3DB	58,5	0,37	1,6	64,6	0,9
	80	23	19	24,75	1,5	1,5	0,6	19	32208A	3DC	71,1	0,37	1,6	82,2	0,9
	90	23	20	25,25	2	1,5	0,6	19	30308A	2FB	81,5	0,37	1,7	90,3	0,9
	90	23	17	25,25	2	1,5	0,6	28	31308A	7FB	80,8	0,83	0,7	77,4	0,4
	90	33	27	35,25	2	1,5	0,6	23	32308A	2FD	111	0,35	1,7	133	0,9
45	75	20	15,5	20	1	1	0,3	16	32009XA	3CC	55,4	0,4	1,5	76	0,8
	85	19	16	20,75	1,5	1,5	0,6	18	30209A	3DB	62,7	0,4	1,5	72,7	0,8
	85	23	19	24,75	1,5	1,5	0,6	20	32209A	3DC	86,9	0,4	1,5	93,1	0,8
	100	25	22	27,25	2	1,5	0,6	21	30309A	2FB	103	0,35	1,7	114	0,9
	100	25	18	27,25	2	1,5	0,6	31	31309A	7FB	101	0,83	0,7	96,9	0,4
	100	36	30	38,25	2	1,5	0,6	25	32309A	2FD	127	0,35	1,7	167	0,9
50	80	20	15,5	20	1	1	0,3	18	32010XA	3CC	57,5	0,43	1,4	83,6	0,8

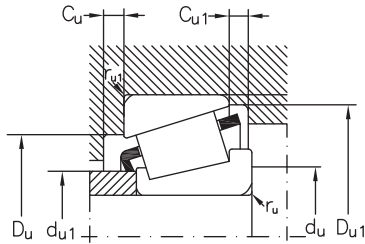


Speed limit		Weight	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
9000	13000	0,090	22	21	36	36	38	2	3	1	1
9000	13000	0,074	23	23	34	34	37	2	2	1	1
8500	12000	0,130	25	23	40	41	42	2	3	1	1
8000	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

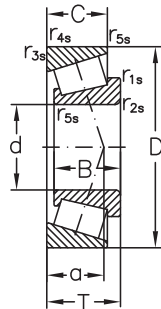


Dimensions					Designation					ISO series	Basic radial load. Factors				
d	D	B	C	T	r _{1s} min.	r _{2s} min.	r _{3s} min.	r _{4s} min.	r ₅	a	dyn. C _r	e	Y	stat C _{0r}	Y ₀
mm											kN	-		kN	-
50	90	20	17	21,75	1,5	1,5	0,6	19	30210A	3DB	72,7	0,43	1,4	86,9	0,8
	90	23	19	24,75	1,5	1,5	0,6	21	32210A	3DC	78,4	0,43	1,4	95	0,8
	110	27	23	29,25	2,5	2	0,6	23	30310A	2FB	136	0,35	1,7	133	0,9
	110	27	19	29,25	2,5	2	0,6	34	31310A	7FB	116	0,83	0,7	114	0,4
	110	40	33	42,25	2,5	2	0,6	27	32310A	2FD	174	0,35	1,7	205	0,9
55	90	23	17,5	23	1,5	1,5	0,6	20	32011XA	3CC	76,9	0,4	1,5	110	0,8
	100	21	18	22,75	2	1,5	0,6	20	30211A	3DB	98,8	0,4	1,5	101	0,8
	100	25	21	26,75	2	1,5	0,6	22	32211A	3DC	131	0,4	1,5	181	0,8
	120	29	25	31,5	2,5	2	0,6	24	30311A	2FB	158	0,35	1,7	155	0,9
	120	29	21	31,5	2,5	2	0,6	37	31311A	7FB	115	0,83	0,7	130	0,4
	120	43	35	45,5	2,5	2	0,6	29	32311A	2FD	188	0,35	1,7	238	0,9
	120	43	35	45,5	2,5	2	0,6	29	32311A	2FD	188	0,35	1,7	238	0,9
60	95	23	17,5	23	1,5	1,5	0,6	21	32012XA	4CC	90,3	0,43	1,4	116	0,8
	110	22	19	23,75	2	1,5	0,6	22	30212A	3EB	106	0,4	1,5	108	0,8
	110	28	24	29,75	2	1,5	0,6	24	32212A	3EC	119	0,4	1,5	152	0,8
	130	31	26	33,5	3	2,5	1	26	30312A	2FB	160	0,35	1,7	186	0,9
	130	31	22	33,5	3	2,5	1	39	31312A	7FB	138	0,83	0,7	158	0,4
	130	46	37	48,5	3	2,5	1	31	32312A	2FD	218	0,35	1,7	276	0,9
	130	46	37	48,5	3	2,5	1	31	32312A	2FD	218	0,35	1,7	276	0,9
65	100	23	17,5	23	1,5	1,5	0,6	22	32013XA	4CC	91,7	0,46	1,3	121	0,7
	120	23	20	24,75	2	1,5	0,6	23	30213A	3EB	125	0,4	1,5	127	0,8
	120	31	27	32,75	2	1,5	0,6	27	32213A	3EC	143	0,4	1,5	183	0,8
	140	33	28	36	3	2,5	1	28	30313A	2GB	184	0,35	1,7	217	0,9
	140	33	23	36	3	2,5	1	42	30313RA	7GB	184	0,83	0,7	217	0,4
	140	48	39	51	3	2,5	1	33	32313A	2GO	234	0,35	1,7	328	0,9
	140	48	39	51	3	2,5	1	33	32313A	2GO	234	0,35	1,7	328	0,9
70	110	25	19	25	1,5	1,5	0,6	23	32014XA	4CC	96	0,43	1,4	145	0,8
	125	24	21	26,25	2	1,5	0,6	25	30214A	3EB	119	0,43	1,4	148	0,8
	125	31	27	33,25	2	1,5	0,6	28	32214A	3EC	149	0,43	1,4	198	0,8
	150	35	30	38	3	2,5	1	29	30314A	2GB	209	0,35	1,7	247	0,9
	150	35	25	38	3	2,5	1	45	31314A	7GB	178	0,83	0,7	209	0,4
	150	51	42	54	3	2,5	1	36	32314A	2GD	282	0,35	1,7	361	0,9
	150	51	42	54	3	2,5	1	36	32314A	2GD	282	0,35	1,7	361	0,9
75	115	25	19	25	1,5	1,5	0,6	25	32015XA	4CC	101	0,46	1,3	155	0,7
	130	25	22	27,25	2	1,5	0,6	27	30215A	4DB	133	0,43	1,4	167	0,8
	130	31	27	33,25	2	1,5	0,6	29	32215A	4DC	153	0,43	1,4	201	0,8
	160	37	31	40	3	2,5	1	31	30315A	2GB	234	0,35	1,7	276	0,9
	160	37	26	40	3	2,5	1	48	31315A	7GB	199	0,83	0,7	233	0,4
	160	55	45	58	3	2,5	1	38	32315A	2GD	319	0,35	1,7	451	0,9
	160	55	45	58	3	2,5	1	38	32315A	2GD	319	0,35	1,7	451	0,9
80	125	29	22	29	1,5	1,5	0,6	27	32016XA	3CC	131	0,43	1,4	205	0,8
	140	26	22	28,25	2,5	2	0,6	28	30216A	3EB	143	0,43	1,4	174	0,8
	140	33	28	35,25	2,5	2	0,6	30	32216A	3EC	178	0,43	1,4	233	0,8
	170	39	33	42,5	3	2,5	1	33	30316A	2GB	257	0,35	1,7	304	0,9
	170	39	27	42,5	3	2,5	1	52	31316A	7GB	213	0,83	0,7	252	0,4

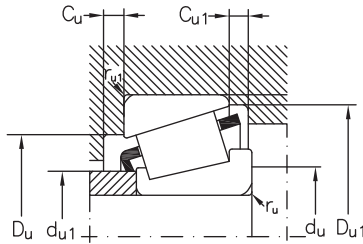


Speed limit		Weight	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
4300	5600	0,530	58	57	79	83	85	3	4,5	1,5	1,5
4300	5600	0,600	58	57	78	83	85	3	5,5	1,5	1,5
3600	4800	1,19	65	60	95	100	102	4	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

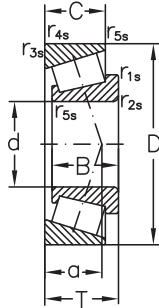


Dimensions					Designation					ISO series	Basic radial load. Factors					
d	D	B	C	T	r _{1s}	r _{2s}	r _{3s}	r _{4s}	r ₅	a	dyn. C _r	e	Y	stat C _{0r}	Y ₀	
mm											kN	-		kN	-	
80	170	58	48	61,5	3	2,5	1	41		32316A	2GD	361	0,35	1,7	475	0,9
85	130	29	22	29	1,5	1,5	0,6	28		32017XA	4CC	136	0,44	1,4	213	0,8
	150	28	24	30,5	2,5	2	0,6	30		30217A	3EB	167	0,43	1,4	206	0,8
	150	36	30	38,5	2,5	2	0,6	33		32217A	3EC	213	0,43	1,4	283	0,8
	180	41	34	44,5	4	3	1	35		30317A	2GB	288	0,35	1,7	347	0,9
	180	41	28	44,5	4	3	1	55		31317A	7GB	230	0,83	0,7	271	0,4
	180	60	49	63,5	4	3	1	42		32317A	2GD	382	0,35	1,7	504	0,9
90	140	32	24	32	2	1,5	0,6	30		32018XA	3CC	159	0,43	1,4	246	0,8
	160	30	26	32,5	2,5	2	0,6	31		30218A	3FB	184	0,43	1,4	233	0,8
	160	40	34	42,5	2,5	2	0,6	36		32218A	3FC	238	0,43	1,4	323	0,8
	190	43	36	46,5	4	3	1	36		30318A	2GB	314	0,35	1,7	380	0,9
	190	43	30	46,5	4	3	1	57		31318A	7GB	251	0,83	0,7	299	0,4
	190	64	53	67,5	4	3	1	44		32318A	2GD	434	0,35	1,7	580	0,9
95	145	32	24	32	2	1,5	0,6	31		32019XA	4CC	160	0,44	1,4	257	0,8
	170	32	27	34,5	3	2,5	1	33		30219A	2FB	205	0,43	1,4	261	0,8
	170	43	37	45,5	3	2,5	1	39		32219A	3FC	267	0,43	1,4	371	0,8
	200	45	38	49,5	4	3	1	39		30319A	2GB	314	0,35	1,7	371	0,9
	200	45	32	49,5	4	3	1	60		31319A	7GB	277	0,83	0,7	337	0,4
	200	67	55	71,5	4	3	1	47		32319A	2GD	476	0,35	1,7	637	0,9
100	150	32	24	32	2	1,5	0,6	32		32020XA	4CC	163	0,46	1,3	266	0,7
	180	34	29	37	3	2,5	1	35		30220A	3FB	234	0,43	1,4	304	0,8
	180	46	39	49	3	2,5	1	41		32220A	3FC	303	0,43	1,4	418	0,8
	215	47	39	51,5	4	2	1	40		30320A	2GB	382	0,35	1,7	466	0,9
	215	73	60	77,5	4	3	1	53		32320A	2GD	543	0,35	1,7	741	0,9
105	160	35	26	35	2,5	2	0,6	34		33021 A	4DC	234	0,44	1,4	409	0,8
	190	36	30	39	3	2,5	1	37		30221 A	3FB	257	0,43	1,4	337	0,8
	190	50	43	53	3	2,5	1	44		32221 A	3FC	340	0,43	1,4	485	0,8
	225	77	63	81,5	4	3	1	53		32321 A	2GD	575	0,35	1,7	774	0,9
110	170	38	29	38	2,5	2	0,6	36		32022 XA	4DC	221	0,43	1,4	371	0,8
	200	38	32	41	3	2,5	1	39		30222 A	3FB	293	0,43	1,4	385	0,8
	200	53	46	56	3	2,5	1	46		32222 A	3FC	382	0,43	1,4	542	0,8
	240	50	42	54,5	4	3	1	43		30322 A	2GB	449	0,35	1,7	556	0,9
	240	80	65	84,5	4	3	1	55		32322 A	2GD	596	0,35	1,7	789	0,9
120	180	38	29	38	2,5	2	0,6	39		32024XA	4DC	230	0,46	1,3	394	0,7
	215	40	34	43,5	3	2,5	1	43		30224A	4FB	324	0,43	1,4	442	0,8
	215	58	50	61,5	3	2,5	1	51		32224A	4FD	445	0,43	1,4	660	0,8
	260	55	46	59,5	4	3	1	47		30324A	2GB	533	0,35	1,7	675	0,9
	260	86	69	90,5	4	3	1	60		32324A	2GD	752	0,35	1,7	1064	0,9
130	200	45	34	45	2,5	2	0,6	42		32026XA	4EC	298	0,43	1,4	513	0,8
	230	40	34	43,75	4	3	1	45		30226A	4FB	351	0,43	1,4	466	0,8
	230	64	54	67,75	4	3	1	56		32226A	4FD	523	0,43	1,4	789	0,8

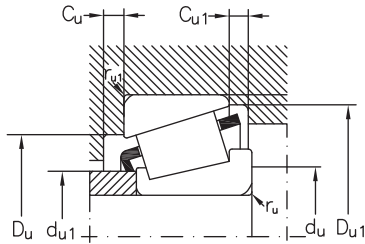


Speed limit		Weight	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
1900	2800	5,90	98	92	142	158	159	7	13,5	3	2,5
2400	3400	1,30	94	92	117	122	125	6	7	1,5	1,5
2200	3200	2,00	97	95	132	140	141	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

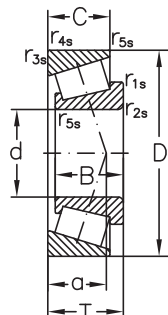


Dimensions					Designation					ISO series	Basic radial load. Factors				
d	D	B	C	T	r _{1s} min.	r _{2s} min.	r _{3s} min.	r _{4s} min.	r ₅	a	dyn. C _r	e	Y	stat C _{0r}	Y ₀
mm											kN	-		kN	-
130	280	58	49	63,75	5	4	1,5	51	30326A	2GB	596	0,35	1,7	760	0,9
	280	66	44	72	5	4	1,5	87	31326XA	7GB	575	0,83	0,7	741	0,4
	280	93	78	98,75	5	4	1,5	66	32326A	-	947	0,35	1,7	1333	0,9
140	210	45	34	45	2,5	2	0,6	46	32028XA	4DC	314	0,46	1,3	556	0,7
	250	42	36	45,75	4	3	1	47	30228A	4FB	397	0,43	1,4	542	0,8
	250	68	58	71,75	4	3	1	60	32228A	4FD	612	0,43	1,4	950	0,8
	300	70	47	77	5	4	1,5	90	31328XA	7GB	658	0,83	0,7	855	0,4
150	225	48	36	48	3	2,5	1	49	32030XA	4EC	351	0,46	1,3	622	0,7
	270	45	38	49	4	3	1	50	30230A	4GB	408	0,43	1,4	532	0,8
	270	73	60	77	4	3	1	64	32230A	4GD	700	0,43	1,4	1083	0,8
160	240	51	38	51	3	2,5	1	52	32032XA	4EC	408	0,46	1,3	741	0,7
	290	48	40	52	4	3	1	54	30232A	4GB	502	0,43	1,4	698	0,8
	290	80	67	84	4	3	1	70	32232A	4GD	836	0,43	1,4	1330	0,8
170	230	38	30	38	2,5	2	0,6	42	32934A	3DC	272	0,37	1,6	556	0,9
	260	57	43	57	3	2,5	1	56	32034XA	4EC	486	0,44	1,4	869	0,8
	310	52	43	57	5	4	1,5	58	30234A	4GB	585	0,43	1,4	822	0,8
	310	86	71	91	5	4	1,5	75	32234A	4GD	960	0,43	1,4	1549	0,8
180	250	45	34	45	2,5	2	0,6	53	32936A	4DC	334	0,48	1,3	698	0,7
	280	64	48	64	3	2,5	1	59	32036XA	3FD	612	0,43	1,4	1102	0,8
	320	52	43	57	5	4	1,5	61	30236A	4GB	554	0,46	1,3	774	0,7
	320	86	71	91	5	4	1,5	78	32236A	4GD	960	0,46	1,3	1549	0,7
190	260	45	34	45	2,5	2	0,6	55	32938A	4DC	358	0,48	1,3	772	0,7
	290	64	48	64	3	2,5	1	62	32038XA	4FD	627	0,44	1,4	1140	0,8
	340	92	75	97	5	4	1,5	81	30238A	4GD	685	0,43	1,4	950	0,8
200	280	51	39	51	3	2,5	1	53	32940 A	3EC	449	0,4	1,5	903	0,8
	310	70	53	70	3	2,5	1	66	32040 XA	4FD	711	0,43	1,4	1302	0,8
	310	70	53	70	3	2,5	1	66	32240 A	4FD	1150	0,43	1,4	1900	0,8
	310	70	53	70	3	2,5	1	66	32944 A	4FD	460	0,43	1,4	950	0,8
	360	98	82	104	5	4	1,5	83	32044 XA	3GD	852	0,4	1,5	1577	0,8
220	300	51	39	51	3	2,5	1	58	32944M	3EC	407	0,43	1,4	827	0,8
	340	76	57	76	4	3	1	72	32044XA	4FD	850	0,43	1,4	1537	0,8

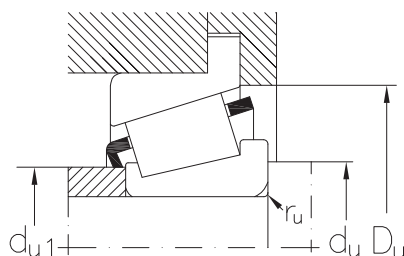


Speed limit		Weight	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
1300	1800	19,5	164	148	239	262	255	8	14,5	5	4
1200	1700	18,6	157	148	218	262	261	9	28	5	4
1100	1600	27,6	160	148	230	262	260	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
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

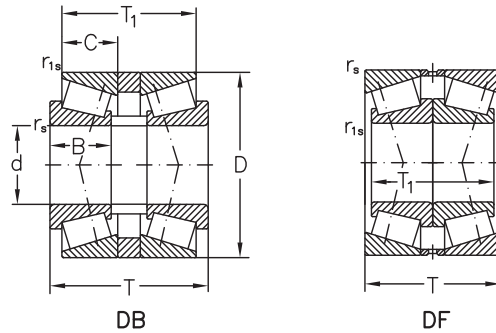


Dimensions										Designation	ISO series
d	D	B	C	T	r_{1s}, r_{2s} min.	r_{3s}, r_{4s} min.	D_1	b	a		
mm										-	
20	47	14	12	6,25	1	1	51	3	11	30204AR	2DB
25	52	15	13	6,25	1	1	57	3,5	12	30205AR	3CC
30	62	16	14	6,75	1	1	67	3,5	14	30206AR	3DB
	62	20	17	8,25	1	1	67	4	15	32206AR	3DC
	72	19	16	8,75	1,5	1,5	77	4	15	30306AR	2FB
	72	27	23	11,75	1,5	1,5	77	6	18	32306AR	2FD
35	72	17	15	7,25	1,5	1,5	77	4	15	30207AR	3DB
	72	23	19	10,25	1,5	1,5	77	4,5	17	32207AR	3DC
	80	21	18	8,25	2	1,5	85	4,5	16	30307AR	2FB
	80	31	25	13,75	2	1,5	85	6	20	32307AR	2FE
40	80	18	16	7,75	1,5	1,5	85	4	16	30208AR	3DB
	80	23	19	10,25	1,5	1,5	85	4,5	19	32208AR	3DC
	90	23	20	9,75	2	1,5	95	4,5	19	30308AR	2FB
	90	33	27	14,25	2	1,5	95	6	23	32308AR	2FD
45	85	19	16	8,75	1,5	1,5	90	4	18	30209AR	3DB
	85	23	19	10,25	1,5	1,5	90	4,5	20	32209AR	3DC
	100	25	22	10,25	2	1,5	106	5	21	30309AR	2FB
	100	36	30	15,25	2	1,5	106	7	25	32309AR	2FD
50	90	20	17	8,75	1,5	1,5	95	4	19	30210AR	3DB
	90	23	19	10,25	1,5	1,5	95	4,5	21	32210AR	3DC
	110	27	23	11,25	2,5	2	116	5	23	30310AR	2FB
	110	40	33	17,25	2,5	2	116	8	27	32310AR	2FD
55	100	21	18	9,25	2	1,5	106	4,5	20	30211AR	3DB
	100	25	21	10,75	2	1,5	106	5	22	32211AR	3DC
	120	43	35	18,5	2,5	2	127	8	29	32311AR	2FD
60	110	22	19	9,25	2	1,5	116	4,5	22	30212AR	2EB
	110	28	24	10,75	2	1,5	116	5	24	32212AR	2EC
	130	46	37	19,5	3	2,5	137	8	31	32312AR	2FD
65	120	23	20	9,25	2	1,5	127	4,5	23	30213AR	3EB
	120	31	27	11,75	2	1,5	127	6	27	32213AR	3EC
70	125	24	21	10,25	2	1,5	132	5	25	30214AR	3EB
	125	31	27	12,25	2	1,5	132	6	28	32214AR	3EC

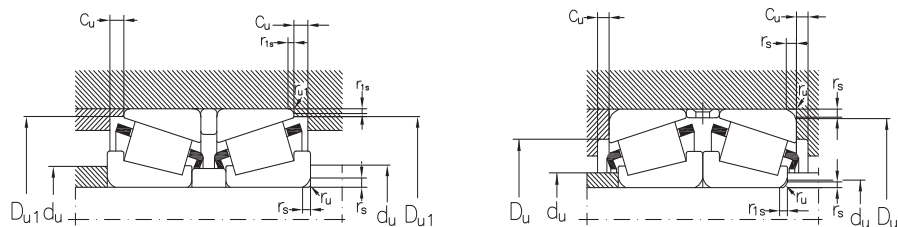


Basic radial load. Factors					Speed limit		Weight	Mounting dimensions			
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil		d _{u1} max.	d _u min.	D _u min.	r _u max.
kN	-		kN	-	min ⁻¹		Kg				
26	0,35	1,7	29	0,9	8000	11000	0,127	27	26	43	1
29,5	0,37	1,6	36	0,9	7500	10000	0,161	31	31	48	1
38	0,37	1,6	48	0,9	6300	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



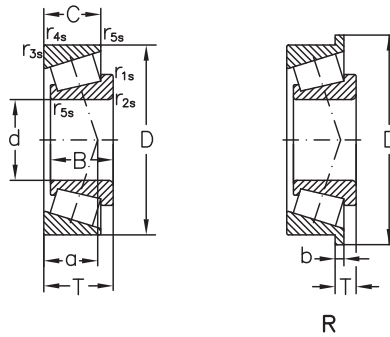
Dimensions								Designation	Speed limit		Weight
d	D	B	C	T	T ₁	r _s min.	r _{1s} min.		grease	oil	
mm								-	min ⁻¹		Kg
45	85	21	19	57,5	46	1,5	0,6	32209AP2F2DBT57,5	3600	4800	1,28
	85	23	19	55	43,5	1,5	0,6	32209AP4DBT55	3600	4800	1,26
55	100	22,52	21	69,5	57,66	2	0,6	32211AP2F2DBT69,5	3000	4000	2,06
	100	25	21	69,5	58	2	0,6	32211AUPDBT69,5	3000	4000	1,15
70	110	25	19	58	46	1,5	0,5	32014XADBT58	2600	3400	1,87
80	125	29	22	70	56	1,5	0,6	32016XADBT70	2000	2800	3,08
90	140	32	24	75	59	2	0,6	32018XADBT75	1800	2600	3,95
100	180	46	39	140	120	3	0,8	32220AS1DBT140	1400	2000	12,6
110	200	52,5	46	112	105	0,6	2,5	32222ADFT112	1400	1900	7,77
	240	50	42	109	100	1	3	30322ADFT1109	1300	1800	12,6
120	215	58	50	123	116	0,6	2	32224ADFT123	1300	1800	18,7
	260	55	46	119	110	1	3	30324ADFT119	1200	1600	29,8
	260	86	69	181	172	1	3	32324ADFT181	1000	1400	46,2
130	200	45	34	90	90	0,6	2	32026XAP5S0DFT90	1300	1800	10,6
	230	64	54	135,5	128	1	3	32226ADFT135,5	1200	1600	23,1
	280	66	45	144	132	2	4	31326ADFT144	950	1400	40,5
140	250	68	58	163,5	136	3	1	32228ADBT164	1100	1500	30,9
170	310	86	71	202	162	5	1,5	32234AMDBT202	800	1200	64,1
	310	86	71	202	162	5	1,5	32234AMP5DBT202	800	1200	64,1



Basic radial load. Factors						Mounting dimensions					
dyn. Cr	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

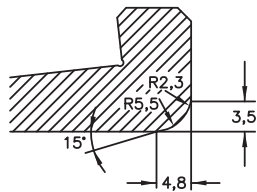
Tapered roller bearings, single row

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
	49,225	19,05	14,288	18,034	1,3	1,3		11	09067/09195
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
29	50,292	14,732	10,668	14,224	3,5	1,3		11	L45449/L45410
	62	19,05	14,288	18,161	3,5	1,3		13	15123/15245
	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
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
39,688	73,025	22,098	21,336	25,654	0,8	2,3		18	M201047/M201011
41,275	73,431	19,812	14,732	19,559	3,5	0,8		16	LM501349/LM501310
44,45	73,025	18,258	15,083	18,258	1,5	1,5		14	L102849/L102810
	82,931	25,4	19,05	23,813	3,6	0,8		18	25580/25520
	95,25	28,575	22,225	27,783	0,8	0,8		20	460/453A
45,242	73,431	19,812	15,748	19,558	3,5	0,8		15	LM102949/LM102910
45,618	82,931	25,4	19,05	23,812	3,5	0,8		18	25590/25520
	82,931	25,4	22,225	26,988	3,5	2,3		19	25590/25523
46,038	85	25,608	20,638	25,4	0,8	1,3		19	2984A/2924
50	90	22,225	15,875	8,887	2	0,8	94,661	4,762	16 365/362Bcl.3
50,8	82,55	22,225	16,51	21,59	3,5	1,3		16	LM104949/LM104911
	92,075	25,4	19,845	24,608	3,5	0,8		20	28580/28521
	92,25	28,575	22,225	27,783	3,5	0,8		20	33889/33822
	97,63	24,608	19,446	9,124	3,5	0,8	101,549	3,962	21 28678/28622B
	107,95	29,317	22,225	27,783	3,5	0,8		21	33885/33822
53,975	123,825	32,791	25,4	17,462	3,5	3,3	130,073	6,35	37 72212/72487B
57,15	104,775	29,317	24,605	30,162	2,3	3,3		23	462A/453X
	112,712	30,162	23,812	30,162	8	3,3		23	39581/39520
60,325	127	36,512	26,988	36,512	3,5	3,3		32	HM813841/HM813810
63,485	95	15,5	12	17	1	1		28	L910349/L910310
63,5	92,075	12,7	9,525	13,495	1,5	1,5		16	LL510749/LL510710

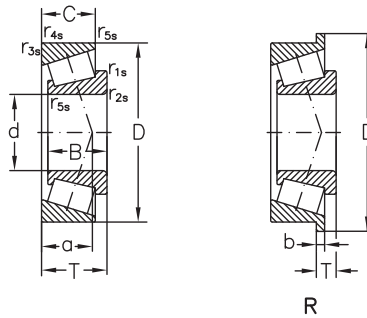
* Special mounting chamfer.



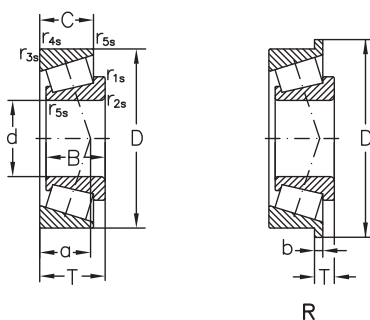
Basic radial load. Factors					Speed limit		Weight
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
12,0	0,45	1,3	11,85	0,7	11000	15000	0,055
12,0	0,45	1,3	11,85	0,7	10000	15000	0,058
12,0	0,45	1,3	11,85	0,7	10000	14000	0,063
19,8	0,29	2,1	21,1	1,2	8500	12000	0,081
31,1	0,27	2,3	33,1	1,2	7000	10000	0,160
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
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
31,1	0,41	1,5	35,912	0,8	5300	7500	0,180
42,9	0,38	1,6	50,696	0,9	4800	7000	0,248
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
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
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
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
130	0,34	1,8	196	1,0	2800	4000	1,03

Tapered roller bearings, single row

inch dimensions



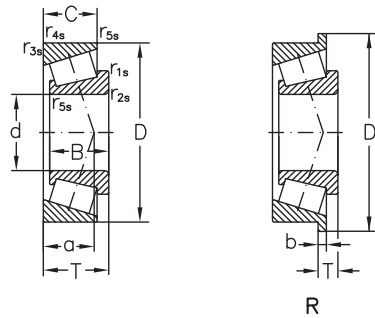
Dimensions										Designation
d	D	B	C	T	r_{1s}, r_{2s} min.	r_{3s}, r_{4s} min.	D_1	b	a	
mm										-
	112,712	30,048	23,812	30,162	3,5	0,8			25	3982/3928
	112,712	30,048	23,812	30,162	3,5	0,8			25	3982/39208
	112,712	30,048	23,812	30,162	3,5	3,3			23	39585/39520
	120	29,007	23,444	29,007	3,5	3,3			26	483/472A
	122,238	38,43	29,77	38,305	3,5	2			27	X3962/X3963
66,675	110	25,4	19,05	25,4	3,5	1,3			24	29590/29521
	112,712	30,048	23,812	30,162	3,5	3,3			25	3984/3920
	122,238	38,354	29,718	38,1	3,5	3,3			27	HM212049/HM212011
71,438	127	36,17	28,575	36,512	3,5	3,3			28	567A/563cl.3
73,025	127	36,17	28,575	36,512	3,5	3,3			28	567/563cl.3
76,2	139,992	36,098	28,575	36,512	3,5	3,3			31	575/572
82,55	139,992	36,098	28,575	36,512	3,5	3,3			31	580/572
	146,05	41,275	31,75	41,275	3,5	3,3			34	663/653
85,725	133,35	29,769	25,4	33,338	3,3	3,3			31	497/492Wcl.0
	146,05	41,275	31,75	41,275	6,4	3,3			34	665A/653cl.0
88,9	152,4	39,688	30,163	39,688	6,4	3,3			34	HM518445/HM518410
	190,5	57,531	46,038	57,15	8	3,3			41	HM221434/HM221410
89,974	146,975	40	32,5	40	7	3,5			31	HM218248/HM218210
92,075	152,4	36,322	30,162	39,688	6,4	3,3			35	598A/592A
	152,4	36,322	30,162	15,875	3,5	3,3	158,648	6,35	35	594/592cl.0
96,838	149,225	28,971	24,608	12,7	3,5	3,3	154,681	5,558	34	42381/42587Bcl.3
100,012	157,162	36,116	26,195	36,512	3,5	3,3			36	52393/52618cl.0
101,6	180,975	48,006	38,1	17,462	3,5	3,3	188,798	7,938	40	780/772Bcl.0
	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		74525/74850Bcl.0
136,525	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		74525/74850Bcl.0
139,7	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		74550/74850B
	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		74550/74850Bcl.0
	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				74550/74850cl.0
158,75	225,425	39,688	33,338	13,495	3,5	3,3	230,881	5,558		46780/46720Bcl.0
	225,425	39,688	33,338	41,275	3,5	3,3				46780/46720cl.0



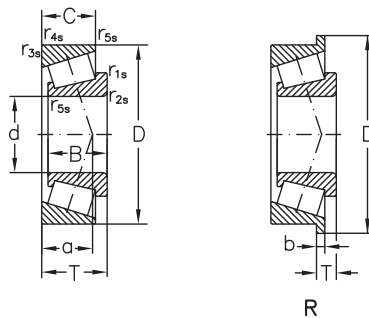
Basic radial load. Factors					Speed limit		Weight
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
161	0,50	1,2	226	0,7	2600	3800	2,16
42,3	0,78	0,8	56,8	0,4	3000	4500	0,400
31,2	0,40	1,5	46,0	0,8	3200	4500	0,250
116	0,40	1,5	174	0,8	2800	4000	1,24
116	0,40	1,5	174	0,8	2800	4000	1,24
130	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
161	0,36	1,7	226	0,9	2400	3600	1,64
161	0,36	1,7	226	0,9	2400	3400	2,68
184	0,40	1,5	239	0,8	2200	3200	2,35
327	0,40	1,5	448	0,8	2000	3000	5,37
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
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
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
174	0,44	1,4	268	0,7	2000	2800	2,59
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
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

Tapered roller bearings, single row

inch dimensions

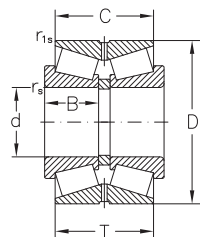


Dimensions										Designation
d	D	B	C	T	r_{1s}, r_{2s} min.	r_{3s}, r_{4s} min.	D_1	b	a	
mm										-
180	250	45	37	47	3	3				JM736149/JM36110
196,85	254	27,783	21,433	28,575	1,5	1,5				L540049/L540010
203,2	261,142	27,783	21,433	28,575	1,5	1,5				LL641149/LL641110
209,55	282,575	46,038	36,512	46,038	3,5	3,3				67989/67920
	317,5	63,5	46,038	63,5	4,3	3,3				93825/93125cl.3
234,95	327,025	52,388	36,512	52,388	6,4	3,3				8575/8520
	327,025	52,388	36,512	52,388	6,4	3,3				8575/8520cl.3
241,3	327,025	52,388	36,512	25,4	6,4	3,3	336,448	9,525		8578/8520B
	327,025	52,388	36,512	25,4	6,4	3,3	336,448	9,525		8578/8520Bcl.B

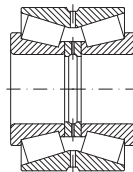


Basic radial load. Factors					Speed limit		Weight
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
310	0,49	1,2	531	0,7	1400	2000	6,17
310	0,49	1,2	531	0,7	1400	2000	6,17
310	0,49	1,2	531	0,7	1400	2000	6,08
310	0,49	1,2	531	0,7	1400	2000	6,08
305	0,38	1,6	541	0,9	1300	1800	5,40
305	0,38	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	12,3
468	0,41	1,5	934	0,8	850	1200	11,9
468	0,41	1,5	934	0,8	850	1200	11,9

Tapered roller bearings, double row

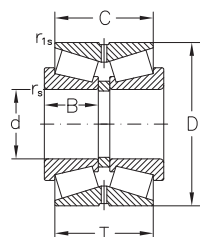


$d < 220$

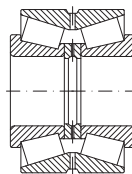


$d > 220$

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		Weight
dyn. C_r	e	Y_1	Y_2	stat C_{0r}	Y_0	grease	oil	
kN	-			kN	-	min^{-1}		Kg
662	0,37	1,8	2,7	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

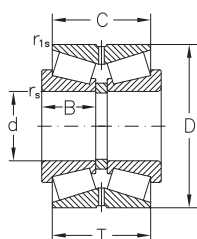


Fig. 1

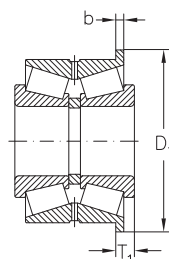


Fig. 2

Dimensions					Designation		
d	D	B	C	T	r ₁ min.	r _{1s} min.	
mm					-		
	120	29,007	53,975	65,09	3,5	0,8	482/472D
82,55	136,525	29,769	53,975	69,85	3,5	0,8	495/493D
85,725	136,525	29,769	53,975	69,85	3,5	0,8	497/493DC
92,075	149,225	28,971	52,387	66,672	3,5	0,8	42362/42587D
107,95	158,75	21,4	39,688	53,978	3,5	0,8	37425/37626Dcl.3
115	190,5	50	82,6	108	3,5	1	181115/181190XG
136,525	190,5	39,7	73,025	85,725	3,5	0,8	48393/48320D
	215,9	51	92	110	2,5	1	200136X/200215XH¹⁾

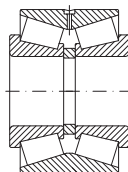


Fig. 3

Basic radial load. Factors						Speed limit		Weight	Fig.
dyn. Cr	e	Y ₁	Y ₂	stat C _{0r}	Y ₀	grease	oil		
kN	-			kN	-	min ⁻¹		Kg	
255	0,38	1,8	2,6	415	1,7	2200	2800	2,45	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
435	0,26	2,6	3,8	750	2,5	1400	1800	10,1	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







Four row taper roller bearings

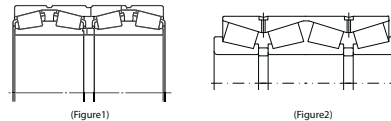
Four row tapered roller bearings are used mostly for rolling mill bearing arrangements application. They can carry axial loads which occur in such applications in addition to radial loads. Four-row tapered roller bearings, because of their design, must be installed as complete bearings in the chocks. To enable quick roll changes to be made they must therefore have a loose fit on the roll necks. Loose fits have the disadvantage that the inner rings wander on their seats under the prevailing load conditions causing wear to the seats which normally have a lower hardness than the rings. To alleviate the effects of a loose fit to some extent, i.e. to reduce wear, DAS LAGER bearings have a helical groove in the bore and/or lubrication grooves in the side faces of the inner rings.

DAS LAGER have wide range of four-row tapered roller bearings which covers not only the conventional designs with intermediate rings between the outer and/or inner rings (fig), but also a new design with modified rings which integrate the intermediate rings

Advantages of these four-row tapered roller bearings

- simpler mounting because of fewer components
- improved load distribution over the four rows of rollers, leading to less wear and longer service life
- simpler axial location on the roll necks because of reduced inner ring width tolerances
- dimensional equivalence to conventional four-row tapered roller bearings with intermediate rings.

DAS LAGER four-row tapered roller bearings are produced in the TQO (Figure1) and TQI (Figure2) designs.



Bearings of the TQO configuration

Bearings of this design have two pairs of tapered roller and cage assemblies, the two rows of rollers of the pair being arranged face-to-face.

Bearings of the TQI configuration

Bearings of the TQI design have two paired rows of rollers arranged back-to-back (Figure2). Their use is limited, being primarily where high stiffness is required and considerable tilting moments have to be accommodated. The bearings are generally mounted with an interference fit on the roll necks and therefore often have a tapered bore. The bearings are also used for the vertical rolls of universal mills; in this case the outer rings are mounted with an interference fit in the chocks and the inner rings have a loose fit on their seat.

Suffix Designation

A, B, C Developed new internal design

E Bearing without spacer rings

EX Bearing with spacer rings

G Helical groove in bearing bore

DA1- HA2 Outer and inner rings of case hardened steel

DA4 - HA5 Outer and inner rings and rollers of case hardened steel

DE1 - HE2 Outer and inner rings of vacuum remelted steel

C... Combined with a number, designates the mean value of the axial clearance in μm

Four Row Taper Roller Bearings

Non-standardized

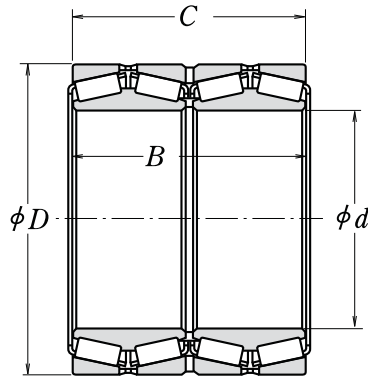


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	C0r	(kg)		
139,7	200,025	160,338	157,162	815	1976	15,5	1	DLG 331138 AG
177,8	247,65	192,088	192,088	1169	2850	29	1	DLG 331480 G
205	320	203,5	203,5	1805	3468	54,5	1	BT4B 328065/DA1
206,375	282,575	190,5	190,5	1235	3183	36,5	1	DLG 331486 G
206,375	282,575	190,5	190,5	1235	3183	35,8	1	BT4-0021 G/DA1
216,103	330,2	269,875	263,525	2128	4845	84	1	BT4B 328204/DA1
220,662	314,325	239,712	239,712	2090	4940	61,5	1	DLG 331156 G
240	338	248	248	2423	5225	69,3	1	BT4-0020/DA1
241,478	349,148	228,6	228,6	2052	4750	74,5	1	DLG 330782 AG
244,475	327,025	193,675	193,675	1739	4085	46	1	DLG 330862 B
254	358,775	269,875	269,875	2717	6745	88	1	DLG 331275 B
254	358,775	257,175	292,1	2717	6745	90,5	2	BT4B 332610/DA1
258,762	358,775	257,175	292,1	2717	6745	100	2	BT4B 332961/DA1
260	440	298,5	298,5	3715	6983	190	1	BT4B 328551/DA1
260,35	422,275	317,5	314,325	4237	7600	165	1	BT4B 331487 BG/DA1
260,35	422,275	317,5	314,325	3924	7600	180	1	BT4B 331487 G/DA1
269,875	381	282,575	282,575	2926	7125	105	1	BT4B 331168 B
279,4	407	288	320	3401	8550	140	2	BT4B 328345/DA1
279,578	380,898	244,475	244,475	2176	6080	86	1	DLG 330540 AG
280	460	324	324	4446	8835	215	1	BT4B 332441 G/DA1
285,75	380,898	244,475	244,475	2176	6080	81	1	DLG 330337 AG
287,5	440	284	330,3	3971	8075	180	2	BT4B 332997 B/DA1
287,5	440	284	330,3	3971	8075	180	2	BT4B 332997/DA1
288,925	406,4	298,45	298,45	3401	8550	125	1	BT4B 331452 G/DA1
292,1	422,275	269,875	269,875	3344	7600	125	1	DLG 331968
292,1	422,275	269,875	269,875	3610	7600	125	1	BT4B 331968 BG/DA1
300	440	279,4	280,988	3031	7410	145	1	BT4B 328725 G/DA1
300	460	388,5	388,5	5121	11875	240	1	BT4B 332472
300,038	422,275	311,15	311,15	3610	9025	140	1	DLG 331287
304,648	438,048	279,4	280,99	3297	7600	135	1	DLG 331492
304,648	438,048	279,4	280,99	2926	6603	135	1	BT4B 328828 G/DA1
304,8	482,6	377,825	365,125	4760	9880	265	1	DLG 330693 C
304,902	412,648	266,7	266,7	#VALUE!	#VALUE!	102,5	1	DLG 330758 BG
304,902	412,648	266,7	266,7	3031	7125	100	1	BT4-0004 G/DA1
317,5	422,275	269,875	269,875	2926	7743	105	1	DLG 330870 A
317,5	422,275	269,875	269,875	3192	7743	105	1	DLG 330870 BG
317,5	438,15	276,225	276,225	3344	7885	135	1	BT4B 328952 A/DA1
317,5	438,15	276,225	276,225	3344	7885	125	1	BT4B 334020 G/DA4

Four Row Taper Roller Bearings

Non-standardized

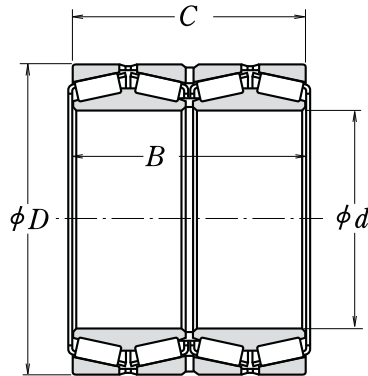


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	COr	(kg)		
317,5	447,675	327,025	327,025	4180	10260	165	1	BT4B 331161 AG/DA4
317,5	447,675	327,025	327,025	4494	10260	165	1	BT4B 331161 BG/DA1
317,5	422,275	261,938	290,514	2926	7743	110	2	BT4B 332642/DA1
320	422,275	261,424	336	2926	7743	125	2	BT4B 328344/DA1
320	422,275	261,424	290	2926	7743	120	2	BT4B 332716/DA1
320	422,275	261,424	336	2926	7743	125	2	BT4B 332962/DA1
323,452	447,675	323,85	414,338	4180	10260	200	2	BT4B 332668/DA1
330,2	444,5	301,625	301,625	3506	9168	135	1	BT4B 332647 G/DA1
330,302	438,023	254	247,65	2470	6983	110	1	DLG 331664
330,302	438,023	254	247,65	2670	6983	105	1	BT4B 331664 AG/DA1
333,375	469,9	342,9	342,9	4342	10830	190	1	DLG 331381
333,375	469,9	328,612	366,712	4342	10830	190	2	BT4B 328083/DA1
340	520	323,5	323,5	5330	9880	240	1	BT4B 332963 B/DA1
340	520	323,5	323,5	4969	9880	245	1	BT4B 332963/DA1
342,9	533,4	301,625	307,975	4494	8360	240	1	BT4-8034 G/DA1
342,9	571,5	342,9	342,54	5957	11020	365	1	BT4B 331553/DA1
345,281	488,95	358,775	358,775	4703	11875	240	1	BT4B 334074/DA1
346,075	488,95	358,775	358,775	4703	11875	220	1	DLG 331228
347,662	469,9	260,35	260,35	3610	9690	130	1	BT4B 331077 AG/DA1
347,662	469,9	260,35	260,35	3715	8075	125	1	BT4B 331077 BG/DA1
347,662	469,9	292,1	292,1	3610	9690	150	1	DLG 331092 A
347,662	469,9	246,063	280,194	3192	7866	135	2	DLG 331807
350	480	420	420	4513	9690	211	1	BT4-8117 E1/C475 *
352,425	488,95	342,9	384,175	3610	9690	205	2	BT4B 332654/DA1
355	490	316	316	3924	10450	185	1	DLG 331508
355,6	482,6	269,875	265,113	3800	7600	140	1	330662 E/C480 *
355,6	488,95	317,5	317,5	3924	10450	195	1	DLG 331271
355,6	488,95	317,5	317,5	4237	10450	180	1	DLG 331271 BG
360	510	380	380	5330	13585	255	1	DLG 332059
360	540	280	280	4180	8550	230	1	BT4B 328159/DA1
360	540	325	325	5434	10260	250	1	BT4-8015 G/DA1
368,3	523,875	382,588	382,588	5957	14250	275	1	DLG 331159 A
368,3	523,875	366,712	411,162	5539	14250	275	2	BT4B 334011
374,65	501,65	260,35	250,825	3192	7743	140	1	BT4B 332188/DA1
380	560	325	325	5225	11210	265	1	BT4B 328294/DA1
380	560	360	390	6375	13015	300	1	BT4-8033 G/DA1
380	560	360	360	5852	13015	295	1	BT4B 328816/DA1
380	620	368	368	6688	13015	440	1	BT4B 332889/DA1

Four Row Taper Roller Bearings

Non-standardized

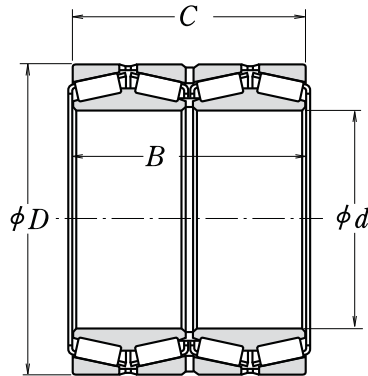


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	C0r	(kg)		
384,175	546,1	400,05	400,05	6118	15770	310	1	DLG 331149 A
384,175	546,1	400,05	400,05	6118	15770	340	1	BT4B 334128/DA1
384,175	546,1	384,175	428,625	6118	15770	300	2	BT4B 331809/DA1
385,762	514,35	317,5	317,5	4076	11400	190	1	DLG 331202
390,525	546,1	384,175	428,625	6118	15770	340	2	BT4B 332664/DA1
391,071	550	384,175	428,625	6118	15770	345	2	BT4B 328305/DA1
395	545	288,9	268	3715	9025	195	1	BT4B 332824/DA1
400	540	295	330	4598	11875	210	2	DLG 332297
406,4	546,1	288,925	268,288	3715	9025	185	1	DLG 331465
406,4	546,1	288,925	268,288	3971	9025	180	1	DLG 331465 BG
406,4	546,1	330	330	4760	12540	225	1	BT4B 334092 AG/DA1
406,4	565,15	381	381	5748	14820	300	1	BT4B 331347 AG/DA1
406,4	565,15	440	440	7268	17670	340	1	BT4-8002 G/DA1
406,4	590,55	400,05	400,05	6584	15770	370	1	DLG 331133 A
406,4	590,55	381	434,975	6584	15770	370	2	BT4B 328923/DA1
409,575	546,1	334,962	334,962	4237	11875	220	1	BT4B 328967 A/DA4
409,575	546,1	334,962	334,962	4446	12540	220	1	BT4B 331333 A/DA1
409,575	546,1	334,962	334,962	4760	12540	220	1	BT4B 331333 BG/DA1
409,575	546,1	334,962	334,962	4446	12540	220	1	BT4B 331333/DA1
415,925	590,55	434,975	434,975	6850	18335	395	1	DLG 331160 A
415,925	590,55	419,1	469,9	6850	18335	440	2	BT4B 332814/DA1
419,1	590,55	419,1	469,9	6850	18335	440	2	BT4B 328203/DA1
419,1	590,64	419,1	469,9	6270	14250	420	2	BT4B 328564/DA4
420	560	437	437	5539	15485	285	1	BT4B 328826 G/DA1
420	620	355	355	6118	13870	375	1	BT4B 328374/DA1
430	570	336,55	336,55	4703	13300	240	1	DLG 331192 A
430	570	380	380	5016	13300	260	1	BT4-8049 G/DA1
430	575	380	380	6080	15770	280	1	BT4-8006 BG/DA1
431,8	571,5	279,4	279,4	3506	9168	200	1	DLG 331125 A
431,8	571,5	279,4	279,4	3506	9168	200	1	BT4B 331125 BG/DA1
431,8	571,5	336,55	336,55	4703	13300	240	1	BT4B 331226 AG/DA1
431,8	571,5	336,55	336,55	5016	13300	240	1	BT4B 331226 BG/DA1
431,8	571,5	336,55	336,55	4703	13300	240	1	BT4B 331226/DA1
431,8	635	355,6	355,6	6270	14250	385	1	DLG 332060
431,8	635	355,6	440	6270	14250	405	1	BT4B 334019 G/DA1
431,8	571,5	320,675	366,713	4703	13300	250	2	DLG 331999
431,8	647,7	338,138	387,35	6270	14250	420	2	BT4B 332590/DA1
440	580	420	420	5748	16720	300	1	BT4B 328829/DA1

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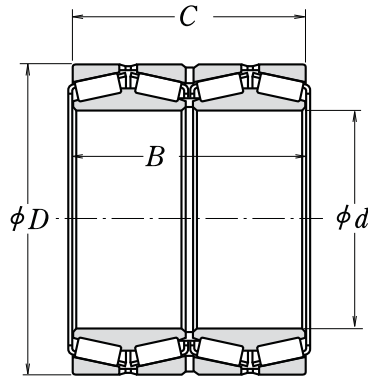


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	COr	(kg)		
440	650	353,5	353,5	6270	14250	410	1	DLG 332313
444,5	571,5	336,55	336,55	4703	13585	215	1	BT4B 328670
447,675	635	463,55	463,55	7838	20900	485	1	DLG 330608 C
447,675	635	446,088	496,888	7838	20900	475	2	BT4B 328922/DA1
450	580	450	450	5852	18620	280	1	BT4B 328161/DA1
450	595	404	404	5225	15485	305	1	BT4B 328365/DA1
450	595	415	415	6688	18050	320	1	BT4-8024 G/DA1
450	595	352	390	5225	15485	295	2	BT4B 334147/DA1
453,39	635	446,088	496,888	7838	20900	600	2	BT4B 332822/DA1
457,073	730,148	419,1	412,75	8522	18620	630	1	BT4B 328287 G/DA1
457,2	596,9	279,4	276,225	3971	10260	200	1	DLG 331169 A
457,2	596,9	279,4	276,225	3971	10260	200	1	DLG 331169 BG
457,2	596,9	279,4	276,225	4342	10260	200	1	DLG 331169 CG
457,2	596,9	320	320	4598	13015	235	1	BT4B 334006
460	610	400	400	5957	16435	315	1	BT4B 328285
460	625	421	421	6850	19000	380	1	BT4B 332502/DA1
462	615,95	330,2	330,2	5225	14250	275	1	BT4B 328692
475	600	368	368	5434	15770	250	1	BT4B 328913 BG/DA1
475	600	368	368	5016	15770	250	1	BT4B 328913 G/DA1
475	640	360	360	5225	14535	335	1	BT4-8035 G/DA1
475	660	450	450	8151	21280	460	1	BT4B 329007/DA1
479,425	679,45	495,3	495,3	8883	21375	605	1	DLG 330886 B
482,6	615,95	330,2	330,2	4864	14535	245	1	DLG 330641 CA
482,6	615,95	330,2	330,2	4864	14535	245	1	DLG 330641 CG
482,6	615,95	330,2	330,2	4864	14535	245	1	DLG 332096
482,6	615,95	330,2	330,2	5225	14535	240	1	DLG 332096 BG
482,6	615,95	330,2	419,1	4864	14535	265	1	BT4B 331626 A/DA1
482,6	615,95	330,2	419,1	4864	14535	265	1	BT4B 331626 AG/DA1
482,6	615,95	330,2	419,1	5225	14535	250	1	BT4B 331626 BG/DA1
482,6	630	420	420	6270	18335	345	1	BT4B 328773 G/DA1
482,6	635	421	421	7002	19380	365	1	BT4B 334105 BG/DA1
482,6	647,7	417,512	417,512	6850	19000	400	1	DLG 331259
482,6	615,95	317,5	355,6	4864	14535	245	2	BT4B 328268/DA1
488,95	622,3	365,125	365,125	5330	16435	265	1	BT4B 328391 G/DA1
488,95	679,45	479,425	533,4	8883	24225	640	2	BT4B 332760/DA1
489,026	634,873	320,675	320,675	4760	13870	270	1	BT4B 328282/DA1
500	720	400	400	7838	19380	550	1	BT4B 328524/DA1
501,65	673,1	387,35	400,05	6850	18335	395	1	BT4B 331499 G/DA1

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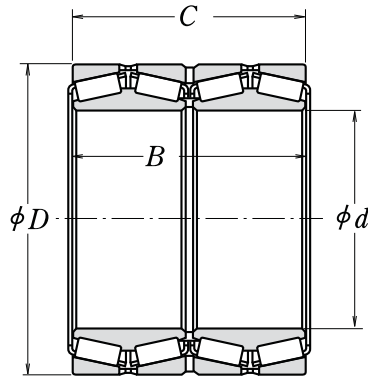


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	C0r	(kg)		
501,65	711,2	520,7	520,7	9690	26125	755	1	DLG 331081 A
508	762	463,55	463,55	9595	22040	730	1	DLG 332131
510	655	362	405	5957	18050	330	2	BT4B 328732/DA1
514,35	673,1	422,275	422,275	6850	20520	410	1	DLG 331157 A
514,35	673,1	422,275	422,275	7420	20520	405	1	DLG 331157 BG
515	700	420	420	7524	20520	515	1	BT4B 328965/DA1
515	700	370	420	7002	18620	490	2	BT4B 334097/DA1
519,112	736,6	536,575	536,575	10830	29450	755	1	DLG 331078 A
520,7	711,2	400,05	400,05	7106	18620	460	1	BT4B 331243 A/DA1
530	680	440	440	7838	22420	405	1	BT4-8043 G/DA1
530,225	736,6	519,112	579,438	10640	29450	865	2	BT4B 332933/DA1
536,575	761,873	558,8	558,8	11115	30400	835	1	BT4B 331174/DA1
540	690	400	400	6688	20140	375	1	DLG 331978
540	690	400	434	6688	20140	400	1	BT4B 334038 G/HA3
547,688	761,873	536,575	600,075	11115	30400	930	2	BT4B 332659/DA1
555,233	761,873	536,575	692,15	11115	30400	990	2	BT4B 334125/DA1
558,8	736,6	322,268	322,265	5957	15770	375	1	DLG 331165 A
558,8	736,6	322,268	322,265	5957	15770	375	1	DLG 331165 AG
558,8	736,6	409,575	409,575	7268	20900	475	1	DLG 330993 BG
558,8	736,6	409,575	409,575	7838	20900	480	1	BT4B 330993 AG/DA1
558,8	736,6	457,2	455,612	7999	24700	545	1	BT4B 331346 A/DA1
558,8	736,6	457,2	455,612	7999	24700	545	1	BT4B 331346/DA1
560	920	618	618	15675	32300	1700	1	BT4B 328509/DA4
571,5	812,8	593,725	593,725	11495	30400	1000	1	DLG 330529 B
571,5	812,8	593,725	593,725	12540	34200	1105	1	BT4B 332666/DA1
581,025	812,8	571,5	641,35	11495	30400	1100	2	BT4B 332658/DA4
584,2	730,25	349,25	342,9	6460	16150	327	1	BT4B 331189 E/C600 *
584,2	762	401,638	396,875	7268	21280	485	1	DLG 331148 A
584,2	901,7	539,747	523,08	12730	26600	1250	1	BT4B 328314 G/DA1
585,788	771,525	479,425	479,425	9405	28500	625	1	DLG 331093 A
585,788	771,525	479,425	479,425	10070	28500	620	1	BT4B 331093 BG/DA1
595,312	844,55	615,95	615,95	12730	34675	1115	1	DLG 331300
596,9	980	609,6	604,838	15960	34675	1920	1	DLG 331566
600	870	488	488	11875	27550	940	1	BT4B 328350 G/DA1
603,25	857,25	622,3	622,3	13965	38475	1235	1	DLG 331625
604,838	787,4	369,888	420,688	7999	22040	580	2	BT4B 328045/DA1
609,6	787,4	361,95	361,95	7002	20140	455	1	DLG 331175 A
609,6	813,562	479,425	479,425	10070	28975	715	1	DLG 331925

Four Row Taper Roller Bearings

Non-standardized

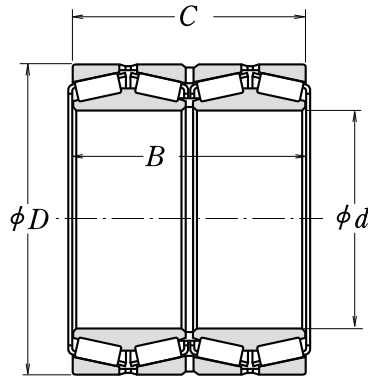


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	C0r	(kg)		
620	800	363,5	363,5	7106	20520	465	1	BT4B 328510/DA1
630	860	615	615	12160	32775	1023	1	BT4-8122 G/DA1
635	901,7	654,05	654,05	14915	42750	1420	1	DLG 330990 A
644,525	857,25	523,875	590,55	11495	34675	1030	2	BT4B 332934/DA1
646,112	857,25	542,925	542,925	11495	34675	875	1	BT4B 332671/DA1
647	1030	560	560	15960	36100	1760	1	BT4-8065 G/DA1
648	1030	560	560	15960	36100	1760	1	BT4-8063 G/DA1
650	915	674	674	15295	42750	1430	1	DLG 332307
650	1030	560	560	15960	36100	1810	1	BT4B 332827 AG/DA1
650	1030	560	560	15675	34675	1830	1	BT4B 332827/DA1
650	1040	610	610	16720	34675	1970	1	BT4-8036 G/DA1
657,225	933,45	676,275	676,275	16340	46550	1575	1	DLG 330824 A
660	855	318,48	319,192	5852	16150	490	1	BT4B 331065 AG/DA4
660	855	318,5	318,5	6688	17670	490	1	BT4B 328511/DA1
660,4	812,8	365,125	365,125	6375	21280	420	1	DLG 331190
660,4	812,8	365,125	365,125	6850	21280	415	1	BT4B 331190 BG/DA1
669,925	933,45	649,288	725,488	16340	46550	1700	2	BT4B 332928/DA1
676	910	620	620	13490	39425	1150	1	BT4B 332906/DA4
679,45	901,7	552,45	552,45	11685	34675	975	1	DLG 331700
679,45	901,7	552,45	552,45	12350	37050	975	1	BT4B 331700 AG/DA4
680	930	700	700	17385	51300	1625	1	BT4B 328349/DA1
682,625	965,2	701,675	701,675	16720	47500	1750	1	DLG 331503 G/DA4
682,625	965,2	701,675	701,675	16340	46550	1825	1	BT4B 328558/DA4
685,8	876	355,6	352,425	7420	20900	525	1	BT4B 331089 CG/DA1
685,8	876,3	355,6	352,425	6850	20900	530	1	DLG 331089
685,8	876,3	355,6	434,975	6850	20900	580	1	BT4B 328704 G/DA1
685,8	876,3	355,6	352,425	6584	19760	530	1	BT4B 331089 A/DA4
708,025	930,275	565,15	565,15	12350	37050	1030	1	BT4B 332098 A/DA4
710	900	410	410	8360	25175	660	1	DLG 331351
710	900	410	410	8360	25175	660	1	BT4B 331351 AG/DA1
710	900	410	410	9196	25650	620	1	BT4B 331351 BG/DA1
711,2	914,4	317,5	317,5	6688	18335	525	1	DLG 330882 C
714,375	1016	704,85	704,85	17765	50350	1950	1	BT4B 331358/DA4
717,55	946,15	565,15	565,15	12730	38475	1090	1	DLG 332244
730	940	500	500	11495	34200	925	1	DLG 331752
730,25	1035,05	755,65	755,65	19475	55575	2170	1	DLG 330803 A
744,538	1035,05	727,075	812,8	19475	55575	2350	2	BT4B 332943/DA4
749,3	990,6	605	605	14345	43225	1250	1	DLG 331616

Non-standardized

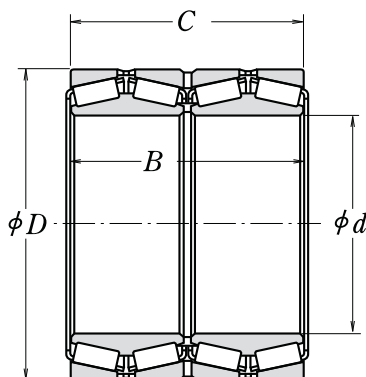


Figure 1

Principal dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D	B	C	Cr	C0r	(kg)		
749,3	1066,8	736,6	723,9	19475	55575	2250	1	DLG 331094 A
749,3	990,6	577	650	14345	43225	1500	2	BT4B 332596/DA4
750	1130	690	690	19095	44175	2430	1	BT4B 328376/DA4
762	1066,8	736,6	723,9	19475	55575	2145	1	DLG 331907
762	1066,8	736,6	723,9	20900	55575	2090	1	BT4B 331907 BG/DA4
762	1079,5	787,4	787,4	21280	62225	2480	1	DLG 330676 B
770	1040	650	800	17385	50350	2015	2	BT4B 334099/DA4
777,672	1079,5	755,65	844,55	20900	59850	2650	2	BT4B 332959/DA4
777,875	1079,5	755,65	844,55	20900	59850	2650	2	BT4B 332956/DA4
812,8	1143	768,35	768,35	20900	59850	2590	1	DLG 331094 A
825,5	1168,4	844,55	844,55	24700	72675	3050	1	BT4B 331066 A/DA4
825,5	1168,4	844,6	844,6	22420	72675	2800	1	BT4B 334040/DA4
828,675	1143	733,425	825,5	21280	62225	2475	2	BT4B 332663/DA4
850	1360	910	910	32965	78850	5440	1	DLG 331069
863,6	1130,3	669,925	669,925	18810	58900	2000	1	BT4B 328857/DA4
863,6	1130,3	669,925	669,925	18810	58900	1900	1	BT4B 331123 B
863,6	1169,987	844,55	844,55	22610	72675	2700	1	BT4B 332967/DA4
863,6	1181,1	666,75	666,75	19855	54150	2150	1	BT4B 331649/DA4
863,6	1219,2	889	876,3	26695	77425	3470	1	BT4B 330742 A/DA4
863,6	1130,3	644,525	717,55	18810	58900	2100	2	BT4B 332571/DA4
872,769	1179,805	628,65	793,75	19855	54150	2530	2	BT4B 332960/DA4
872,769	1181,1	628,65	714,375	19855	54150	2450	2	BT4B 332786/DA4
872,847	1181,1	628,65	714,375	19855	54150	2450	2	BT4B 328956/DA4
877,888	1220	844,55	844,55	24700	72675	3080	1	BT4B 332981/DA4
879,475	1219,2	838,2	933,45	26695	77425	3680	2	BT4B 328074/DA4
889	1219,2	784,225	880	25650	74100	3340	2	BT4B 332602/DA4
896,903	1264	680	766	21755	60800	3100	2	BT4B 334081/DA4
901,7	1295,4	914,4	901,7	29260	82175	4170	1	DLG 330903 A
938,213	1270	825,5	825,5	24700	77425	3230	1	DLG 330726 A
939,8	1333,5	952,5	952,5	30305	90250	4510	1	BT4B 330944 AG/DA4
1004,634	1308,1	730,25	812,8	23370	72675	3060	2	BT4B 332720/DA4





Thrust taper roller bearings

Thrust tapered roller bearings can carry very heavy axial loads, what are intensive to shock and are stiff.

Tapered roller thrust bearings with cage are of separable design so that the two washers and the roller and cage thrust assembly can be mounted separately and easily.

Thrust tapered roller bearings can carry heavier thrust load then thrust spherical and cylindrical roller bearing with same envelope dimentions. They are designed for high thrust-load capacity and applications with increased pressures.

Mostly they are used machine tools, mill stands, oil well swivels, plastic extruders applications.

Mostly they are used machine tools, mill stands, oil well swivels, plastic extruders applications.

Single direction tapered roller thrust bearings

The washers of the bearings with shaft and housing washers having the same dimensions (see figure1-a) both have a tapered raceway and one retaining flange. Bearings of this design are to be preferred where very heavy axial loads are to be supported as, for example, in the swivels of drilling rigs or in crane hooks. The bearings have a

cage which is centred on both washers.

Bearings of the other design (see figure 1-b) have a shaft washer with tapered raceway and retaining flange whilst the housing washer is plane (flat). Therefore, bearings of this design are able to accept minor eccentricities of the shaft with respect to the housing bore without any detrimental influence on bearing performance. With the exception of a few sizes which have a full complement of rollers, the bearings are fitted with a roller centred cage.

Double direction thrust tapered roller bearings

Double direction thrust tapered roller bearings (see figure 1-c) are mainly used together with multi-row cylindrical roller bearings in rolling mill applications. Those bearings with a plane shaft washer are the more popular as they are able to accommodate slight eccentricities of the shaft with respect to the housing bore, of the order of the radial internal clearance of the radial bearing with which they are used. A spacer sleeve is arranged between the two housing washers. This is dimensioned so that the cover screws of the chock can be fully tightened and no special spring adjustment of the bearing is required.

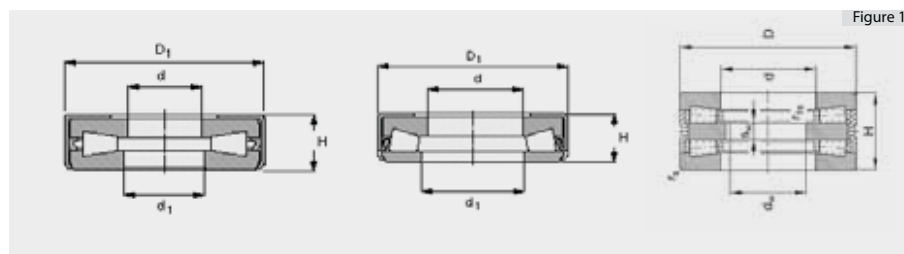


Figure 1

Shaft washer		Tolerance classes									
		Normal, P6, P5				P4		Normal	P6	P5	P4
d		Δ_{dmp}		V_{dp}	Δ_{dmp}		V_{dp}	Si	Si	Si	Si
over	incl.	high	low	max	high	low	max	max			
mm		μm		μm	μm		μm	μm			
-	18	0	-8	6	0	-7	5	10	5	3	2
18	30	0	-10	8	0	-8	6	10	5	3	2
30	50	0	-12	9	0	-10	8	10	6	3	2
50	80	0	-15	11	0	-12	9	10	7	4	3
80	120	0	-20	15	0	-15	11	15	8	4	3
120	180	0	-25	19	0	-18	14	15	9	5	4
180	250	0	-30	23	0	-22	17	20	10	5	4
250	315	0	-35	26	0	-25	19	25	13	7	5
315	400	0	-40	30	0	-30	23	30	15	7	5
400	500	0	-45	34	0	-35	26	30	18	9	6
500	630	0	-50	38	0	-40	30	35	21	11	7
630	800	0	-75	-	0	-50	-	40	25	13	8
800	1 000	0	-100	-	0	-70	-	45	30	15	8
1 000	1 250	0	-125	-	0	-100	-	50	35	18	9
1 250	1 600	0	-160	-	-	-	-	60	40	25	14

Tolerances

DAS LAGER single and double direction tapered roller thrust bearings's the bore and outside diameter tolerances as follow.

- d** Nominal bore diameter
- Δ_{dmp}** Deviation of the mean bore diameter from the nominal ($\Delta_{dmp} = dmp - d$)
- V_{dp}** Bore diameter variation; difference between the largest and smallest single bore diameters in one plane
- S_i** Thickness variation, measured from middle of raceway to back (seat) face of shaft washer and of housing washer, respectively (axial runout)

Minimum Load

The minimum axial load to be applied to single direction tapered roller thrust bearings can be estimated using

$$F_{am} = A (n/1000)^2$$

where

F_{am} = minimum axial load [kN]

A = minimum load factor (see product data)

n = rotational speed [r/min]

Equivalent dynamic bearing load

For single direction thrust tapered roller bearings which are subjected to purely axial dynamic loads

$$P = F_a$$

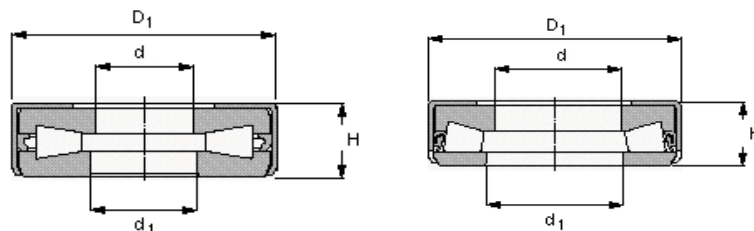
Equivalent static bearing load

For single direction tapered roller thrust bearings

$$P = F_a$$

Double Row Taper Roller Bearings

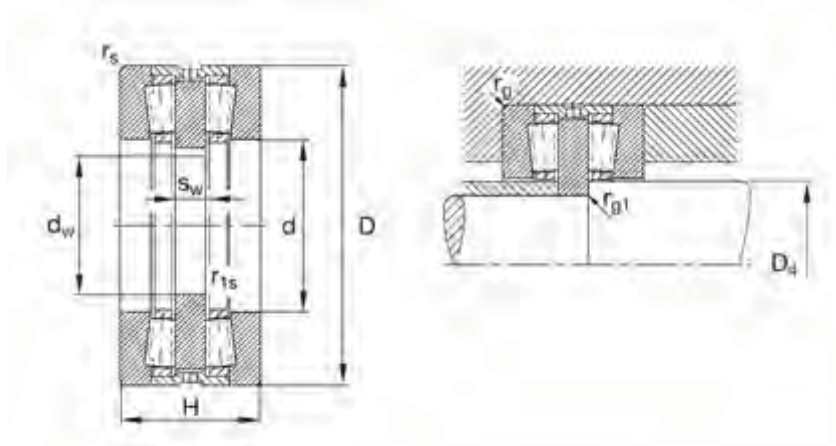
Non-standardized



Basic dimensions (mm)				Basic load ratings (kN)		Weight	Figure	Designation
d	D1	D	H	Cr	C0r	(kg)		
26,4	27	60	15	71	217	0,24	1	DLG 617500
30,02	32,08	66,675	19,446	89	261	0,34	1	DLG 634011 A
33,1	33,5	56,5	15,875	59	164	0,17	2	DLG 353153
36,652	37	66,675	19,7	84	252	0,31	2	DLG 353013 A
38,1	38,5	72,619	20	105	318	0,37	2	DLG 353115
38,9	41,3	76,5	20,433	113	342	0,43	1	DLG 634059
40	40,4	66	18	84	247	0,26	2	DLG 353166 B/DA3
40	40,4	66	18	84	247	0,26	2	DLG 353166 C/DA3
45,1	45,4	74	20	92	266	0,35	2	DLG 353118
46	46,4	78	22	96	271	0,44	2	BFSB 353291/DA3
50	50,4	78	22	96	271	0,4	2	DLG 353056 B
50	58	78	22	96	271	0,4	2	BFSB 353323/DA3
50,3	50,7	78	22	96	271	0,4	2	DLG 353143 A
50,6	51	78	22	96	271	0,38	2	DLG 353150 A
50,95	51,4	93,27	26,195	181	580	0,89	2	BFSB 353253 E-1
54	54,4	82	22	96	276	0,4	2	BFSB 353311 E/DA3
152,4	317,5	317,5	69,85	1397	6080	30	1	K-T 611
180	500	500	145	5225	24225	195	2	DLG 353022
203,2	419,1	419,1	92,075	2470	11020	65,5	1	K-T 811
220	500	500	125	3401	15200	160	1	351148 B
228,6	482,6	482,6	104,775	3135	14250	100	1	K-T 911
234,95	546,1	546,1	127	4342	20520	165	1	K-T 921
260	580	580	145	4446	20140	210	1	DLG 351153
279,4	603,25	601,675	136,525	6850	27075	205	2	BFSB 353316/DA7
279,4	603,25	603,25	136,525	5121	24700	205	1	K-T 1120
300	660	660	165	5643	25650	350	1	DLG 351195
300	663,5	658	165	6270	26600	315	2	BFSB 353916
340	460	457	73	1169	5415	37	2	BFSB 350565
347,5	710	710	160	7420	38000	345	2	DLG 351468 A
370	560	550	115	3344	13585	110	2	BFSB 353205
380	560	550	110	2717	11400	110	2	DLG 353164
480	730	730	112	3401	18050	180	2	DLG 350998
500	760	755	140	5643	28975	250	2	BFS 8000/DA1
558,8	1066,8	1065,225	285,75	18810	71250	1200	2	BFSB 353285/DA4
600	900	890	170	6688	30875	405	2	BFSB 353201
749,3	952,5	954,8	127	5539	28500	230	2	BFSB 353247
840	1140	1135	195	10640	60800	575	2	DLG 351573
1002	1274	1240	150	8522	54150	465	2	BFSB 353901/DA4
1005	1280	1274	150	7838	48450	505	2	BFSB 353210
1770	1930	1930	80	3135	30400	250	2	BFSB 353312/DA1
1828,8	2184,4	2182	203,2	19475	135850	1450	2	BFSB 353320/DA4

Double Row Taper Roller Bearings

Non-standardized



Basic dimensions (mm)			Basic load ratings (kN)		Weight	Designation
d	D	H	Cr	C0r	(kg)	
170	240	84	320	1230	12,5	DLG 350980 C
180	280	90	540	2290	22	DLG 353162
220	300	96	420	1580	20	DLG 351019 C
240	320	96	400	1810	21,5	DLG 351182 C
250	380	100	860	4330	43,5	DLG 353005
260	360	92	580	2480	28	DLG 350981 C
270	450	180	1570	5710	120	DLG 351164 C
305,07	530	200	2270	10080	185	BFDB 353194/HB3
320	440	108	950	4760	48,5	DLG 353102 A
320	470	130	1240	5420	80	DLG 350982 C
350	490	130	1120	4850	73,5	DLG 351100 C
350	540	135	1640	8700	115	DLG 353006
380	560	130	1710	9510	110	DLG 351175 C
380	650	215	3200	15780	275	BFDB 353204
400	650	200	2570	13020	235	DLG 353106
400	650	200	2570	13020	235	DLG 353106 C
400	650	200	2570	13020	230	DLG 353106 D
420	620	170	2300	11600	185	DLG 351121 C
420	620	185	2300	11600	200	BFDB 353200/HA3
440	645	167	1890	10270	190	DLG 353152
450	645	155	1890	10270	170	DLG 350916 D
470	720	200	3250	16730	285	DLG 351301 C
470	720	200	3250	16730	285	DLG 353151
470	720	210	3250	16730	305	BFDB 353238/HA3
530	710	218	2100	10460	245	DLG 351475 C
550	760	230	2780	12550	310	DLG 350976 C
600	880	290	4500	20150	550	BFDB 350824 B/HA1
600	910	290	4500	20150	655	DLG 350901 C
670	900	230	3410	18060	425	DLG 351761 A



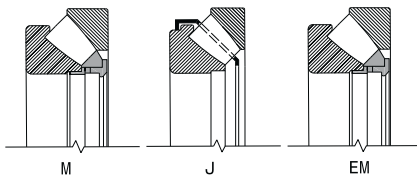


Thrust spherical roller bearings

DAS LAGER spherical roller thrust bearings contain a large number of asymmetrical barrel-shaped rollers, inclined so steeply that the bearing accommodates high axial loads in addition to considerable radial loads at relatively high rotational speeds. The spherical-shaped raceway of the housing washer accommodates misalignment between the shaft and housing. Spherical roller thrust bearings are separable, which allows the shaft washer, cage and roller assembly to be mounted separately from the housing washer. Due to their internal design these bearings need to be lubricated with oil, except under extremely low speeds where grease lubrication is adequate. Applications for this bearing type include column bearings for cranes, brick machines, plansifter, cement industry, heavy worm gears, and screw pumps.

Cage

DAS LAGER spherical roller thrust bearings are designed and produced with steel and brass cages. Each cage design is designated by "J" for steel and "M" for brass cages. See the follow picture for cage design construction.



Boundary Dimensions

Boundary dimensions of spherical roller thrust bearings comply with standard ISO 104.

Tolerance

"Spherical roller thrust bearings are produced in accordance to ABEC 1 or P0 tolerance class. All of these tolerances comply with standard ISO 492."

Misalignment

The spherical raceway of the bearing housing washer enables the bearing to accept a considerable amount of misalignment. See the table below for approximate values of misalignment. Please note these values are sufficient for normal operating conditions.

Bearing Type Permissible Misalignment

292	2°
293	2°30'
294	3°

Axial Equivalent Dynamic Load

$$P_a = F_a + 1.2 F_r \quad (F_r < 0.55 F_a) \text{ [kN]}$$

Minimum Axial Load

At high rotational speeds a roller thrust bearing may experience roller element sliding if a minimum load is not applied. For calculation of minimum axial load $F_{a \min}$ the following equation can be used:

$$\frac{C_{0a}}{2000} \leq F_{a \min} = 1.8 F_r M \frac{n_{\max}}{100}^2 \text{ kN}$$

$F_{a \min}$: minimum axial load [kN]

F_r : radial bearing load [kN]

C_{0a} : axial basic static load rating [kN]

$n_{\max}$: maximum rotational speed [rpm]

M : minimum axial load factor

If the axial load applied is too small, it is necessary to create an axial load with the use of springs or a similar device.

If a radial load is applied simultaneously, the following condition must also be fulfilled:

$$F_r < 0.55 F_a$$

Axial Equivalent Static Load

$$P = F_a + 2.7 F_r \quad (F_r < 0.55 F_a) \text{ [kN]}$$

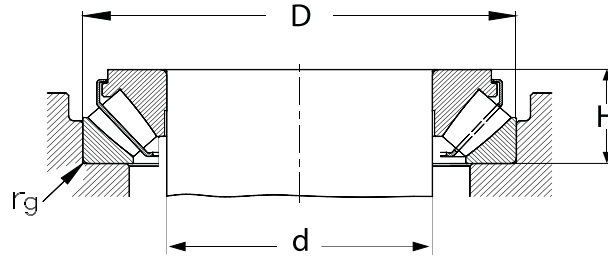
The static safety factor for spherical roller thrust bearings must be so > 4 .

Designation

Suffix	Spherical Roller Thrust Bearings Description	Example of Designation
E	Internal design change for enhanced load carrying capacity	29426 EJ
J	Pressed steel cage guided on the rolling elements	29336 J
M	Machined brass cage guided on the rolling elements	29430 M

Thrust Spherical Roller Bearings

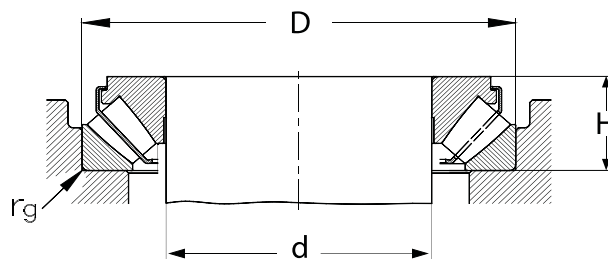
Non-standardized



Basic dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	H	Cr	C0r	Grease	Oil	(kg)	
60	130	42	371	869	2000	2400	2,6	29412
65	140	45	432	1026	1875	2250	3,2	29413
70	150	48	494	1188	1725	2070	3,9	29414
75	160	51	570	1359	1725	2070	4,7	29415
80	170	54	637	1549	1600	1900	5,6	29416
85	150	39	361	1007	1700	2050	2,75	29317
85	180	58	698	1710	1400	1700	6,75	29417
90	155	39	380	1026	1750	2100	2,85	29318
90	190	60	774	1900	1300	1600	7,75	29418
100	170	42	442	1226	1600	1900	3,65	29320
100	210	67	931	2375	1250	1500	10,5	29420
110	190	48	580	1644	1300	1600	5,3	29322
110	230	73	1121	2850	1125	1350	13,5	29422
120	210	54	727	2014	1250	1500	7,35	29324
120	250	78	1302	3278	1100	1300	17,5	29424
130	225	58	822	2375	1200	1400	9	29326
130	270	85	1482	3848	1000	1200	22	29426
140	240	60	931	2708	1100	1300	10,5	29328
140	280	85	1549	4085	1000	1200	23	29428
150	215	39	388	1520	1250	1500	4,3	29230
150	250	60	950	2708	1125	1350	11	29330
150	300	90	1767	4845	920	1100	28	29430
160	270	67	1121	3278	920	1100	14,5	29332
160	320	95	1976	5320	830	1000	33,5	29432
170	340	103	2242	6223	750	900	44,5	29434 E
180	250	42	470	1938	1125	1350	5,8	29236 E
180	300	73	1359	4085	900	1080	19,5	29336 E
180	360	109	2470	6983	700	850	52,5	29436 E
190	320	78	1549	4513	825	990	23,5	29338 E
190	380	115	2708	7600	670	800	60,5	29438 E
200	280	48	623	2518	1000	1200	9,3	29240 E
200	340	85	1767	5225	700	850	29,5	29340 E
200	400	122	3040	8550	625	750	72	29440 E
220	300	48	656	2850	1000	1200	10	29244 E
220	360	85	1900	5985	700	850	33,5	29344 E
220	420	122	3183	9168	580	700	75	29444 E
240	340	60	759	3278	825	990	16,5	29248
240	380	85	1938	6223	720	855	35,5	29348 E
240	440	122	3230	9690	600	720	80	29448 E
260	360	60	776	3468	825	990	18,5	29252
260	420	95	2423	7885	600	720	49	29352 E
260	480	132	3848	12255	525	630	105	29452 E
280	380	60	820	3800	710	855	19,5	29256
280	440	95	2423	8218	600	720	53	29356 E
280	520	145	4655	14535	460	550	135	29456 E
300	420	73	1017	4560	640	770	30,5	29260

Thrust Spherical Roller Bearings

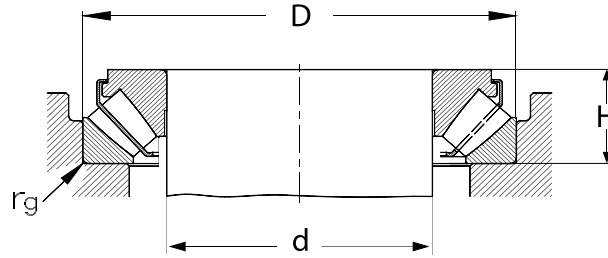
Non-standardized



Basic dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	H	Cr	C0r	Grease	Oil	(kg)	
300	480	109	2945	10070	525	630	75	29360 E
300	540	145	4750	15770	480	580	140	29460 E
320	440	73	1055	4845	600	720	33	29264
320	500	109	3183	10640	525	630	78	29364 E
320	580	155	5415	18050	425	510	175	29464 E
340	460	73	1074	5130	600	720	33,5	29268
340	540	122	2575	10450	425	510	105	29368
340	620	170	6365	21280	420	500	220	29468 E
360	500	85	1387	6460	525	630	52	29272
360	560	122	2622	11020	425	510	110	29372
360	640	170	5890	20140	400	480	230	29472 M
380	520	85	1501	7268	500	600	53	29276
380	600	132	3173	13300	400	480	140	29376
380	670	175	6460	22800	400	480	260	29476 M
400	540	85	1530	7600	500	600	55,5	29280
400	620	132	3278	13870	375	450	150	29380
400	710	185	7268	25175	330	400	310	29480 M
420	580	95	1891	9310	450	540	75,5	29284
420	650	140	3553	15200	360	430	170	29384
420	730	185	7410	26125	330	400	325	29484 M
440	600	95	1967	9880	450	540	78	29288
440	680	145	4940	18335	375	450	180	29388 M
440	780	206	8550	30400	300	360	410	29488 M
460	620	95	1967	10070	425	510	81	29292
460	710	150	4095	18050	320	380	215	29392
460	800	206	8835	31825	300	360	425	29492 M
480	650	103	2233	11210	400	480	98	29296
480	730	150	4152	18620	320	380	220	29396
480	850	224	9073	37050	250	290	550	29496 M
500	670	103	2271	11875	400	470	100	292500
500	750	150	4266	19380	300	360	235	293500
500	870	224	8902	38000	250	290	560	294500 M
530	710	109	2955	14535	375	450	115	292530 M
530	800	160	4969	22420	300	350	270	293530
530	920	236	9975	41800	225	270	650	294530 M
560	750	115	2841	15200	340	405	140	292560
560	980	250	11400	48450	200	250	810	294560 M
600	800	122	3553	17670	230	280	170	292600 M
600	1030	258	12445	53200	200	230	845	294600 M
630	850	132	4532	22420	300	350	210	292630 M
630	950	190	8028	36100	225	270	485	293630 M
630	1090	280	13680	58900	200	220	1040	294630 M
670	900	140	3990	21660	275	330	255	292670
670	1150	290	14630	64600	170	200	1210	294670 M
710	1060	212	9453	43225	200	230	660	293710 M
710	1220	308	16720	72675	150	180	1500	294710 E

Thrust Spherical Roller Bearings

Non-standardized



Basic dimensions (mm)			Basic load ratings (kN)		Speed Ratings		Weight	Designation
d	D	H	Cr	C0r	Grease	Oil	(kg)	
750	1000	150	5795	29450	250	290	325	292/750 M
750	1120	224	8902	42750	190	220	770	293/750
750	1280	315	17765	80750	150	170	1650	294/750 E
800	1060	155	6232	32775	225	270	380	292/800 M
800	1180	230	9453	46550	170	200	865	293/800
800	1360	335	19190	88350	140	160	2025	294/800 E
850	1120	160	6394	34200	220	260	425	292/850 M
850	1440	354	22705	102600	125	150	2390	294/850 E
900	1520	372	25365	115900	120	135	2650	294/900 E
950	1250	180	7866	43225	190	220	600	292/950 M
950	1600	390	26790	125400	100	120	3065	294/950 E
1060	1400	206	9975	55575	150	180	860	292/1060 E
1060	1770	426	31730	148200	90	99	4280	294/1060 E
1180	1520	206	10355	60800	150	180	950	292/1180 E
1250	1800	330	23560	122550	90	108	2770	293/1250 E
1600	2280	408	34960	190000	70	80	5375	293/1600 E





Thrust Ball Bearings

Thrust Ball Bearings are separable axial bearings.

Thrust ball bearing are produced both single and double direction.

Thrust ball bearings are only suitable for low to medium operating speeds.

Thrust ball bearings can carry comparatively high axial loads but they are not suitable for radial loads.

Thrust ball bearings are used in applications where axial loads are too high to be supported by radial bearings or when rigid axial guidance is required.

Single direction thrust ball bearings: (see figure a, b and c)

DAS LAGER single direction thrust ball bearings have one row of balls within a cage, running between two grooved washers. The washers have flat seating surfaces that must be completely supported so that all of the balls can be evenly loaded. This type can carry axial load only one direction.

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).

The bearings are separable so that mounting is simple as the washers and the ball and cage assembly can be mounted separately.

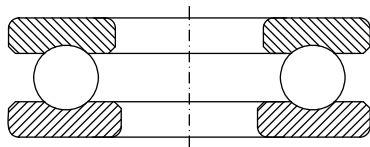
Double direction thrust ball bearings: (see figure d, e and f)

DAS LAGER double direction thrust ball bearings consist of one shaft washer, two housing washers and two ball and cage thrust assemblies. The bearings are separable so that mounting is simple. The various parts can be mounted separately. The housing washers and ball and cage thrust assemblies are identical to those of the single direction bearings.

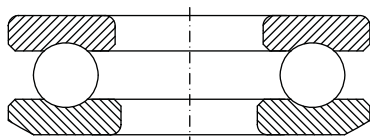
Double direction thrust ball bearings can accommodate axial loads acting in both directions and can thus serve to axially locate a shaft in both directions. They must not be subjected to radial load.

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).

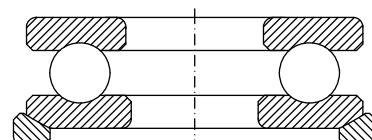
For compensation of possible aligning errors the double direction thrust ball bearings may be used in conjunction with Seating Washers (series U2, U3 and U4, see figure f).



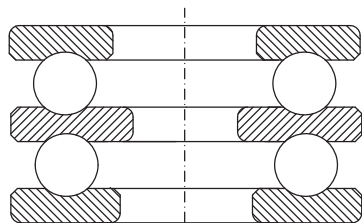
a



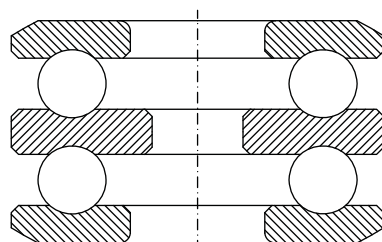
b



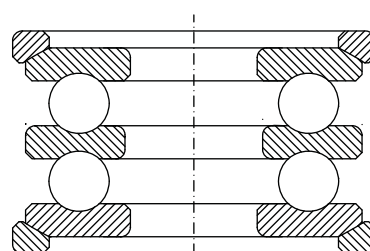
c



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

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

DAS LAGER 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, they 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

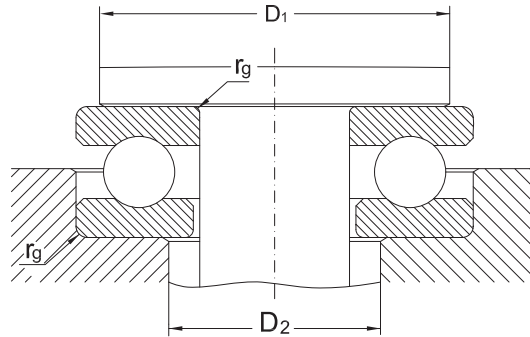
The bearing washer must contact adjacent parts with their face sides only. The radii of bearing corners must not touch the shoulder fillet radii of the shaft or housing shoulders.

Therefore, the largest fillet radius (r_f) must be smaller than the minimum fillet dimension of the bearing rings (r_s) as listed in the bearing tables.

Suffix Designation

- A** Internal design change for enhanced limiting speed
- FP** Machined steel cage guided on the rolling elements
- MP** Machined brass cage guided on the rolling elements
- P6** Higher tolerance class than normal
- P5** Higher tolerance class than P6

Abutment and Fillet dimensions for Thrust Ball bearings of series 511, 512, 513 and 514 [mm]

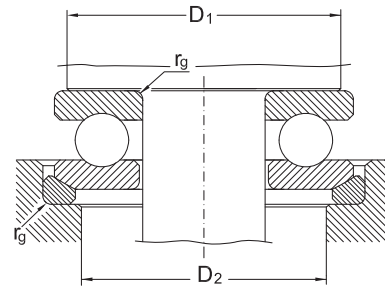
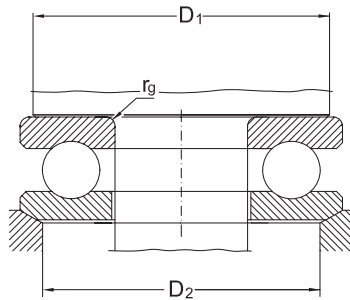


Shaft Φd_1	Bore reference number	Bearing Series											
		511			512			513			514		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm													
10	00	18	16	0,3	20	16	0,6	-	-	-	-	-	-
12	01	20	18	0,3	22	18	0,6	-	-	-	-	-	-
15	02	23	20	0,3	25	22	0,6	-	-	-	-	-	-
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]

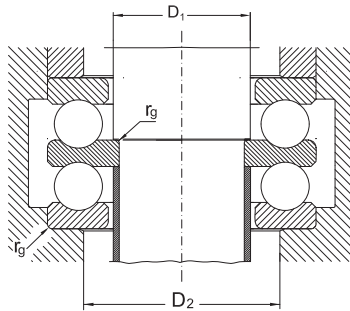
Shaft Φd_1	Bore reference number	Bearing Series								
		511			512			513		
		D ₁ min	D ₂ min	r _g max	D ₁ min	D ₂ min	r _g max	D ₁ min	D ₂ min	r _g max
mm										
160	32	184	176	1	199	186	1,5	226	204	2,5
170	34	197	188	1	212	198	1,5	236	214	2,5
180	36	207	198	1	222	208	1,5	252	228	2,5
190	38	220	210	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]



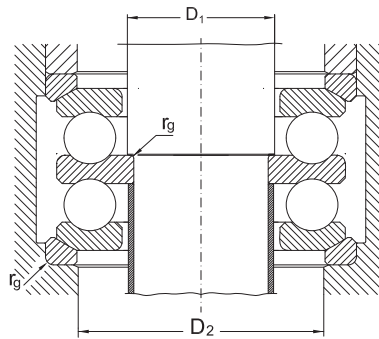
Shaft Φd_1	Bore reference number	Bearing Series								
		532			533			534		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm										
10	00	20	18	0,6	-	-	-	-	-	-
12	01	22	20	0,6	-	-	-	-	-	-
15	02	25	24	0,6	-	-	-	-	-	-
17	03	28	26	0,6	-	-	-	-	-	-
20	04	32	30	0,6	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-

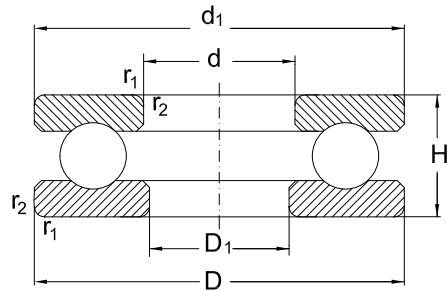
Abutment and Fillet dimensions for Thrust Ball bearings of series 542, 543 and 544 [mm]



Shaft Φd_1	Bore reference number	Bearing Series												
		542				543				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	Shaft	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	-	-	-	-	-	-	-	-	-



Thrust Ball bearings, single direction



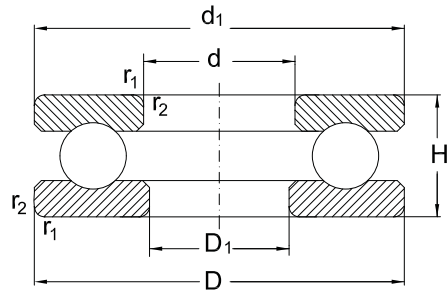
511/ 512/ 513/ 514

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	9,5	14,5	7000	9500
	26	11	0,6	51200	12,1	17,7	6000	8000
12	26	9	0,3	51101	9,9	15,8	6700	9000
	28	11	0,6	51201	12,6	19,8	6000	8000
15	28	9	0,3	51102	10,1	17,4	6300	8500
	32	11	0,6	51202	15,7	25,7	5000	6700
17	30	9	0,3	51103	10,8	20,1	6300	8500
	35	12	0,6	51203	16,3	28,5	5000	6700
20	35	10	0,3	51104	14,3	27,6	5300	7000
	40	14	0,6	51204	21,4	38,5	4300	5600
25	42	11	0,6	51105	17,3	37,1	4800	6300
	47	15	0,6	51205	26,2	52,3	3800	5000
	52	18	1	51305	32,8	57,0	3150	4200
	60	24	1	51405	52,5	91,7	2600	3600
30	47	11	0,6	51106	18,1	40,9	4300	5600
	52	16	0,6	51206	24,2	48,5	3600	4800
	60	21	1	51306	35,8	67,5	2900	3900
	70	28	1	51406	69,2	130,0	2200	3200
35	52	12	0,6	51107	18,9	48,5	4000	5300

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
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



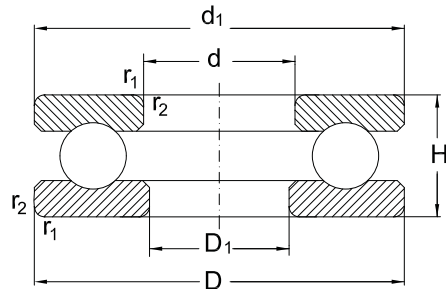
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Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm					kN	min^{-1}		
35	62	18	1	51207	33,3	69,8	3000	4000
	68	24	1	51307	46,9	91,7	2600	3600
	80	32	1,1	51407	82,7	162,0	2000	3000
40	60	13	0,6	51108	24,7	59,9	3400	4500
	68	19	1	51208	44,5	101,0	2800	3800
	78	26	1	51308	58,7	116,0	2200	3200
	90	36	1,1	51408	106,0	213,0	1700	2400
45	65	14	0,6	51109	25,2	66,0	3400	4500
	73	20	1	51209	37,1	82,2	2600	3600
	85	28	1	51309	72,3	145,0	2000	3000
	100	39	1,1	51409	124,0	252,0	1600	2200
50	70	14	0,6	51110	25,7	71,3	3200	4300
	78	22	1	51210	46,9	110,0	2400	3400
	95	31	1,1	51310	84,0	181,0	1900	2800
	110	43	1,5	51410	151,0	323,0	1500	2000
55	78	16	0,6	51111	29,2	80,8	2800	3800
	90	25	1	51211	58,7	139,0	2200	3200
	105	35	1,1	51311	98,8	213,0	1700	2400
	120	48	1,5	51411	185,0	380,0	1300	1800

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
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



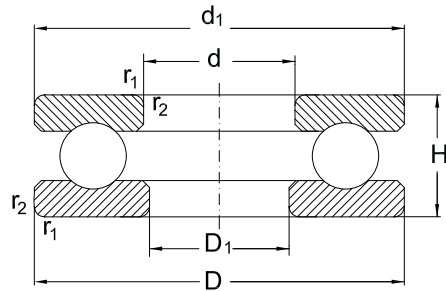
511/ 512/ 513/ 514

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	39,5	116,0	2600	3600
	95	26	1	51212	59,3	143,0	2000	3000
	110	35	1,1	51312	96,0	213,0	1600	2200
	130	51	1,5	51412 FP	189,0	409,0	1200	1700
65	90	18	1	51113	35,8	103,0	2400	3400
	100	27	1	51213	60,5	155,0	2000	3000
	115	36	1,1	51313	101,0	228,0	1600	2200
	140	56	2	51413 FP	205,0	466,0	1100	1600
70	95	18	1	51114	38,3	114,0	2400	3400
	105	27	1	51214	61,8	164,0	1900	2800
	125	40	1,1	51314	128,0	304,0	1400	1900
	150	60	2	51414 FP	222,0	523,0	1100	1600
75	100	19	1	51115	42,0	139,0	2200	3200
	110	27	1	51215	64,2	174,0	1900	2800
	135	44	1,5	51315	155,0	371,0	1300	1800
	160	65	2	51415 FP	238,0	580,0	1000	1500
80	105	19	1	51116	42,7	145,0	2200	3200
	115	28	1	51216	72,3	198,0	1800	2600
	140	44	1,5	51316	151,0	371,0	1300	1800
	170	68	2,1	51416 FP	257,0	637,0	950	1400

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
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



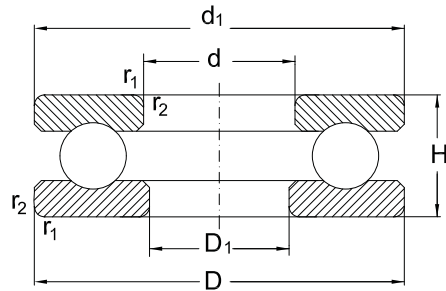
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Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
85	110	19	1	51117	43,9	155,0	2200	3200
	125	31	1	51217	92,6	261,0	1600	2200
	150	49	1,5	51317	181,0	442,0	1200	1700
	177	72	2,1	51417 FP	272,0	713,0	900	1300
90	120	22	1	51118	56,2	198,0	1900	2800
	135	35	1,1	51218	113,0	309,0	1500	2000
	155	50	1,5	51318	185,0	475,0	1200	1700
	187	77	2,1	51418 FP	292,0	774,0	850	1200
100	135	25	1	51120	80,9	276,0	1600	2200
	150	38	1,1	51120 FP	75,3	247,0	1400	1900
	170	55	1,5	51220	118,0	328,0	1100	1600
	205	85	3	51320	218,0	580,0	750	1000
110	145	25	1	51420 FP	352,0	1007,0	1600	2200
	160	38	1,1	51122	82,7	299,0	1300	1800
	187	63	2	51222	124,0	371,0	950	1400
	225	95	3	51322 FP	267,0	774,0	700	950
120	155	25	1	51422 FP	390,0	1159,0	1500	2000
	170	39	1,1	51124	84,0	318,0	1200	1700
	205	70	2,1	51224	133,0	418,0	850	1200
	245	102	4	51324 FP	309,0	931,0	670	900

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
d	d ₁	D ₁	Bearing	
mm				[kg]
85	110	87	0,60	
	125	88	1,22	
	150	88	3,53	
	180	88	9,79	
90	120	92	0,88	
	135	93	1,68	
	155	93	3,57	
	190	93	11,60	
100	135	102	1,30	
	150	103	2,22	
	170	103	4,95	
	210	103	15,40	
110	145	112	1,45	
	160	113	2,41	
	190	113	7,70	
	230	113	20,80	
120	155	122	1,59	
	170	123	2,67	
	210	123	10,70	
	250	123	26,50	

Thrust Ball bearings, single direction



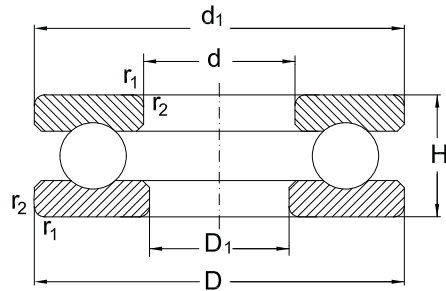
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Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
130	170	30	1	51126	105,0	404,0	1300	1800
	187	45	1,5	51226	177,0	556,0	1100	1600
	220	75	2,1	51326 MP	340,0	1083,0	800	1100
	265	110	4	51426 FP	494,0	1644,0	600	800
140	178	31	1	51128	105,0	418,0	1300	1800
	197	46	1,5	51228	181,0	589,0	1000	1500
	235	80	2,1	51328 MP	377,0	1254,0	750	1000
150	188	31	1	51130 FP	105,0	418,0	1200	1700
	212	50	1,5	51230 MP	226,0	760,0	950	1400
	245	80	2,1	51330 MP	390,0	1330,0	700	950
	295	120	4	51430 FP	531,0	1862,0	560	750
160	198	31	1	51132 FP	106,0	442,0	1200	1700
	222	51	1,5	51232 MP	230,0	808,0	950	1400
	265	87	3	51332 M	427,0	1577,0	670	900
170	213	34	1,1	51134 FP	126,0	513,0	1100	1600
	237	55	1,5	51234 MP	272,0	969,0	850	1200
	275	87	3	51334 M	445,0	1672,0	670	900
180	222	34	1,1	51136 FP	128,0	542,0	1000	1500
	245	56	1,5	51236 MP	281,0	1026,0	850	1200
	295	95	3	51336 M	494,0	1900,0	600	800

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
d	d ₁	D ₁	Bearing	
mm			[kg]	
130	170	132	2,37	
	190	133	3,99	
	225	134	13,00	
	270	134	32,80	
140	180	142	2,59	
	200	143	4,33	
	240	144	15,70	
150	190	152	2,26	
	215	153	6,09	
	250	154	16,40	
	300	154	43,10	
160	200	162	2,39	
	225	163	6,56	
	270	164	21,30	
170	215	172	3,08	
	240	173	8,12	
	280	174	22,50	
180	225	183	3,17	
	250	183	8,70	
	300	184	28,3	

Thrust Ball bearings, single direction



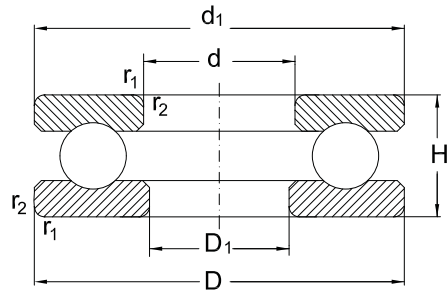
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Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
190	237	37	1,1	51138 FP	163,0	675,0	950	1400
	265	62	2	51238 MP	315,0	1207,0	750	1000
	315	105	4	51338 M	562,0	2280,0	560	750
200	245	37	1,1	51140 FP	160,0	675,0	950	1400
	275	62	2	51240 MP	321,0	1254,0	750	1000
	335	110	4	51340 M	593,0	2470,0	530	700
220	265	37	1,1	51144 FP	169,0	760,0	850	1200
	295	63	2	51244 MP	333,0	1387,0	700	950
240	297	45	1,5	51148 FP	222,0	988,0	750	1000
	335	78	2,1	51248 MP	439,0	1900,0	600	800
260	317	45	1,5	51152 FP	226,0	1045,0	750	1000
	355	79	2,1	51252 MP	451,0	2052,0	560	750
280	347	53	1,5	51156 FP	303,0	1387,0	670	900
	375	80	2,1	51256 MP	469,0	2204,0	560	750
300	376	62	2	51160 FP	346,0	1672,0	600	800
	415	95	3	51260 MP	575,0	2850,0	480	630
320	396	63	2	51164 FP	352,0	1767,0	560	750
	435	95	3	51264 MP	543,0	2850,0	480	630
340	416	64	2	51168 FP	358,0	1862,0	560	750
	455	96	3	51268 M	575,0	3040,0	450	600

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
d	d ₁	D ₁	Bearing	
mm				[kg]
190	240	193	4,08	
	270	194	11,70	
	320	195	35,70	
200	250	203	4,26	
	280	204	12,00	
	340	205	44,30	
220	270	223	4,64	
	300	224	13,20	
240	300	243	7,69	
	340	244	23,00	
260	320	263	8,25	
	360	264	25,20	
280	350	283	12,50	
	380	284	26,70	
300	380	304	17,70	
	420	304	42,30	
320	400	324	19,10	
	440	325	44,20	
340	420	344	20,50	
	460	345	47,00	

Thrust Ball bearings, single direction



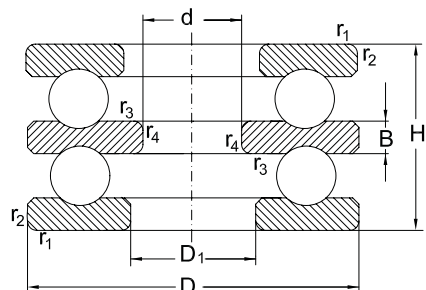
511/ 512/ 513/ 514

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	436	65	2	51172 MP	371,0	1976,0	530	700
	495	110	4	51272 M	704,0	3943,0	400	530
380	456	65	2	51176 MP	377,0	2090,0	500	670
400	476	65	2	51180 MP	383,0	2166,0	500	670
420	495	65	2	51184 MP	390,0	2280,0	480	630
460	555	80	2,1	51192 MP	501,0	3088,0	430	560
500	595	80	2,1	511/500 MP	525,0	3420,0	400	530
530	635	85	3	510/530 MP	193,0	1520,0	360	480
560	665	85	3	511/560 MP	618,0	4418,0	300	380

Thrust Ball bearings, single direction

Shaft		Dimensions		Weight
d	d ₁	D ₁	Bearing	
mm				[kg]
360	440	364	21,50	
	500	365	69,50	
380	460	384	22,40	
400	480	404	23,50	
420	500	424	24,40	
460	560	464	42,00	
500	600	505	44,90	
530	640	535	54,80	
560	670	565	58,00	

Thrust Ball bearings, double direction



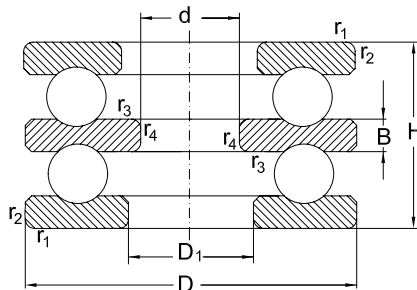
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Shaft		Dimension			Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm						kN	min ⁻¹		
10	32	22	0,6	0,3	52202	15,7	25,7	5000	6700
15	40	26	0,6	0,3	52204	21,4	38,5	4300	5600
	60	45	1	0,6	52205	26,2	52,3	2600	3600
20	47	28	0,6	0,3	52205	28	50,4	3800	5000
	52	34	1	0,3	52305	32,8	57	3200	4300
	70	52	1	0,6	52406	69,2	130	2200	3200
25	52	29	0,6	0,3	52206	24,2	48,5	3600	4800
	60	38	1	0,3	52306	35,8	67,5	3000	4000
	80	59	1,1	0,6	52407	82,7	162	2000	3000
30	62	34	1	0,3	52207	33,3	69,8	3000	4000
	68	36	1	0,6	52208	44,5	101	2800	3800
	68	44	1	0,3	52307	46,9	91,7	2600	3600
	78	49	1	0,6	52308	58,7	116	2200	3200
	90	65	1,1	0,6	52408	106	213	1700	2400
35	73	37	1	0,6	52209	37,1	82,2	2600	3600
	85	52	1	0,6	52309	72,3	145	2000	3000
	100	72	1,1	0,6	52409	124	252	1600	2200
40	78	39	1	0,6	52210	46,9	110	2400	3400
	95	58	1,1	0,6	52310	84	181	1900	2800
	110	78	1,5	0,6	52410	156	310	1500	200

Thrust Ball bearings, double direction

Shaft		Dimensions		Weight
d	D ₁	B	Bearing	
mm			[kg]	
10	17	5	0,08	
15	22	6	0,15	
	27	11	0,59	
20	27	7	0,22	
	27	8	0,32	
	32	12	0,92	
25	32	7	0,25	
	32	9	0,47	
	37	14	1,35	
30	37	8	0,41	
	42	9	0,55	
	37	10	0,68	
	42	12	1,01	
	42	15	1,92	
35	47	9	0,60	
	47	12	1,25	
	47	17	2,55	
40	52	9	0,71	
	52	14	1,77	
	52	18	3,43	

Thrust Ball bearings, double direction



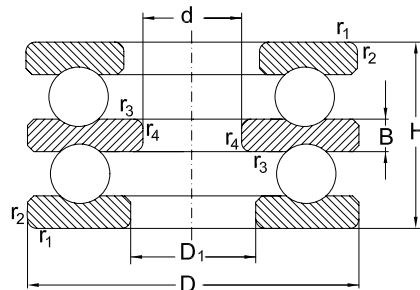
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Shaft		Dimension			Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm						kN	min ⁻¹		
45	90	45	1	0,6	52211	58,7	139	2200	3200
	105	64	1,1	0,6	52311	98,8	213	1700	2400
	120	87	1,5	0,6	52411	169	371	1300	1800
50	95	46	1	0,6	52212	59,3	143	2000	3000
	110	64	1,1	0,6	52312	96	213	1600	2200
	130	93	1,5	0,6	52412	189	409	1200	1700
	140	101	2	1	52413	216	450	1100	1600
55	100	47	1	0,6	52213	60,5	155	2000	3000
	105	47	1	1	52214	61,8	164	1900	2800
	115	65	1,1	0,6	52313	101	228	1600	2200
	125	72	1,1	1	52314	128	304	1400	1900
	150	107	2	1	52414	222	523	1100	1600
60	110	47	1	1	52215	64,2	174	1900	2800
	135	79	1,5	1	52315	155	371	1300	1800
	160	115	2	1	52415	250	560	1000	1500
65	115	48	1	1	52216	72,3	198	1800	2600
	140	79	1,5	1	52316	151	371	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	92,6	261	1600	2200

Thrust Ball bearings, double direction

Shaft		Dimensions		Weight
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



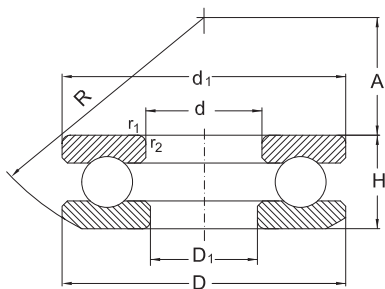
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Shaft		Dimension		Designation		Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.	r_3, r_4 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm						kN		min^{-1}	
70	150	87	1,5	1	52317	157	371	1200	1700
	190	135	2,1	1,1	52418	252	580	850	1200
75	135	62	1,1	1	52218	113	309	1500	200
	155	88	1,5	1	52318	228	570	1200	1700
80	210	150	3	1,1	52420	247	855	750	1000
85	150	67	1,1	1	52220	118	328	1400	1900
	170	97	1,5	1	52320	218	580	1100	1600
95	160	67	1,1	1	52222	124	371	1300	1800
	190	110	2	1	52322MP	152	418	950	1400
100	170	68	1,1	1,1	52224	133	418	1200	1700
	210	123	2,1	1,1	52324MP	171	475	850	1200
110	190	80	1,5	1,1	52226	177	556	1100	1600
	225	130	2,1	1,1	52326MP	219	589	800	1100
120	200	81	1,5	1,1	52228	181	589	1000	1500
	240	140	2,1	1,1	52328MP	238	646	750	1000
130	215	89	1,5	1,1	52230MP	226	760	950	1400
140	225	90	1,5	1,1	52232MP	230	808	950	1400
150	240	97	1,5	1,1	52234MP	272	969	850	1200

Thrust Ball bearings, double direction

Shaft		Dimensions		Weight
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	

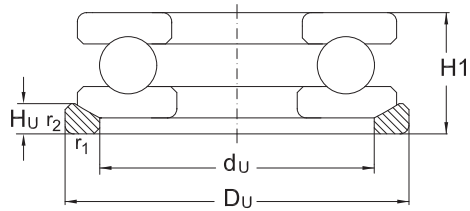
Thrust Ball bearings, single direction, with Sphered Housing Washer



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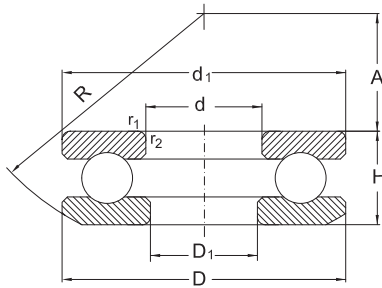
Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm						kN		min ⁻¹	
10	26	11,6	0,6	53200	U200	12,7	17	6000	8000
12	28	11,4	0,6	53201	U201	13,2	19	6000	8000
15	32	13,3	0,6	53202	U202	16,6	25	5000	6700
17	35	13,2	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



Dimensions									Weight	
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

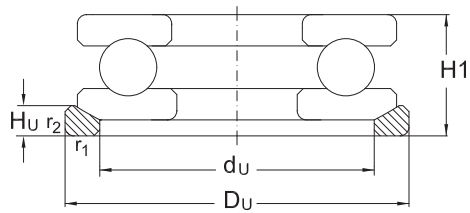
Thrust Ball bearings, single direction, with Sphered Housing Washer



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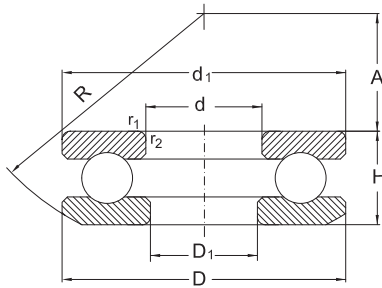
Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.	Bearing	Seating Washer	dyn. C_a	stat. C_{0a}	grease	oil
mm						kN		min^{-1}	
45	73	21,3	1	53209	U209	39	80	2600	3600
	85	30,1	1	53309	U309	75	140	2000	3000
	100	42,4	1,1	53409	U409	129	245	1600	2200
50	78	23,5	1	53210	U210	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	53412FP	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	53413FP	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	53414FP	U414	236	500	1100	1600

Thrust Ball bearings, single direction, with Sphered Housing Washer



Dimensions									Weight	
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

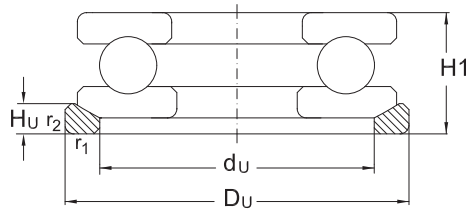
Thrust Ball bearings, single direction, with Sphered Housing Washer



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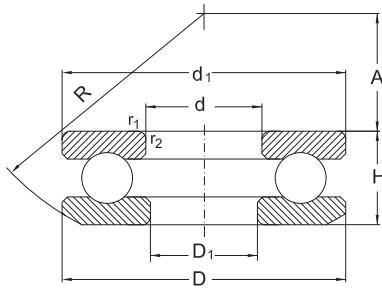
Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.	Bearing	Seating Washer	dyn. C_a	stat. C_{0a}	grease	oil
mm						kN	min ⁻¹		
75	110	28,3	1	53215	U215	67	170	1900	2800
	135	48,1	1,5	53315	U315	163	360	1300	1800
	160	69	2	53415FP	U415	250	560	1000	1500
80	115	29,5	1	53216	U216	75	190	1800	2600
	140	47,6	1,5	53316	U316	160	360	1300	1800
	170	72,2	2,1	53416FP	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	53417FP	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	53418FP	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	53420FP	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	53422FP	U422	415	1140	700	950

Thrust Ball bearings, single direction, with Sphered Housing Washer



Dimensions									Weight	
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

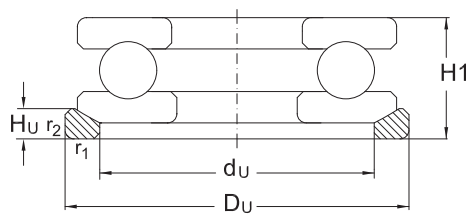
Thrust Ball bearings, single direction, with Sphered Housing Washer



532/ 533/ 534

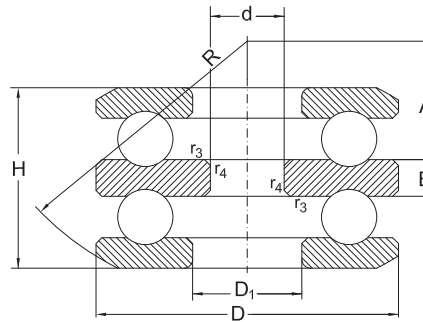
Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm						kN		min ⁻¹	
120	170	40,8	1,1	53224	U224	140	400	1200	1700
	210	74,1	2,1	53324MP	U324	325	915	850	1200
	250	107,3	4	53424FP	U424	425	1220	670	900
130	190	47,9	1,5	53226	U226	183	540	1100	1600
	225	80,3	2,1	53326MP	U326	360	1060	800	1100
	270	115,2	4	53426FP	U426	520	1600	600	800
140	200	48,6	1,5	53228	U228	190	570	1000	1500
	240	84,9	2,1	53328MP	U328	400	1220	750	1000
150	215	53,3	1,5	53230MP	U230	236	735	950	1400
	250	83,7	2,1	53330MP	U330	405	1290	700	950
160	225	54,7	1,5	53232MP	U232	245	780	950	1400
170	240	58,7	1,5	53234MP	U234	285	930	850	1200
180	250	58,2	1,5	53236MP	U236	290	1000	700	1100
190	270	65,7	2	53238MP	U238	335	1160	600	1000

Thrust Ball bearings, single direction, with Sphered Housing Washer



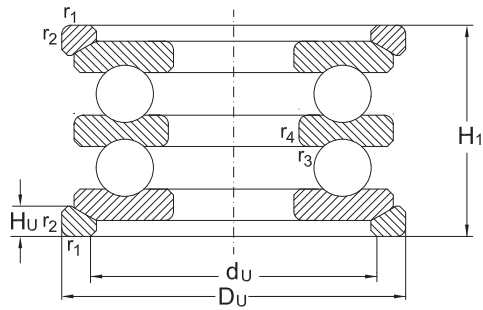
Dimensions									Weight	
d	D ₁	d ₁	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
120	123	170	125	61	145	175	15	46	2,57	0,65
	123	205	160	63	165	220	22	80	10,60	2
	123	245	200	70	185	260	32	118	28,10	4,7
130	133	187	140	67	160	195	17	53	3,93	0,9
	134	220	160	53	177	235	26	86	12,90	2,5
	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



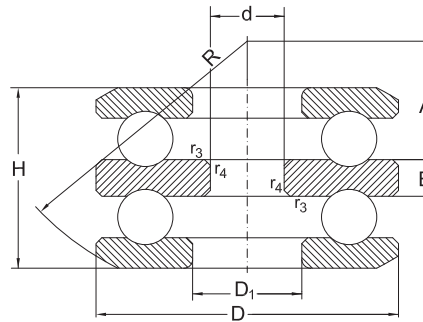
Shaft	Dimension				Designation		Basical radial load		Speed limit	
	d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease oil
mm								kN		min ⁻¹
10	32	24,6	0,6	0,3		54202	U202	16,6	25	5000 6700
15	40	27,4	0,6	0,3		54204	U204	22,4	37,5	4300 5600
	60	49,7	1	0,6		54405	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



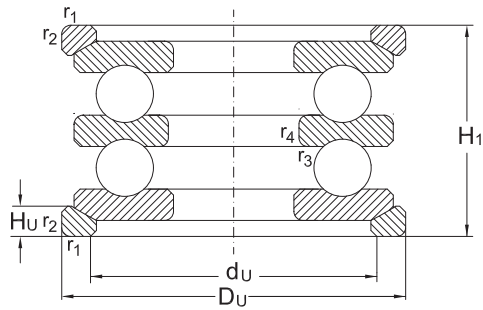
Dimensions									Weight	
d	D ₁	B	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
10	17	5	28	10,5	24	35	4	28	0,09	0,01
	22	6	36	16	30	42	5	32	0,15	0,02
15	27	11	50	15	42	62	8	55	0,50	0,07
	27	7	40	16,5	36	50	5,5	36	0,23	0,03
20	27	8	45	18	38	55	6	42	0,32	0,04
	32	12	56	16	50	75	9	62	0,73	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
30	37	14	64	18,5	58	85	10	69	1,08	0,17
	37	8	50	21	48	65	7	42	0,42	0,06
35	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
40	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
40	47	17	80	23,5	72	105	12,5	86	2,08	0,32
	52	9	64	30,5	62	82	7,5	47	0,70	0,10

Thrust Ball bearings, double direction, with Sphered Housing Washer



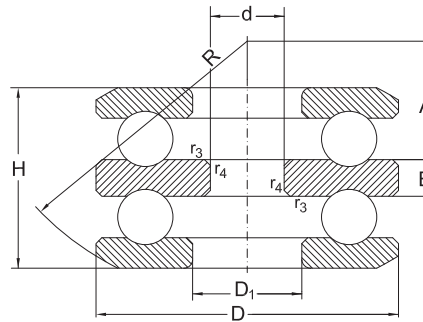
Shaft d	Dimension				Designation		Basical radial load		Speed limit	
	D	H	r_1, r_2 min.	r_3, r_4 min.	Bearing	Seating Washer	dyn. C_a	stat. C_{0a}	grease	oil
mm							kN		min ⁻¹	
40	95	64,7	1,1	0,6	54310	U310	88	173	1900	2800
	110	83,2	1,5	0,6	54410	U410	156	310	1500	2000
45	90	49,6	1	0,6	54211	U211	61	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



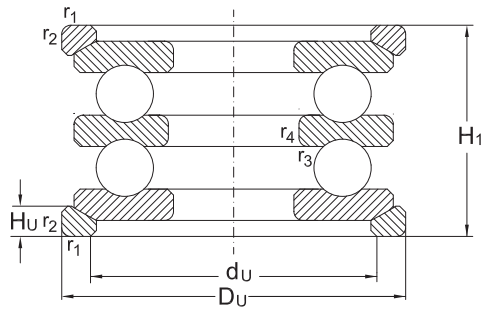
Dimensions									Weight	
d	D ₁	B	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
40	52	14	72	23	72	100	11	70	1,83	0,23
	52	18	90	30	80	115	14	92	2,68	0,41
45	57	10	72	32,5	72	95	9	55	1,13	0,15
	57	15	80	25,5	80	110	11,5	78	2,54	0,28
	57	20	90	22,5	88	125	15,5	101	3,49	0,53
50	62	10	72	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		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		
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	54322MP	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	54324MP	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



Dimensions										Weight	
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 are simple in form and design and are produced in single row and double row designs. The bearings in the 811 and 812 series are mainly used where thrust ball bearings have insufficient load carrying capacity.

Cylindrical roller thrust bearings are suitable for heavy axial loads. Additionally, they are relatively insensitive to shock load. They aren't suitable for radial loads. They provide a very rigid bearing assembly for high thrust loading with less space requirement.

All thrust cylindrical roller bearings, increased sliding friction can occur at the end of the cylindrical rollers. In order to minimise this negative effect, DAS LAGER cylindrical roller thrust bearings with wider sectional widths are produced using several short rollers in each cage pockets instead of using individual longer rollers.

Single Direction Thrust Cylindrical Roller Bearings: (see figure 1 a)

The bearings are of separable design; the individual components can be mounted separately.

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),

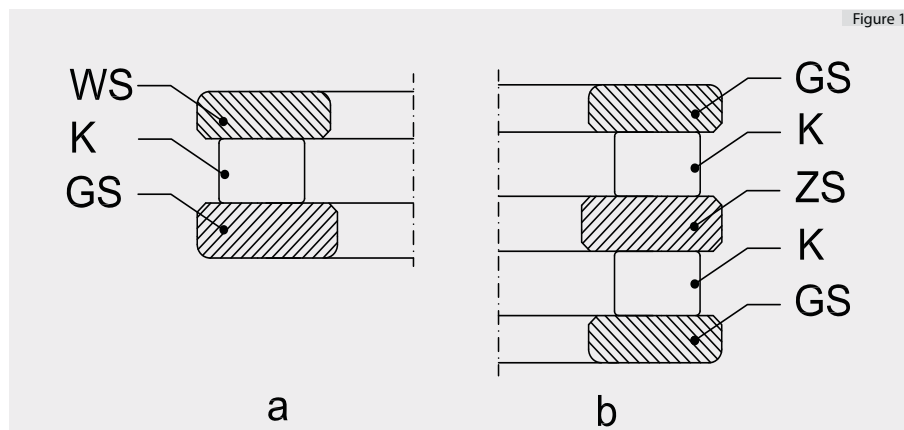
Double Direction Thrust Cylindrical Roller Bearings: (see figure 1 b)

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 fig 1 b).

Such intermediate washers are part of DAS LAGER 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.

Figure 1



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 DAS LAGER 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 M), or with solid steel cages, (suffix F).

Tolerances

DAS LAGER 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

machines 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 **DAS LAGER 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 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.

Cylindrical roller and cage thrust assemblies

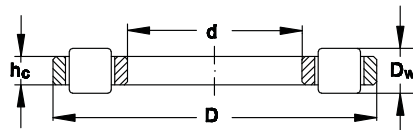


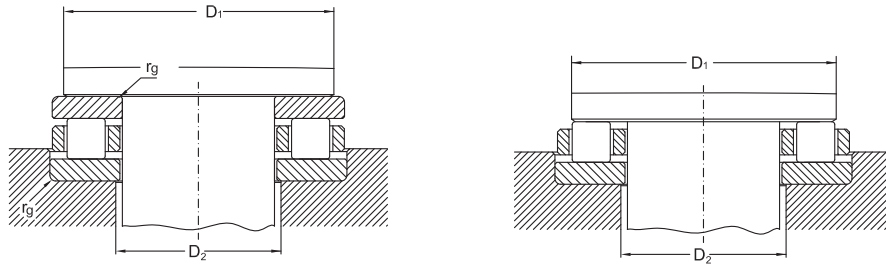
fig. 3



fig. 4

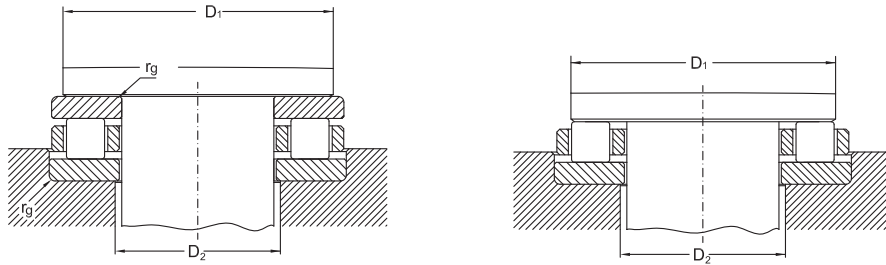
Dimensions				Fig.	Basic load dyn C_a	axial stat. C_{0a}	Speed limit		Designation Bearing	Weight
d	D	D_w	h_c				grease	oil		
mm				-	kN		min^{-1}	min^{-1}		kg
30,04	60	5,5	3,75	4	51,3	176	4000	5600	K89306M	0,066
35,05	68	6	4,2	4	59	214	3100	4400	K89307M	0,096
40,05	81	7	5	4	88,6	333	3000	4300	K85108TN	0,084
60,06	85	7,5	5,2	3	71,7	257	2800	4000	K81112M	0,129
65,06	90	7,5	5,2	3	72,8	268	2600	3800	K81113M	0,134
70,05	100	11	7,5	3	127	432	2200	3000	K81214M	0,319
75	169	19	15,5	4	480	1806	1300	1800	K891215M	2,35
75,06	100	7,5	5,75	3	68,7	268	2000	2800	K81115M	0,146
85	179	19	15,5	4	501	1956	1200	1700	K891117M	2,54
90,06	120	9	6,5	3	106	416	1500	2200	K81115M	0,209

Abutment and Fillet dimensions for cylindrical roller thrust bearings, series 811 and 812 [mm]



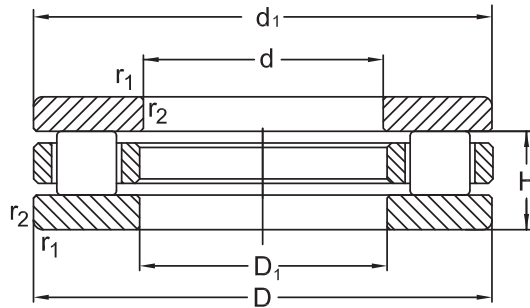
Shaft Φd	Bore reference number	Bearing Series					
		811			812		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm							
15	02	25	18	0,3	-	-	-
17	03	27	20	0,3	-	-	-
20	04	32	23	0,3	-	-	-
25	05	39	28	0,6	-	-	-
30	06	44	33	0,6	49	33	0,6
35	07	49	38	0,6	56	41	1
40	08	56	44	0,6	63	45	1
45	09	61	49	0,6	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]**



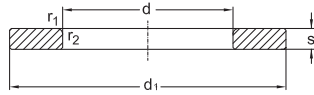
Shaft Φd	Bore reference number	Bearing Series				
		811			812	
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min
mm						
160	32	192	168	1	214	171
170	34	207	178	1	227	183
180	36	217	188	1	237	193
190	38	230	200	1	256	204
200	40	240	210	1	266	214
220	44	260	230	1	286	234
240	48	288	252	1,5	322	258
260	52	308	272	1,5	342	278
280	56	337	293	1,5	362	298
300	60	365	315	2	398	322
320	64	385	335	2	418	342
340	68	405	355	2	438	362
360	72	425	375	2	475	385
380	76	445	395	2	495	405
400	80	465	415	2	515	425
420	84	485	435	2	552	448
440	88	522	458	2,1	572	468
460	92	542	478	2,1	592	488
480	96	562	498	2,1	621	509
500	/500	582	518	2,1	641	529
530	/530	619	551	2,5	680	560
560	/560	649	581	2,5	715	595
600	/600	689	621	2,5	764	636

Cylindrical Roller Thrust Bearings

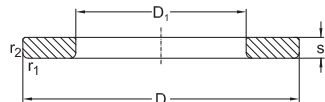


Dimension				Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN		min ⁻¹	min ⁻¹
30	47	11	0,6	81106	28	83	2600	6700
	52	16	0,6	81206	50	132	2400	6300
35	52	12	0,6	81107	30	93	2200	6000
	62	18	1	81207	54	156	1900	5300
40	60	13	0,6	81108	42,5	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

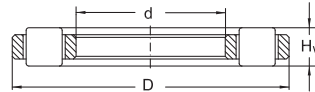
Cylindrical Roller Thrust Bearings



WS 8...



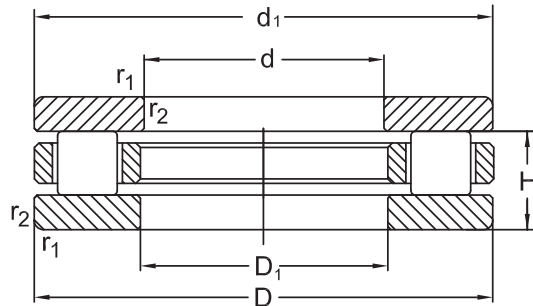
GS 8...



K 8...

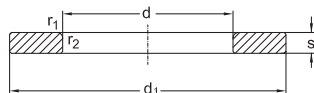
Dimensions				Designation of Bearing Components			Weight
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							[kg]
30	47	32	3	K 81106	WS 81106	GS 81106	0,06
	52	32	4,25	K 81206	WS 81206	GS 81206	0,13
35	52	37	3,5	K 81107	WS 81107	GS 81107	0,08
	62	37	5,25	K 81207	WS 81207	GS 81207	0,23
40	60	42	3,5	K 81108	WS 81108	GS 81108	0,12
	68	42	5	K 81208	WS 81208	GS 81208	0,27
45	65	47	4	K 81109	WS 81109	GS 81109	0,14
	73	47	5,5	K 81209	WS 81209	GS 81209	0,31
50	70	52	4	K 81110	WS 81110	GS 81110	0,16
	78	52	6,5	K 81210	WS 81210	GS 81210	0,38
55	78	57	5	K 81111	WS 81111	GS 81111	0,23
	90	57	7	K 81211	WS 81211	GS 81211	0,60
60	85	62	4,75	K 81112	WS 81112	GS 81112	0,28
	95	62	7,5	K 81212	WS 81212	GS 81212	0,74
65	90	67	5,25	K 81113	WS 81113	GS 81113	0,33
	100	67	8	K 81213	WS 81213	GS 81213	0,82
70	95	72	5,25	K 81114	WS 81114	GS 81114	0,36
	105	72	8	K 81214	WS 81214	GS 81214	0,87
75	100	77	5,75	K 81115	WS 81115	GS 81115	0,43
	110	77	8	K 81215	WS 81215	GS 81215	0,92
80	105	82	5,75	K 81116	WS 81116	GS 81116	0,46
	115	82	8,5	K 81216	WS 81216	GS 81216	1,02

Cylindrical Roller Thrust Bearings

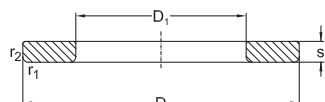


Dimension				Designation	Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm					kN		min^{-1}	min^{-1}
85	110	19	1	81117	76,5	310	850	2600
	125	31	1	81217	153	550	800	2400
90	120	22	1	81118	104	415	800	2400
	135	35	1,1	81218	190	670	800	2400
100	135	25	1	81120	146	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

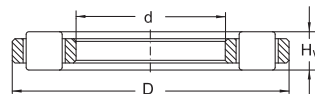
Cylindrical Roller Thrust Bearings



WS 8...



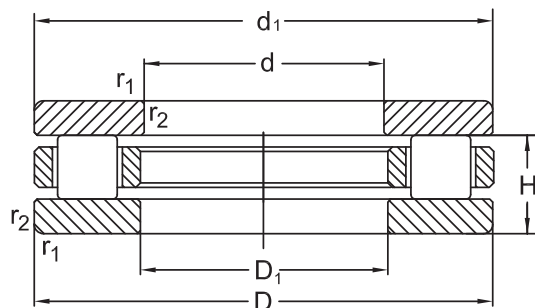
GS 8...



K 8...

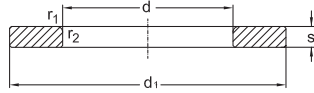
Dimensions				Designation of Bearing Components			Weight
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							[kg]
85	110	87	5,75	K 81117	WS 81117	GS 81117	0,48
	125	88	9,5	K 81217	WS 81217	GS 81217	1,36
90	120	92	6,5	K 81118	WS 81118	GS 81118	0,72
	135	93	10,5	K 81218	WS 81218	GS 81218	1,85
100	135	102	7	K 81120	WS 81120	GS 81120	1,07
	150	103	11,5	K 81220	WS 81220	GS 81220	2,45
110	145	112	7	K 81122	WS 81122	GS 81122	1,12
	160	113	11,5	K 81222	WS 81222	GS 81222	2,70
120	155	122	7	K 81124	WS 81124	GS 81124	1,25
	170	123	12	K 81224	WS 81224	GS 81224	2,98
130	170	132	9	K 81126	WS 81126	GS 81126	1,72
	187	133	13	K 81226	WS 81226	GS 81226	4,37
140	178	142	9,5	K 81128	WS 81128	GS 81128	2,02
	197	143	13,5	K 81228	WS 81228	GS 81228	4,76
150	188	152	9,5	K 81130	WS 81130	GS 81130	2,15
	212	153	14,5	K 81230	WS 81230	GS 81230	6,04
160	198	162	9,5	K 81132	WS 81132	GS 81132	2,28
	222	163	15	K 81232	WS 81232	GS 81232	6,52
170	213	172	10	K 81134	WS 81134	GS 81134	3,01
	237	173	16,5	K 81234	WS 81234	GS 81234	8,12
180	222	183	10	K 81136	WS 81136	GS 81136	3,07
	247	183	17	K 81236	WS 81236	GS 81236	8,69

Cylindrical Roller Thrust Bearings

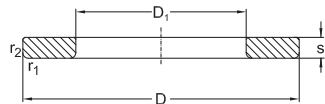


Dimension				Designation	Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm					kN		min^{-1}	min^{-1}
190	240	37	1,1	81138	315	1500	450	1200
	270	62	2	81238	655	2650	430	1100
200	250	37	1,1	81140	325	1600	450	1200
	280	62	2	81240	695	2900	430	1100
220	270	37	1,1	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

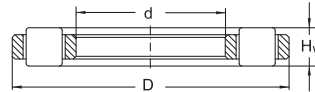
Cylindrical Roller Thrust Bearings



WS 8...



GS 8...



K 8...

Dimensions				Designation of Bearing Components			Weight
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							[kg]
190	237	193	11	K 81138	WS 81138	GS 81138	3,99
	267	194	18	K 81238	WS 81238	GS 81238	11,70
200	247	203	11	K 81140	WS 81140	GS 81140	4,17
	277	204	18	K 81240	WS 81240	GS 81240	12,2
220	267	223	11	K 81144	WS 81144	GS 81144	4,65
	297	224	18,5	K 81244	WS 81244	GS 81244	13,4
240	297	243	13,5	K 81148	WS 81148	GS 81148	7,43
	335	244	23	K 81248	WS 81248	GS 81248	23,10
260	317	263	13,5	K 81152	WS 81152	GS 81152	7,99
	355	264	23,5	K 81252	WS 81252	GS 81252	25,1
280	347	283	15,5	K 81156	WS 81156	GS 81156	12
	375	284	24	K 81256	WS 81256	GS 81256	27,1
300	376	304	18,5	K 81160	WS 81160	GS 81160	17,2
	415	304	28,5	K 81260	WS 81260	GS 81260	42,50
360	436	364	20	K 81172	WS 81172	GS 81172	21,4
	495	365	32,5	K 81272	WS 81272	GS 81272	68,7
380	456	384	20	K 81176	WS 81176	GS 81176	22,4
	515	385	33,5	K 81276	WS 81276	GS 81276	73,3

Cylindrical roller thrust bearings, single direction Non-standardized

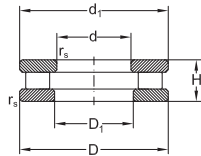


Fig. 1

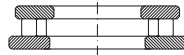


Fig. 2

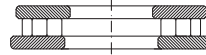


Fig. 3

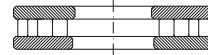


Fig. 4

Dimensions						Fig.	Basic axial load		Speed limit		Designation Bearing	Weight
d	D	H	r _s 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	85205M	0,131
	52	18	0,5	52	25,2	1	36,8	92,4	3000	4300	85105M	0,181
34,925	79	15,875	1,5	78	37	2	80	316	2200	3200	892007M	0,43
40	91,035	15,5	0,3	87	45	3	92	378	2400	3400	85108M	0,500
	105	16	0,5	105	48	10	141	591	2800	4000	86208M	0,859
46	112,035	19	0,3	105	53	3	139	591	2000	2800	85109M	1,04
50	105	20	0,5	105,5	54,5	9	172	776	2300	3300	85110TN	0,655
	105	16	0,5	105,5	52	8	172	776	2800	4000	85210TN	0,633
62	138,04	22	0,6	134	70	3	215	950	1700	2400	85112M	1,87
70	95	6	0,3	-	72	1	46,2	234	3400	4800	85114M	0,154
76,2	228,6	35	1	227	77,7	1	436	1996	1000	1500	85115M	7,64
85	110	6	0,3	-	87	7	50	274	3000	4300	85117M	0,18
96,15¹⁾	181,6 ¹⁾	17,2	0,3	175,05	96,15	4	286	1774	1700	2400	85119M	2,39
100	210	67	3	208,5	103	2	669	2711	750	1100	85320M	12,7
101,6	177,8	44,45	3	176,2	101,6	2	383	1435	700	2000	T734	5,17
101,6	203,2	44,45	3	201,6	103,17	2	514	2142	550	1900	T735	7,49
101,6	228,6	44,45	3	227,01	103,17	2	645	2941	490	1700	T736	10,3
127	203,2	44,45	3	201,599	128,575	1	425	1735	600	1600	T738	6,07
152,4	254	50,8	4	252,399	153,97	1	674	3023	400	1400	T744	11,2
160	345	120	4	314	160,3	2	1836	7603	450	630	85132M	66,8
177,8	279,4	50,8	4	277,038	180,16	2	768	3666	300	1200	T748	12,8
200	280	62	2	277	204	1	735	3146	700	1000	81240M	66,8
210	420	120	4	420	212	2	2380	11616	400	560	85142M	95,6
	460	120	4	460	212	3	2500	12144	380	530	85242M	117
240	540	125 ²⁾	5	540	242	4	5308	34918	360	500	85148M	248
254	406,4	76,2	7	404,04	256,38	2	1530	7860	200	800	T754	41,8
270	520	125	5	520	274	3	8239	16840	360	500	85154M	148
272	480	132	5	480	274	3	2681	13010	360	500	85254M	122
280	520	145	6	520	284	3	3296	16005	340	480	85156M	160
340	620	170	6	620	344	3	4258	20698	280	400	85168M	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

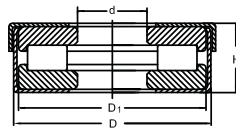


fig. 5

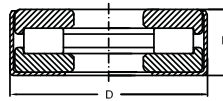


fig. 6

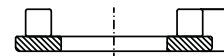


fig. 7

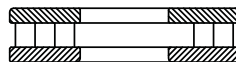


Fig. 8

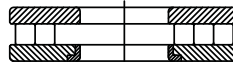


fig. 9

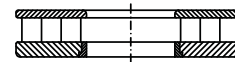


fig. 10

Dimensions								Basic axial load		Speed limit		Designation Bearing	Weight	
d	D	H	r _s min.	r ₁₅ min.	d ₁	D ₁	Fig.	dyn C _a	stat. C _{0a}	grease	oil			
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	851Z06TN	0,20
39	73	20,5					69,5	6	67,7	190	2200	3200	851Z08	0,38
44	110	20												
50,952	74,74	15,875	0,6		0,5	105	50	10	141	591	2300	3300	86108M	1,147
70	95	6	0,3											
85	110	6	0,3											
						</								

Cylindrical roller thrust bearings, double direction Non-standardized

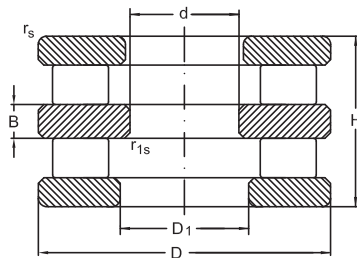


fig. 1

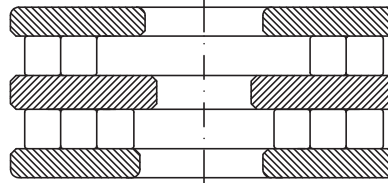


fig. 2

Dimensions								Basic axial load		Speed limit		Designation Bearing	Weight
d	D	H	B	r_s min.	r_{1s} min.	D_1	Fig.	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	86117M	21,82
140	200	72	19	1	1	154	1	253	1061	900	1300	86228M	6,87
141	200	68	24	1	1	162,4	-	192	878	900	1300	86128M	6,392
150	215	78	20	0,6	0,6	166	-	287	1217	900	1300	86130M	8,82
210	400	262,7	95	3	3	242	-	2390	7770	430	630	86142M	157





Slewing bearings

Design

To "slew" means to turn without change of place; a "slewing" bearing is a rotational rolling-element bearing that typically supports a heavy but slow- turning or slow-oscillating load.

Slewing bearings often use two rows of rolling elements. They often use three race elements, such as an inner ring and two outer ring "halves" that clamp together axially.

Slewing bearings are often made with gear teeth integral with the inner or outer race, used to drive the platform relative to the base.

Generally, slewing bearings are large-size rolling bearings that can accommodate axial, radial and moment loads acting either singly or in combination and in any direction. They can perform both slewing (oscillating) movements as well as rotational movements.

Slewing bearings rings made generally of heat treatment alloy steels 41MoCr11. To obtain an increased strength, the semi-finished rings are quenched and tempered.

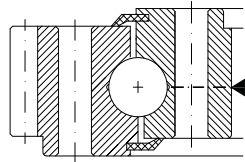
The rolling elements (balls or rollers) are placed between the two rings. They are manufactured of bearings steels and are separated by steel or plastics (TN) distance rings. To avoid the foreign bodies to penetrate the bearings, these are sealed with rubber seals or, sometimes, with labyrinth seals. Lubrication during operation is provided by greasers either on the outer ring or on the inner ring. Their emplacement is simply designated by the symbol.

Slewing bearings can also be manufactured with gear on the outer or inner ring, depending on application. Gear material can be only quenched and tempered or high frequency surface hardened. The raceways of these bearings are also high frequency surface hardened. Ready made slewing bearings are protected against corrosion by painting all surfaces, excepting the gear which is coated with a thin uniform layer of grease. Usually, these surfaces are coated with ground. In this case, the user will paint the bearing after mounting with the same colour as the equipment. Slewing bearings are fastened to the rotating assemblies by screws. For this purpose, there are some holes provided in the rings.

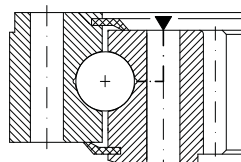
Basically, a slewing bearing († fig. 1) consists of an inner ring (a), an outer ring (b) and rolling elements – balls (c) or cylindrical rollers – that are separated by polyamide spacers (d). The rings, one of which usually incorporates a gear (e), are provided with holes (f) to accommodate attachment bolts. The holes may be threaded. Generally, only the raceways in the rings (h) are hardened and precision-ground. Integral seals (g) made of acrylonitrile-butadiene rubber (NBR) keep the lubricant in, and contaminants out of the bearing. Slewing bearings are relubricated. Slewing bearings through grease fittings (i) to reduce maintenance and operating costs.

Slewing bearings are manufactured in a wide range of constructive designs, with various dimensions. We further mention the most usual bearing sizes:

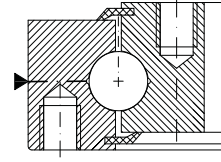
– ball bearings, single row



with external
gear VE.10

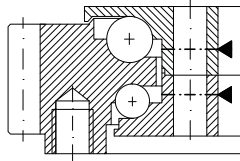


with internal
gear VI.10

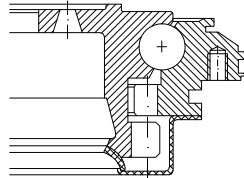


without
gear VU.10

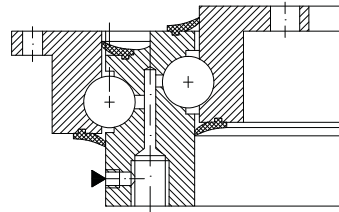
– ball bearings, single and double row



with external
gear VE.20

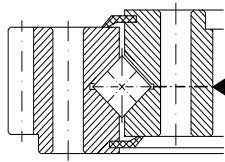


with internal and
external gear VIE.10

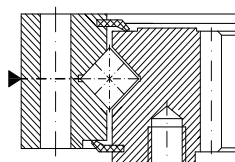


without
gear VU.20

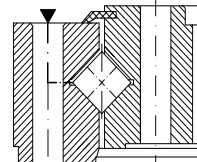
– Crossed tapered roller bearings row



with external
gear XE.10

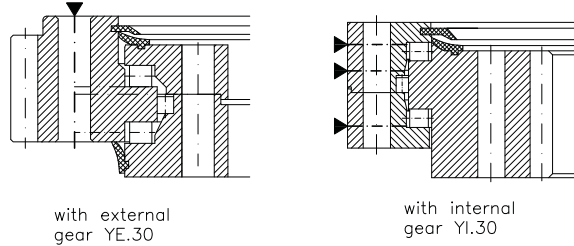


with internal
gear XI.10



without
gear XU.10

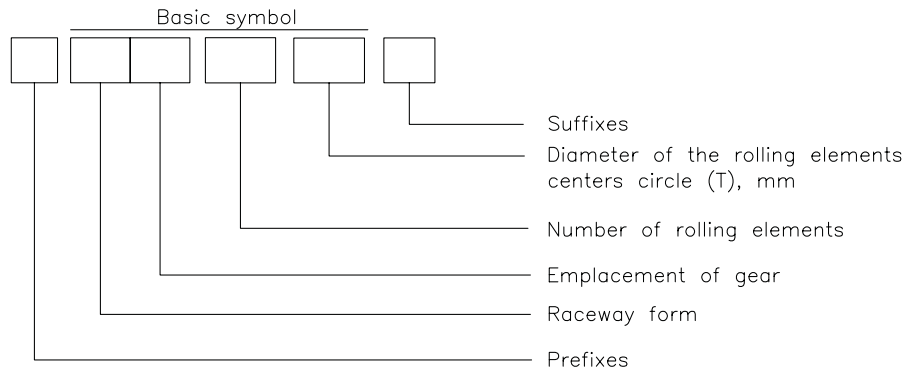
— Cylindrical roller bearings, three row



Slewing bearings can take over heavy axial loads with magnitudes up to 10% of the axial loads and also tilting moments.

Designation

These bearings are differently designated, in comparison to the internationally standardized bearings. In case of the bearings manufactured by DAS LAGER, the designation consists of:



Prefixes

If other materials than heat treatment steels are used, the prefixes are the same as in case of standardized bearings (see page 73).

Basic symbols

Considering the raceway form:

- V** - ball bearings
- X** - crossed cylindrical roller bearings
- Y** - cylindrical roller bearings, three row

Considering gearing emplacement:

- E** - with external gear
- I** - with internal gear
- EI** - with internal and external gearing
- U** - without gearing

Considering the number of rolling elements rows:

- 10** - single row
- 20** - double row
- 30** - three row

Suffixes

- A, B, C, D** - version of basic constructive designs
- F** - steels or sinterized powders distance rings between rolling elements
- TN** - plastics distance rings between the rolling elements
- V** - no distance rings between rolling elements
- L** - light alloy cages of separable design
- F81** - surface hardened gearing

Example of designation:

VI.10.1380ATNF81 Slewing ball bearing (V) with internal gear (I) single row balls (10), with ball centers circle diameter of 1380 mm, design (A), with plastics distance rings (TN) between balls and surface hardened gear (F81).

Fastening screws

The screws used for bearing fastening should be selected from the groups of mechanical characteristics 8.8, 10.9 or even 12.9.

The passing hole diameter for screws, clamping load and tightening torque are given in table 1.

Considering the friction between nut and screw, the nut frontal surface and its adjoint part, the actual value of the nut tightening torque can be approximated to 90% of the theoretical tightening moment.

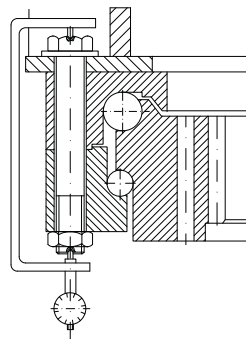
Considering that the extension of the screws with dimensions greater than M30 cannot be well enough controlled by the tightening torque, they should be tightened until the value of 70% of the material yield limit is reached.

Screw extension can be checked by means of a device as shown in the figure below.

Mechanical characteristics of fastening screws

Table 1

Strenght class			8.8	10.9	12.9			
Yield limit, R _{p0.2} N/mm ²			640 for ≤M16 660 for >M16	940	1100			
Metric ISO thread	Cross sectional area of minor dia.	Passing hole diameter	Clamping load	Theoretical tightening torque	Clamping load	Theoretical tightening torque	Clamping load	Theoretical tightening torque
-	mm ²	mm	kN	N m	kN	N m	kN	N m
M16	144	18	72	215	106	310	124	370
M18	175	20	91	300	129	430	151	510
M20	225	22	117	430	166	620	194	720
M22	282	24	146	580	208	830	243	970
M24	324	26	168	740	239	1060	280	1240
M27	427	30	221	1100	315	1550	370	1850
M30	519	33	270	1500	385	2100	450	2500
M33	647	36	335		480		560	
M36	759	39	395		560		660	
M39	913	42	475		670		790	
M42	1045	45	542		772		904	
M45	1224	48	635		905		1059	
M48	1377	52	714		1018		1191	
M52	1652	56	857		1221		1429	
M56	1905	62	989		1408		1648	
M60	2227	66	1156		1647		1927	



Tolerance and clearance

The tolerances of slewing bearings are not standardized. Maximum ovalness for external gear and minimum ovalness for internal gear are marked with colour on three neighboring teeth. The value of ovalness depends on the bearing size, section and heat treatment.

Slewing bearings are manufactured with radial and axial clearance which should be according to the values given in table 2. These clearances are theoretical values and are determined considering the median sizes of the component

parts, which are measured before mounting. (Raceway mean diameters and rolling elements emplacement mean diameters).

Basic static axial load

Basic static axial load can be calculated depending on the bearing type, using the following equations:

- for ball bearings:

$$C_{0a} = f_0 f_{0H} Z D_w^2 \sin \alpha \times 10^{-3}, \text{ kN}$$

Radial and axial clearance

Table 2

Emplacement mean diameter of rolling elements, T		Axial clearance		Radial clearance	
over	up to	min	max	min	max
mm					
500	630	0,1	0,3	0,12	0,26
630	800	0,1	0,3	0,20	0,35
800	1000	0,2	0,4	0,25	0,45
1000	1250	0,2	0,5	0,30	0,55
1250	1600	0,2	0,5	0,35	0,65
1600	2000	0,3	0,6	0,40	0,80
2000	2500	0,4	0,8	0,45	0,90
2500	3150	0,5	0,9	0,50	1,00
3150	4000	0,5	0,9	0,55	1,10
4000	5000	0,5	1,0	0,60	1,20
5000	6300	0,5	1,0	0,65	1,30
6300	8000	0,6	1,2	0,70	1,40
8000	10000	0,6	1,2	0,75	1,50
10000	-	0,7	1,4	0,80	1,60

$$C_{0a} = 220 f_{0H} \left(1 - \frac{D_w \cos \alpha}{T}\right) Z D_w L_w \sin \alpha \times 10^{-3}, \text{ kN}$$

where:

f_{0H} = coefficient, table 4

D_w = roller diameter, mm

T = rollers emplacement diameter, mm

L_w = roller length, mm

Z = number of cylindrical rollers

α = contact angle, degrees

Tilting moment

Tilting moment can be calculated depending on the basic static axial load and emplacement diameter of rolling elements, using the equation:

$$M_z = \frac{C_{0a} T}{4}, \text{ kN m}$$

where:

C_{0a} = basic static axial load, kN

where:

f_0 = coefficient, table 3

f_{0H} = coefficient, table 4

Z = number of balls arranged on a single row

D_w = roller diameter, mm

α = contact angle, degrees

- for cylindrical roller bearings

Values for coefficient f_0

Table 3

$\frac{D_w \cos \alpha}{T}$	f_0
0	61,6
0,01	60,8
0,02	59,9
0,03	59,1
0,04	58,3
0,05	57,3
0,06	56,7

Values for coefficient f_{0H}

Table 4

Hardness HRC	60	58	55	50	45	40	35
f_{0H} Ball bearings	1,0	1,0	0,95	0,75	0,60	0,50	0,40
f_{0H} Roller bearings	1,0	1,0	1,0	0,95	0,80	0,65	0,50

T = emplacement mean diameter of rolling elements, m

Transport and storing

Considering the specific features of these bearings, their dimensions respectively which exceed in most cases 1 meter and reach even more than 5 meters, some special conditions are required for transport and storing. The main condition which have to be observed during transport is to fasten all bearing parts so that no clearance should exist between them. Thus, contact imprints, which have detrimental influence on bearing operation and its rating life, shall be avoided. These bearings should be transported and stored only in horizontal position. Shocks should be avoided.

Mounting of slewing bearings

Special care should be given while mounting these bearings.

The flatness of surface on which bearings are to be mounted should be checked by means of

a thickness gauge set, after the slewing bearing has been placed on the mounting surface.

When mounting the bearing, the non-hardened area of the raceway (the distance between the beginning and end of the high-frequency, surface hardened area) should be considered. It is marked by "C" on the outside or inner surface of both rings.

This part of bearing must be outside the maximum loaded area. The place where the pitch diameter of gear has maximum ovalness, in case of external gear and minimum ovalness, in case of internal gear, which are marked with paint on three neighboring teeth should be mounted near the differential-drive pinion. The permissible values of flatness deviations depending on bearing size and type are given in table 5.

If these values cannot be obtained either from the manufacturing point of view or from the economical one, fluid plastics are allowed to be used, as they bind by cooling and compensate for flatness deviations.

After a suitable bearing placing the fastening screws should be tightened until the above mentioned values of force and moment are following the succession shown below (see table 1). A dynamometrical wrench can be used for tightening.

Lubrication and maintenance

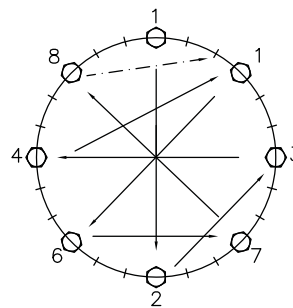
At delivery shall (if no special prescriptions are mentioned) bearings will be lubricated with grease U 170 Li 2, both on raceways and gear. The first relubrication of raceways and gear should be done immediately after mounting. Plenty of grease should be used in order to create a continuous layer all over the circumference and also a grease rib under seals or labyrinth.

Grease is necessary to be uniformly distributed. For that reason, bearing should rotate during lubrication. The relubrication interval should be chosen depending on the operating conditions as follows: for ball bearings it is generally of 100 operating hours and for roller bearings of 50 operating hours. In tropical and high moisture environment and in case of continuous rotating movement relubrication should be done once in a week. Lubrication can be less frequent in case of turning machines, e.g. road trailers, tram bogie joints. Relubrication is absolutely necessary before and after a long non-operating period, especially during winter-time. Water should be prevented from penetrating to the raceways, while cleaning the machinery. Then it must be greased abundantly. No further control

Permissible flatness deviations

Table 5

Pitch diameter T		Permissible deviations		
over	upto	Double row ball slewing bearing	Single row ball slewing bearing	Cylindrical roller slewing bearing
mm				
-	1000	0,20	0,15	0,10
1000	1500	0,25	0,19	0,12
1500	2000	0,30	0,22	0,15
2000	2500	0,35	0,25	0,17
2500	4000	0,40	0,30	0,20
4000	6000	0,50	0,40	0,30
6000	8000	0,60	0,50	0,40



is necessary excepting the periodical control of fastening screws.

Slewing bearings in applications.

Selection of bearing type

Slewing bearings are used in various applications, such as motor cranes, harbour cranes, hydraulic excavators, various rotating platforms, siderurgical equipments, bogies for metropolitan and tram cars, manipulators, foundry equipments etc.

Beside bearing dimensions and technical data, in this catalogue one can also find diagrams showing the tilting moment and limit values of static loads which are helpful when selecting the proper bearing for certain operating conditions.

After calculating the force F_a and resultant moment M_r , the bearing is selected so that the intersection point of the values of resultant force F_a and moment M_r to be placed under the respective curve (see the following example), also considering the screws used for bearing mounting on the assembly (strength class 8.8, 10.9 or 12.9).

Example

It is necessary to determine the type and size of a slewing bearing used for crane, as shown in the adjoint figure. The bearing has to support the following forces:

$$F_1 = 3 \times 10^4 \text{ N}$$

$$l_1 = 45 \text{ m}$$

$$F_2 = 0,8 \times 10^4 \text{ N}$$

$$l_2 = 20 \text{ m}$$

$$F_3 = 4 \times 10^4 \text{ N}$$

$$l_3 = 2 \text{ m}$$

$$F_4 = 1,2 \times 10^4 \text{ N}$$

$$l_4 = 12 \text{ m}$$

$$F_5 = 2 \times 10^4 \text{ N}$$

$$l_5 = 20 \text{ m}$$

$$F_6 = 2 \times 10^4 \text{ N}$$

$$l_6 = 1,5 \text{ m}$$

$$F_7 = 0,8 \times 10^4 \text{ N}$$

1. For maximum bearing loading, including the wind force:

$$F_a = \sum_{i=1}^n F_i = F_1 + F_2 + F_3 + F_4 + F_5 + F_6 = (3 + 0,8 + 4 + 1,2 + 2 + 2) \times 10^4 = 13 \times 10^4 \text{ N}$$

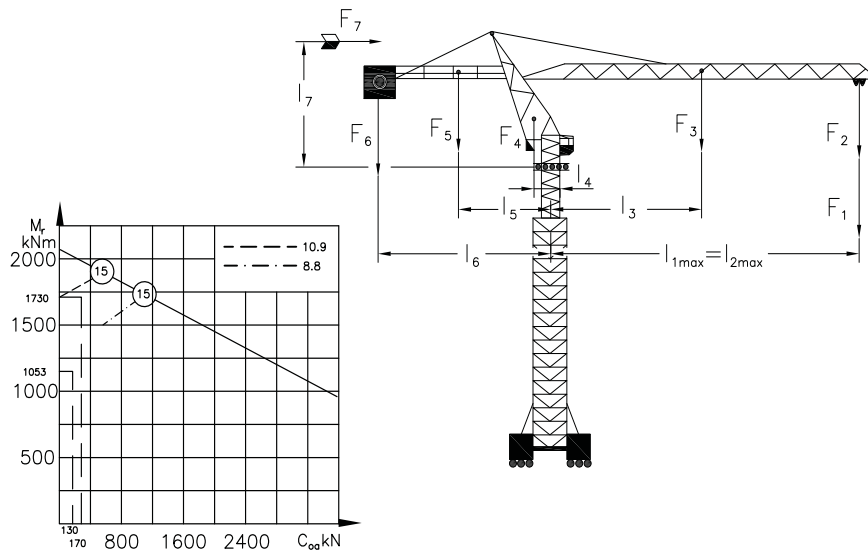
$$M_t = (F_1 + F_2) l_{1\max} + F_3 l_3 - F_4 l_4 - F_5 l_5 - F_6 l_6 + F_7 l_7 \times 10^4 = \\ = (3 + 0,8) \times 45 + 4 \times 20 - 1,2 \times 2 - 2 \times 20 - 6 \times 20 + 0,5 \times 15 \times 10^4 = 105,35 \times 10^4 \text{ N m}$$

2. For maximum bearing loading with an overload of 25%, without wind force:

$$F_a = \sum_{i=1}^n F_i = F_1 \times 1,25 + F_2 + F_3 + F_4 + F_5 + F_6 = (3 \times 1,25 + 0,8 + 4 + 1,2 + 2 + 2) \times 10^4 = 13,75 \times 10^4 \text{ N}$$

$$M_t = (F_1 \times 1,25 + F_2) l_{1\max} + F_3 l_3 - F_4 l_4 - F_5 l_5 - F_6 l_6 \times 10^4 = \\ = (3 \times 1,25 + 0,8) \times 45 + 4 \times 20 - 1,2 \times 2 - 2 \times 20 - 6 \times 20 \times 10^4 = 138,35 \times 10^4 \text{ N m}$$

The adequate results obtained at point 2 will be multiplied by an overload coefficient $c = 1,25$



$$F_a' = F_a \cdot c = 13,75 \times 1,25 \times 10^4 = 17,1875 \times 10^4 \text{ N}$$

$$M_t' = M_t \cdot c = 138,35 \times 1,25 \times 10^4 = 172,9375 \times 10^4 \text{ N m}$$

The values resulting from the calculation of crane load should be placed under the diagram of the bearing which is to be selected. In this case, the designation of one of the bearings which

can support these loads is VI.10.1380TNF81. This bearing can be used with screws from the strength class 8.8, in case 1. In case 2, when the value of the overload coefficient is $c = 1,25$, the bearing should be tightened with screws from the class 10.9, as it results from the diagram on page 661.

Single Row ball slewing bearings with external gear, VE.10 type

Non-standardized

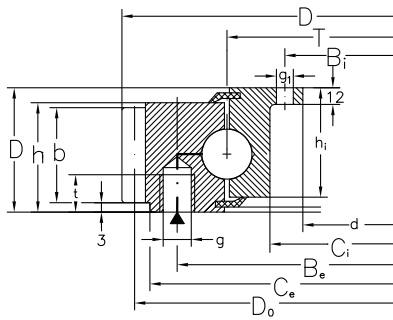


Fig.1

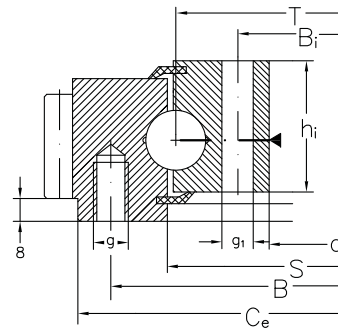


Fig.2

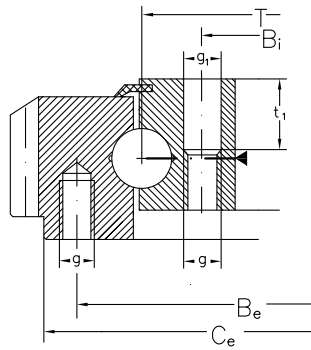


Fig.3

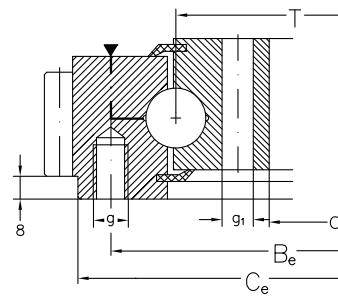


Fig.4

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t	t ₁
mm														
544	434	642	56	462		609	505	46	585	46	M12	18	20	
744	634	834	56	662		807	703	45,5	785	45,5	M12	18	20	
980	886	1080	82	922	979	1042		55	1015	73	M16	18	30	
	886	1082	82	922	979	1045		55	1015	73	M16	18	30	30
	886	1080	82	922	979	1042		55	1015	73	M16	18	30	
1047	915	1220	100	960	1048		930	90	1130	90	M24		50	
1114	980	1290	114	1035		1240	985	85	1198	90		22		
	980	1289	114	1035		1240	985	85	1198	90		22		
1140	990	1296	135	1026	1170	1255		125	1220	90		23		
1205	1075	1392	100	1125	1230	1207	1090	90	1285		M24		50	

► grease nipple

¹⁾ non equidistant holes

Single Row ball slewing bearings with external gear, VE.10 type

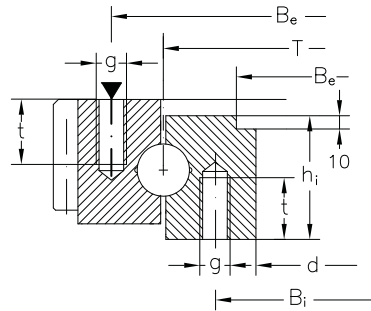


Fig.5

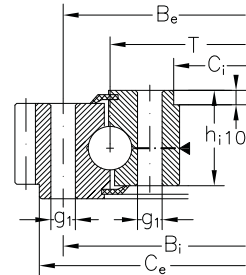


Fig.6

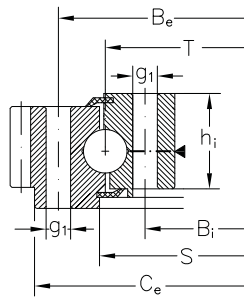


Fig.7

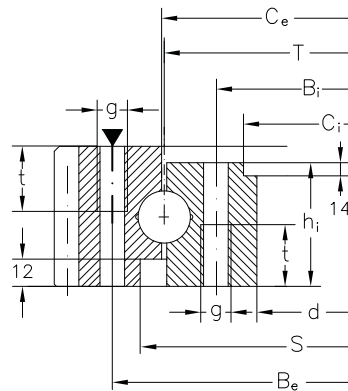


Fig.8

n_i	n_e	D_0	m	Z	b	x	m	Grease nipples		Designation	Fig.	Diagram position	Weight
								no.	type				
								pcs.	-				kg.
14	14	630	6	105	40			4	A2	VE.10.0544F	1	1	40,2
16	16	828	6	138	40	-3		4	A2	VE.10.0744V	1	2	56
30	30	1064	8	133	50			5	A3	VE.10.0980F	2	3	120
30	30	1048	8	131	70	+10		3	A3	VE.10.0980AF	3	3	120
30	30	1064	8	133	50			5	A3	VE.10.0980BF	4	3	120
36	36	1200	10	120	90			6	A3	VE.10.1047V	5	4	308
20	20	1280	5	256	75			4	A3	VE.10.1114ATN	6	6	322
32 ¹⁾	20	1250	10	125	75	+10,5		4	A3	VE.10.1114TN	6	5	319
24	24	1280	8	160	80			4	A3	VE.10.1140V	7	7	314
36	36	1368	12	114	100			4	A1+U3	VE.10.1205V	8	8	406

n_i = grease nipple

n_e = non equidistant holes

Single Row ball slewing bearings with external gear, VE.10 type

Non-standardized

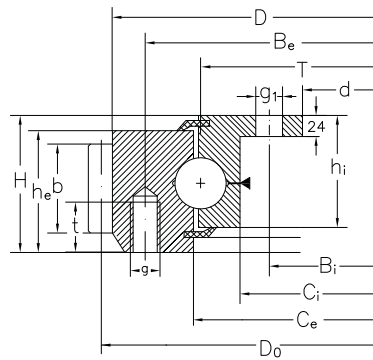


Fig.9

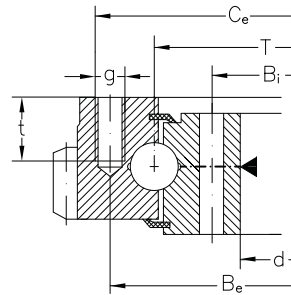


Fig.10

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t	t ₁
mm														
1249,837	1107	1400	88,5	1145		1247	1190	72	1305	68	M16	22	30	
1275	1155	1456	135	1195		1395		130	1355	112	M24X2	26	40	
1462	1330	1644	142	1385		1585		132	1540	104	M24	30	70	65
1490	1300	1737,6	123	1372		1680		118	1608	113			36	
1810	1655	2020	153	1695		1970		142	1930	105			27	
	1656,5	2020	163	1695		1970		152	1930	105			27	
2335	2220	2484	120	2290	2340	2425		100	2384	100	M22		30	
2348	2230	2500	120	2270		2450	2235	105	2410	100	M20	22	45	
2660	2500	2855,2	185	2560		2810	2610	160	2760	160			22	
2985	2790	3228	200	2844				180	3124	140			33	
3210	2990	3509	190	3080		3395	3000	165	3340	155			34	
4320	4150	4564	162	4215				112,5	4425	145	M24		25	

► grease nipple

n_i = number of holes in inner ring

n_e = number of holes in outer ring

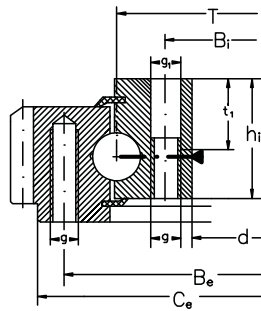


Fig.11

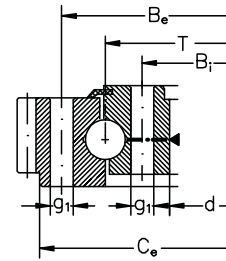


Fig.12

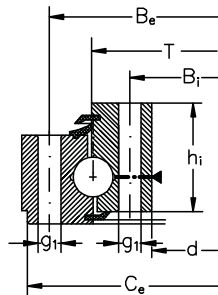


Fig.13

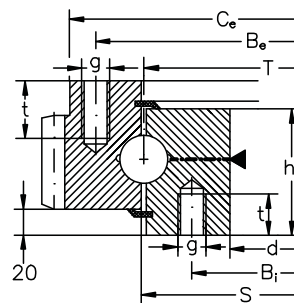
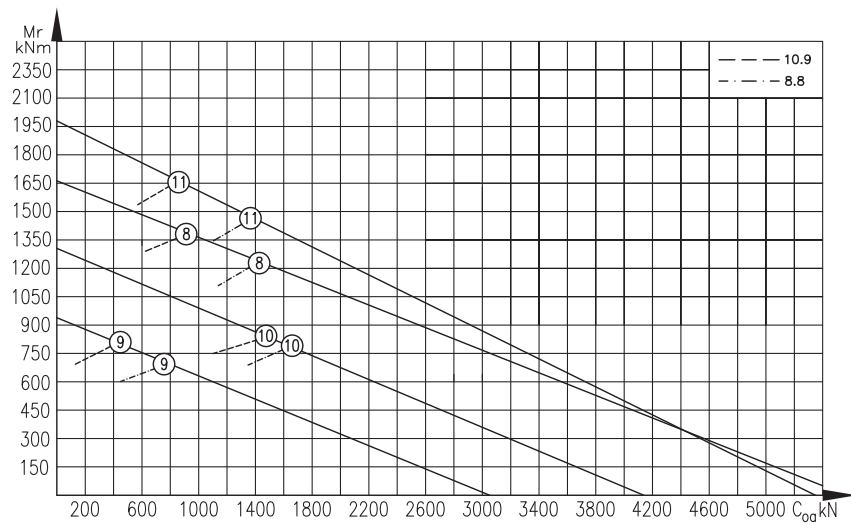
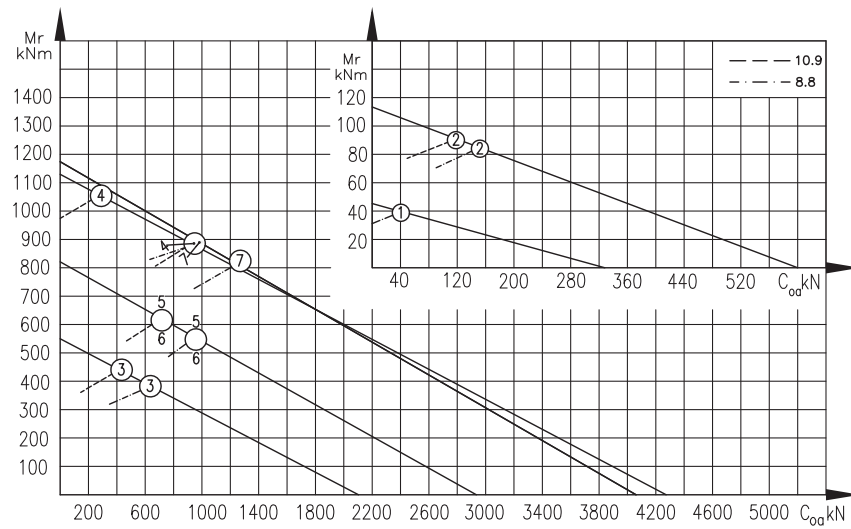


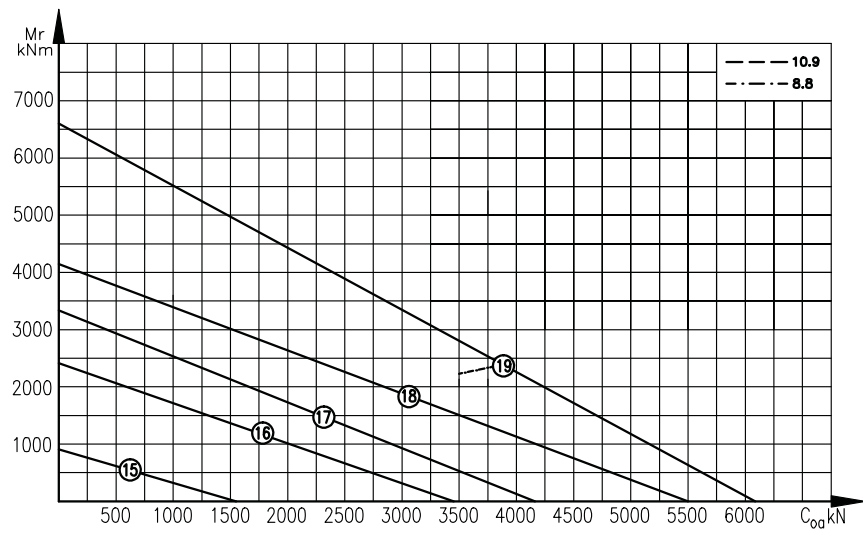
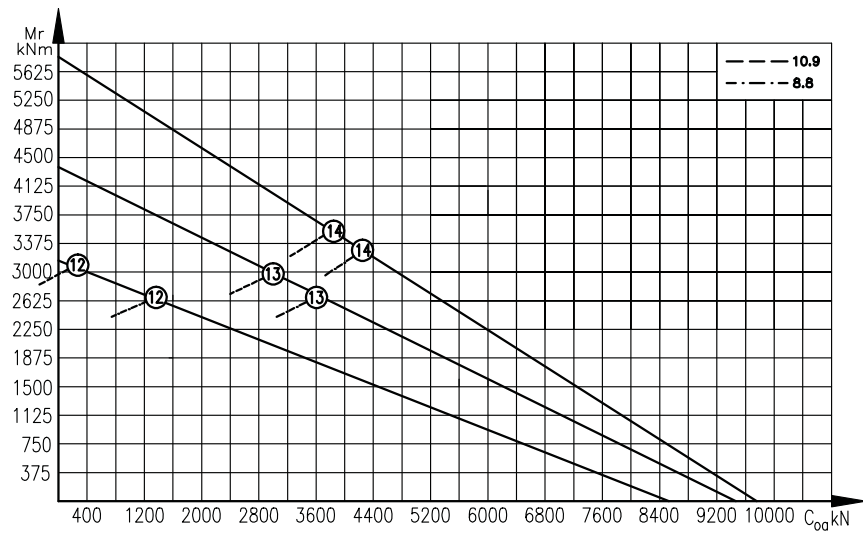
Fig.14

Grease nipples								Designation	Fig.	Diagram position	Weight
n _i	n _e	D ₀	m	Z	b	x m	no.				
pcs. -											kg.
28	48	1380	10	138	65		4	A3	VE.10.1250TN	9 9	225
24	12	1430	14	102	80	-0,5	8	A3	VE.10.1275F	10 10	513
36	36	1620	12	135	94		4	A3	VE.10.1462TN	11 11	560
39 ¹⁾	40	1704	12	142	96	+6	5	A3	VE.10.1490TN	12 12	740
32	32	2000	10	200	90		4	A3	VE.10.1810TN	13 13	856
32	32	2000	10	200	90		4	A3	VE.10.1810ATN	13 13	888
24	24	2466	9	274	80		4	A3	VE.10.2335V	14 14	633
40	40	2480	10	248	80		6	A3	VE.10.2348	4 15	694
48	48	2839,2	8	354	80	-3,6	4	A3	VE.10.2660V	6 16	1520
44	44	3204	12	267	130		8	A3	VE.10.2985	6 17	2460
60	60	3456	18	192	125	+9	6	A3	VE.10.3210	6 18	2740
8	8	4536	14	324	85		3	A3	VE.10.4320	5 19	2124

¹⁾ non equidistant holes

Single Row ball slewing bearings with external gear, VE.10 type





Single Row ball slewing bearings with internal gear, VI.10 type Non-standardized

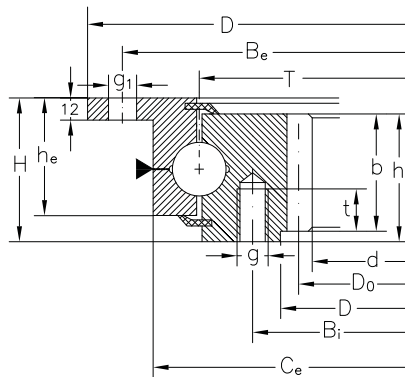


Fig.1

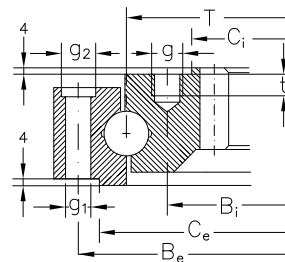


Fig.2

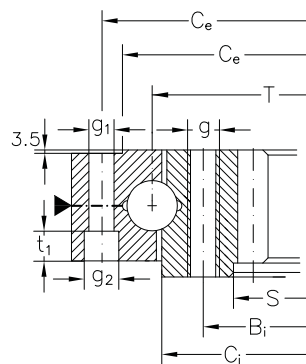


Fig.3

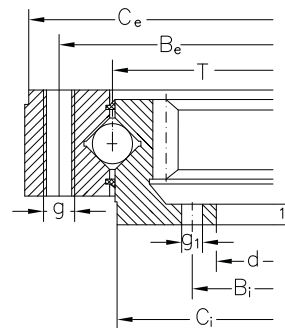


Fig.4

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	g ₂	t	t ₁
mm															
414	326,5	518	56	375	355			45,5	490	45,5	M12	18		20	
525	449,36	595	47	495		560	475	43	575	40	M8	8,5	14	13	10
544	445,2	648	56	505	476			45,5	620	45,5	M12	18		20	
625	496	740	59	560	520	660	626	59	700	54	M16	17,5	26		18
768	650	842	77	686		840	758	75	810	59	M12	13			
895	785,2	972	82	845	820	970	892	63	945	78	M16	18		40	39
978	854	1066	102	926		1065	957	85	1035	96	M16	18		35	
980	854	1066	75	926		1065	970	65	1035	70	M16	18			35
	856	1066	75	926	880	1065	970	65	1035	70	M16	18			35

► grease nipple

1) non equidistant holes

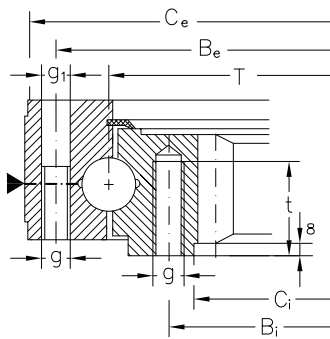


Fig.5

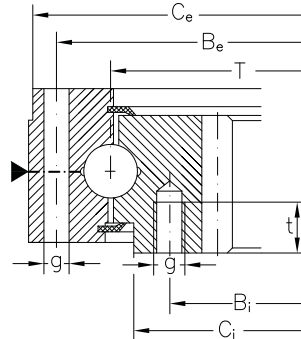


Fig.6

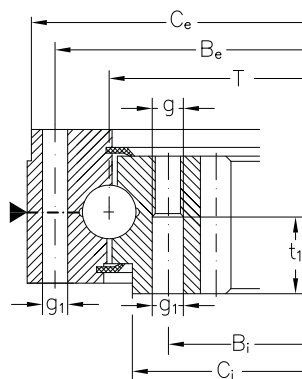


Fig.7

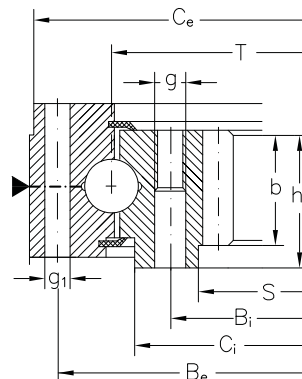


Fig.8

								Grease nipples	Designation	Fig.	Diagram position	Weight
n _i	n _e	D ₀	m	Z	b	x m	no.	type				
								pcs.	-	-	-	kg.
16	15	335	5	67	37,5		4	A2	VI.10.0414V	1	1	28,1
12	12	455	3,5	130	35	-0,525			VI.10.0525F	2	2	33,3
25	13	456	6	76			4	A2	VI.10.0544F	1	3	41,4
16	16	504	4	126	50,5		4	A3	VI.10.0625F	3	4	92,1
16	14 ¹⁾	720	4	180	50		4	A3	VI.10.0768F	4	5	75,4
30	30	800	8	100	50		6	A3	VI.10.0895FF81	5	6	116
26 ¹⁾	24 ¹⁾	870	10	87	85		4	A3	VI.10.0978TNF81	6	7	178
26 ¹⁾	24 ¹⁾	870	10	87	65		4	A3	VI.10.0980FF81	7	8	137
26 ¹⁾	24 ¹⁾	864	4	216	50		4	A3	VI.10.0980AF	8	8	143

n_i = number of holes in inner ring

n_e = number of holes in outer ring

A vertical bar chart with two bars. The first bar is red and the second bar is dark grey. The red bar is significantly taller than the dark grey bar.

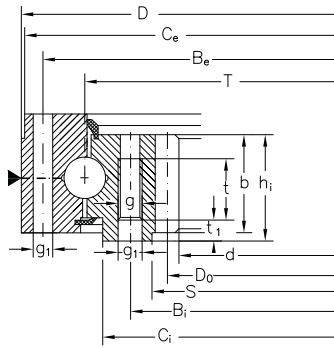


Fig.9

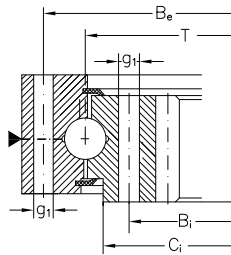


Fig.10

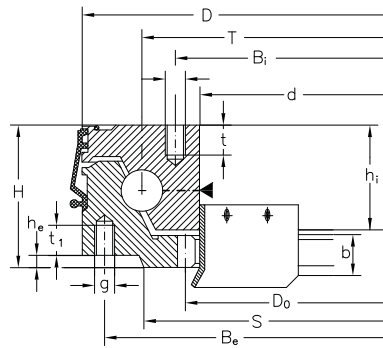


Fig.1 1

Dimensions														
T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g _i	t	t _i
mm														
1150	986,4	1256	102	1085	1045	1255	1132	85	1215	96	M20	22	40	15
	988,8	1256	102	1085	1045	1255	1132	85	1215	96	M20	22	40	15
1250	1090	1362	79	1182			1251	70	1318	63		22		
1300	1250	1350	85	1274	1282			60	1330	12	M8		22	16
	1250	1350	85	1274	1282			60	1330	12	M8		22	16
1380	1171,268	1530	127	1290		1410	1360	107	1480	114		30		
	1172	1530	127	1290		1410	1360	107	1480	114		27		
	1172	1530	127	1280		1410	1360	107	1480	114		33		
	1172	1550	137	1285	1240	1410	1360	114	1480	114		30		
1595	1505	1650	90	1540	1560			64,6	1620	5,6	M10		15	
1615	1408	1752	140	1525	1473	1750	1610	122	1705	134		26		

- ▶ grease nipple
- 1) non equidistant holes

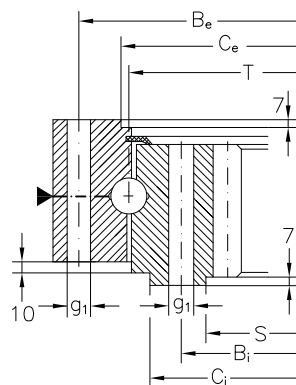


Fig.12

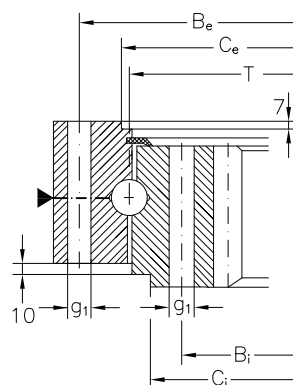


Fig.13

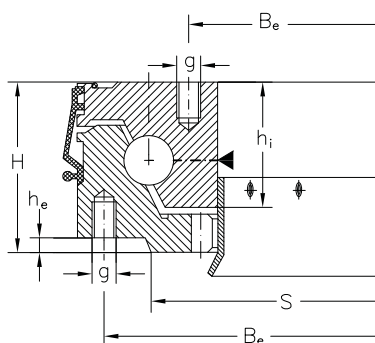


Fig.14

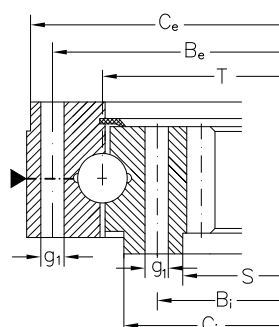


Fig.15

n_i	n_e	D_0	m	Z	b	x	m	Grease nipples		Designation	Fig.	Diagram position	Weight
								no.	type				
								pcs.	-		-	-	kg.
30	30	1008	12	84	79		5	A3		VI.10.1150TNF81	9	9	268
30	30	996	4	249	79		5	A3		VI.10.1150ATN	9	9	265
40	40	1100	10	110	70	-5	8	A3		VI.10.1250TN	10	10	237
30	32	1260	3	420	22	+2,55	1	B1		VI.10.1300AL	11	11	78
29 ¹⁾	32	1260	3	420	22	+2,55	1	B1		VI.10.1300L	11	11	78
24	24	1190	10	119	107		4	A3		VI.10.1380ATNF81	12	13	575
24	24	1176	14	84	107	-10,75	4	A3		VI.10.1380TNF81	12	12	561
38	38	1188	12	99	107		4	A3		VI.10.1380CTNF81	12	14	560
36	36	1176	14	84	107	-10,75	4	A3		VI.10.1380DTNF81	13	15	615
30	30	1520	4	380	30		1	B1		VI.10.1595L	14	16	99
40	40	1428	14	102	115	+3,5	4	A3		VI.10.1615ATNF81	15	17	656

n_i = number of holes in inner ring

n_e = number of holes in outer ring

Single Row ball slewing bearings with internal gear, VI.10 type Non-standardized

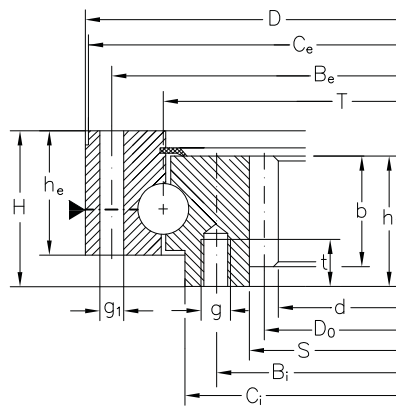


Fig.16

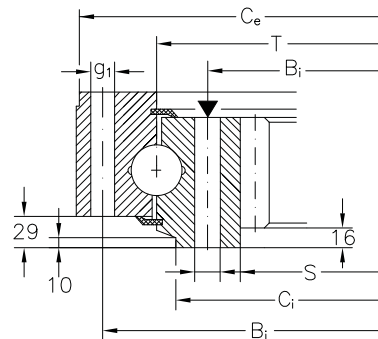


Fig.17

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t	n _i
mm														
1615	1418,4	1752	140	1525	1473	1750	1610	122	1705	134	M24	26	50	40
	1418,4	1752	140	1525	1473	1750	1610	122	1705	134	M24	26	50	40
1740	1510	1908	159	1634	1580	1905	1705	143	1850	130		27		40
	1520	1908	178	1655	1600	1905	1705	142	1850	150	M24	27	50	40
1750	1548	1860	125	1675	1610		1636	125	1820	90	M16		20	36
1895,2	1825	1990	125	1925			1880	32	1865		M24			34 ¹⁾
2127,5	2024	2275	91	2076	2048	2140	2050	66	2206	88	M14		24	35 ¹⁾
2234	1974,5	2414	169	2120	2045	2410	2206	149	2345	140		33		48

► grease nipple

1) non equidistant holes

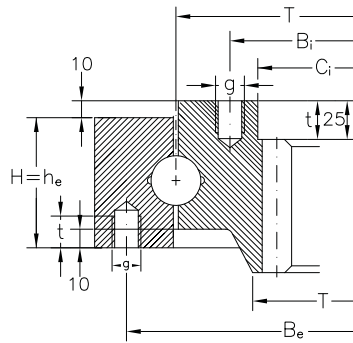


Fig.18

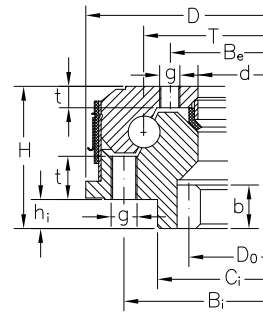


Fig.19

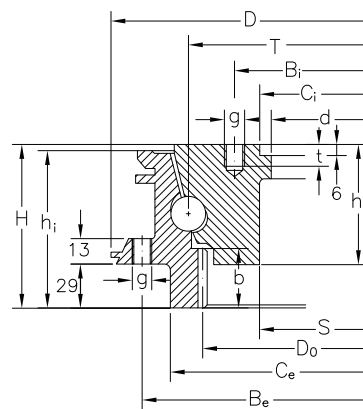


Fig.20

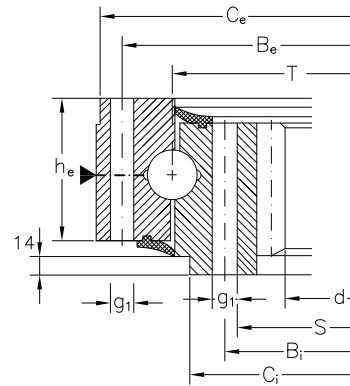


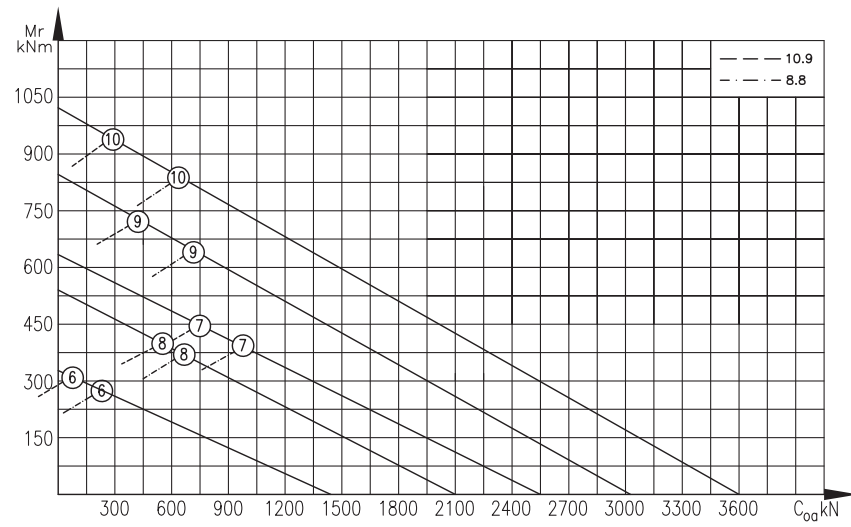
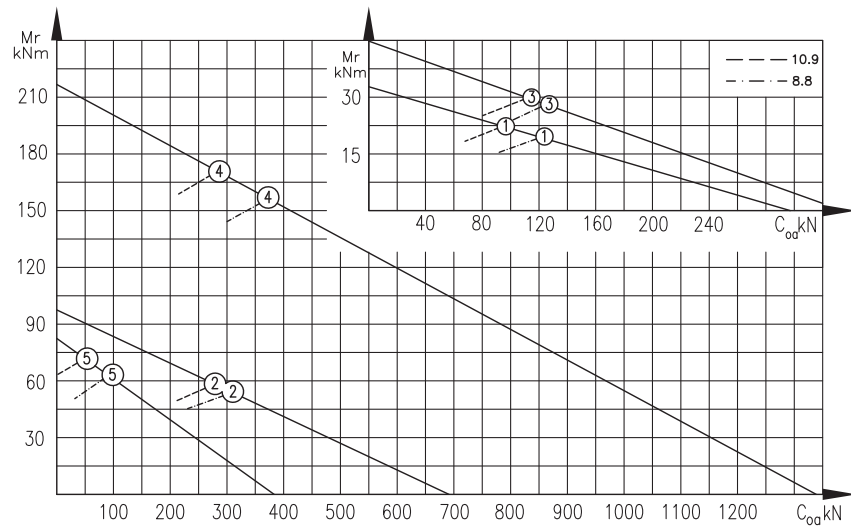
Fig. 21

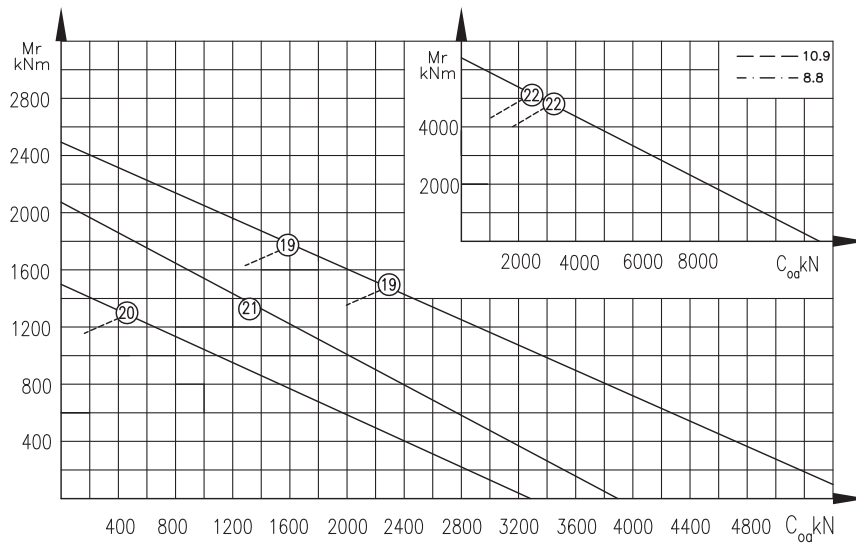
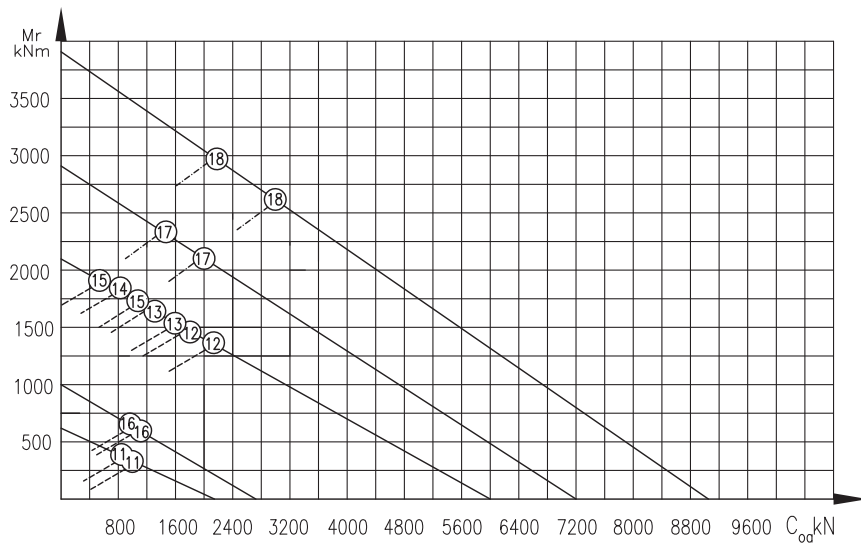
n_e	D_0	m	Z	b	x m	Grease nipples		Designation	Fig.	Diagram position	Weight
						no.	type				
						pcs.	-		-	-	kg.
40	1440	12	120	115		4	A3	VI.10.1615TN	16	17	670
40	1440	12	120	115		4	A3	VI.10.1615TNF81	16	17	670
40	1512	14	108	127	+11,48	4	A3	VI.10.1740ATNF81	17	18	922
40	1504	16	94	127	+24	4	A3	VI.10.1740TN	16	18	953
36	1566	9	174	100				VI.10.1750FF81	18	19	585
36	1840	5	368	44				VI.10.1895F	19	20	282
35	2100	5	420	32	+5			VI.10.2128F	20	21	286
48	1988	14	142	123	+7	6	A3	VI.10.2234TNF81	21	22	1438

n_i = number of holes in inner ring

n_e = number of holes in outer ring

Single Row ball slewing bearings with internal gear, VI.10 type





Single Row ball slewing bearings without gear, VU.10 type Non-standardized

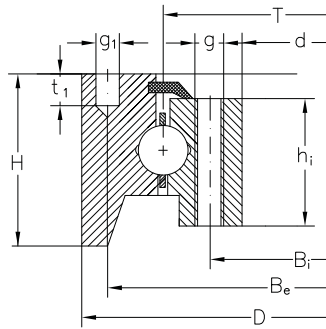


Fig. 1

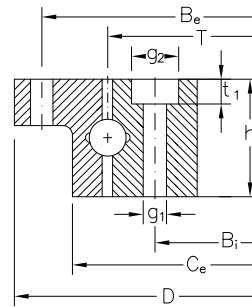


Fig. 2

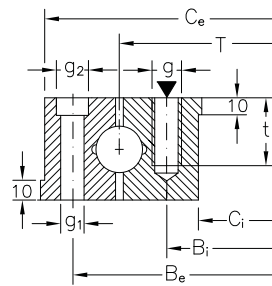


Fig. 3

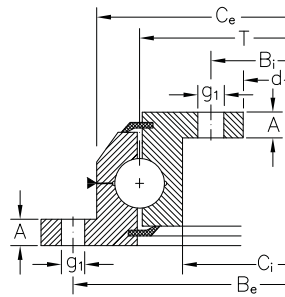


Fig. 4

Dimensions

T	d	D	H	Bi	Ce	ci	hi	Be	he	A	g	g ₁	g ₂
mm													
380	324	444	54	344			38	424	54		M10		
387	300	475	50	340	420		50	450	48	20	M14	11	18
407	315	500	60	345	498	317		470			M12	14	20
414	304	518	56	332	453	375	45,5	490	45,5	12		18	
544	434	648	56	462	583	505	46	620	46	12		18	
	505	648	56		583	505	46	620	46	12		18	
570	470	670	62	520		488	50	630	50			9	15
641	534	748	56	562	687	595	46	720	46	12		18	
741	634	848	56	662	787	695	46	820	46	12		18	
782	680	880	90	715							M16		
844	734	948	56	762	883	805	45,5	920	45,5	12		18	
870	650	1170	104	730	960	770	104	1110	73		M20	22	

► grease nipple
1) non equidistant holes

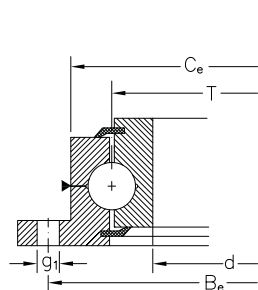


Fig. 5

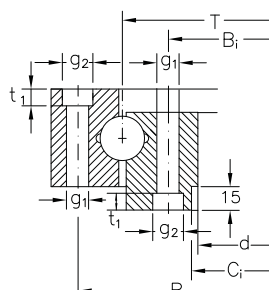


Fig. 6

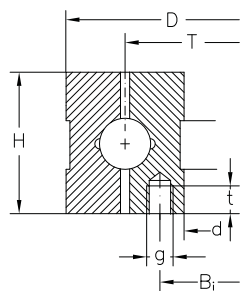


Fig. 7

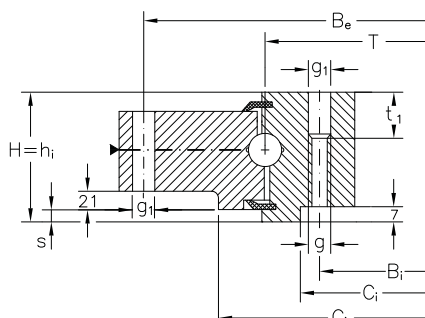


Fig. 8

				Grease nipples		Designation	Fig.	Diagram position	Weight
t	t _i	n _i	n _e	no.	type				
				pcs.	-		-	-	kg.
14		5 ¹⁾	2			VU.10.0380	1	2	19,2
	11	12	12			VU.10.0387V	2	2	29,7
35	14	16	16	4	A2	VU.10.0407TN	3	3	50,7
		12	8	4	A2	VU.10.0414V	4	4	24,7
		14	10	4	A2	VU.10.0544V	4	5	35,5
			10	4	A2	VU.10.0544AV	5	5	31,0
	10	10	10			VU.10.0570FP4	6	6	66,0
		16	12	4	A2	VU.10.0641V	4	7	40,0
		16	12	4	A2	VU.10.0741V	4	8	46,5
15		6				VU.10.0782V	7	9	164
		18	14	4	A2	VU.10.0844V	4	10	50,5
	45	12	12	4	A3	VU.10.0870TN	8	11	404

n_i = number of holes in inner ring
n_e = number of holes in outer ring

Single Row ball slewing bearings without gear, VU.10 type

Non-standardized

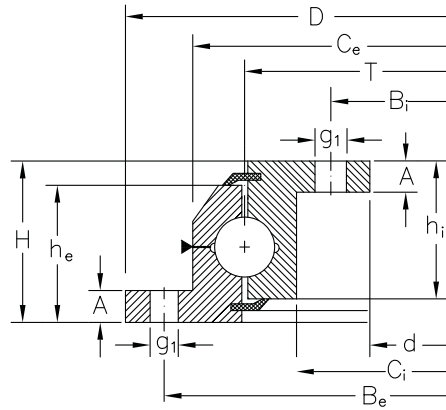


Fig. 4

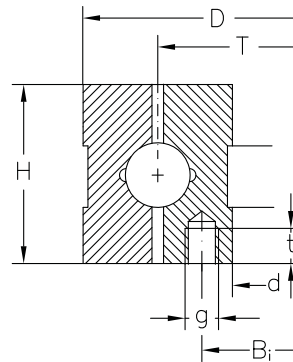


Fig. 7

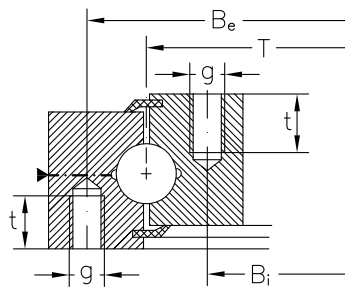


Fig. 9

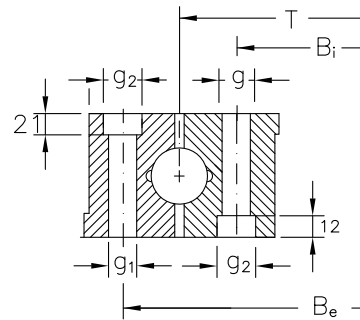


Fig. 10

Dimensions

T	d	D	H	B _i	C _e	C _i	h _i	B _e	h _e	A	g	g ₁	g ₂
mm													
875	740	1000	124	780			114	960	114	M24			
890	800	980	57	830				950		21		11	18
942	834	1048	56	862	988	896	46	1020	46	12		18	
952,5	805	1100	90	845	1017	893	71	1060	71	21		22	
1048	950	1150	80	995						M16			
1093	985	1200	56	1015	1134	1052	46	1170	46	15		18	
1235	1093	1377	140	1135	1375	1095	120	1335	120	M20			
1355	1205	1500	90	1245	1417	1293	71	1460	71	21	M12	18	
2920	2690	3155	250	2750		3018	235	3085	185			39	

► grease nipple

1) non equidistant holes

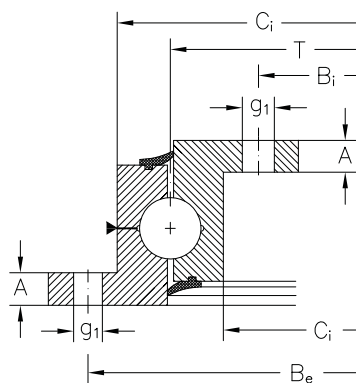


Fig. 11

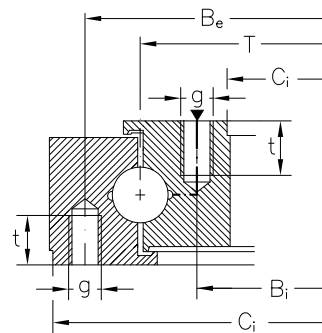


Fig. 12

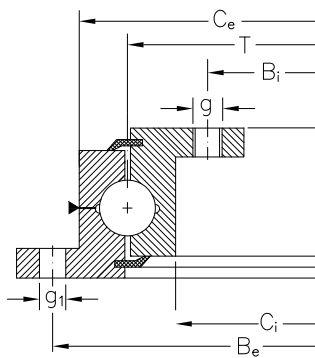


Fig. 13

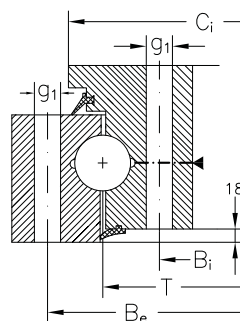
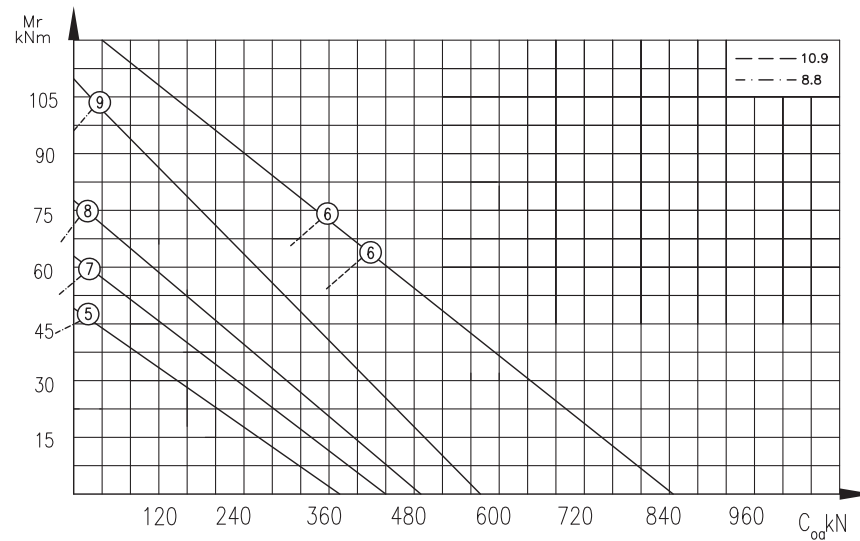
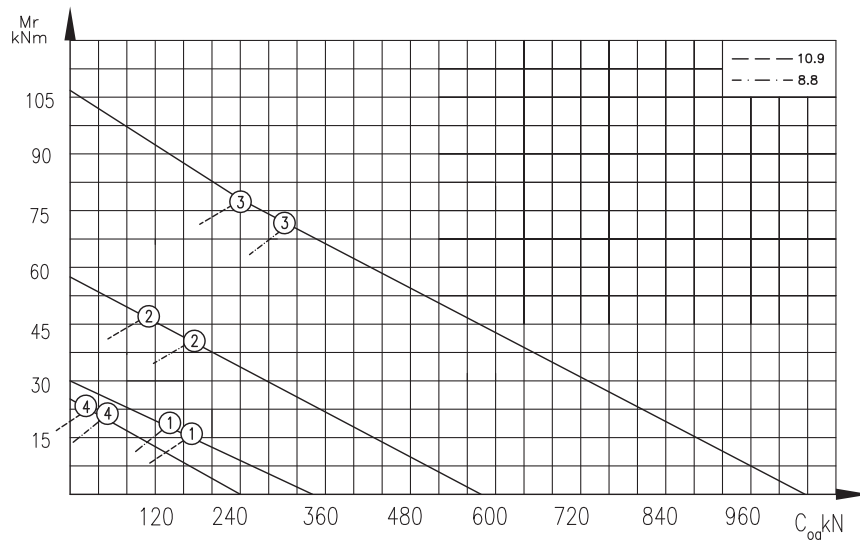


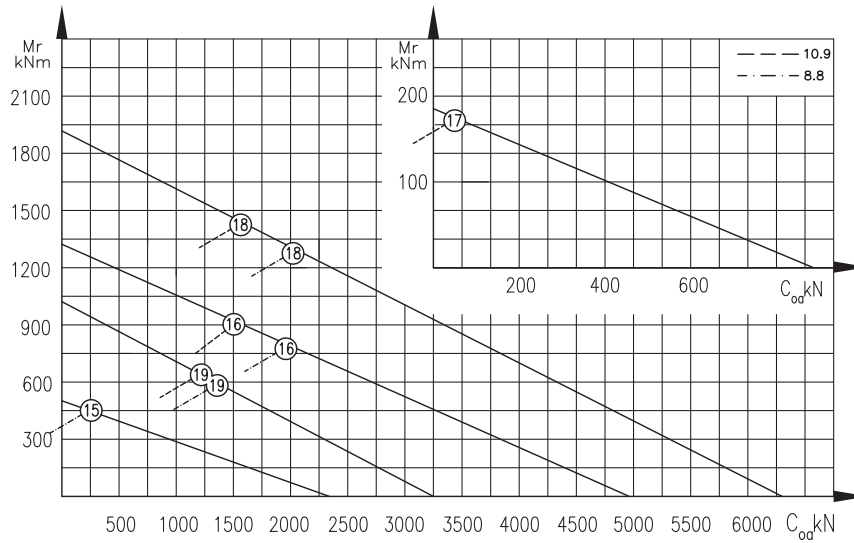
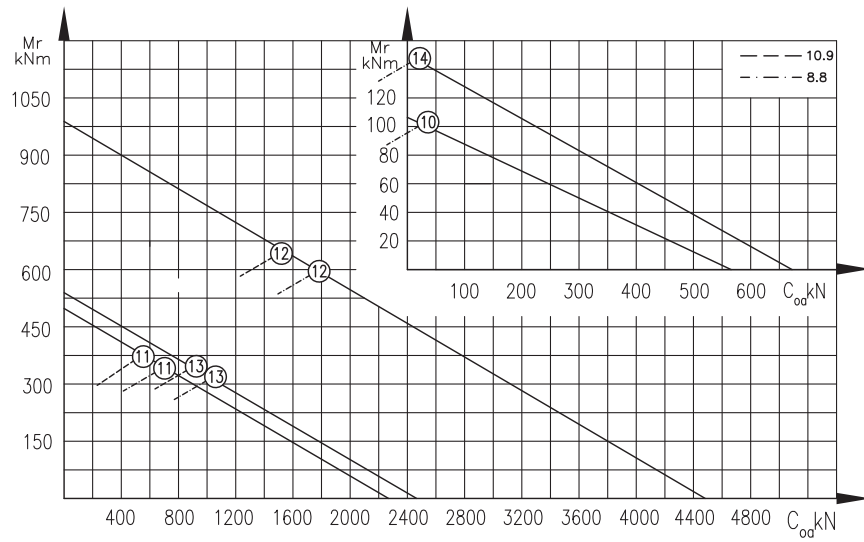
Fig. 14

Grease nipples					Designation	Fig.	Diagram position	Weight
t	n _i	n _e	no.	type				
			pcs.	-		-	-	kg.
45	12	12	4	A3	VU.10.0875V	9	12	291
	10	20			VU.10.0890ATNP4	10	13	101
	20	16	4	A2	VU.10.0942V	4	14	59,0
	30	30	4	A2	VU.10.0952V	4	15	133
15	6				VU.10.1048V	7	16	202
	32 ¹⁾	32 ¹⁾	4	A1+A2	VU.10.1093V	11	17	71,5
50	42	42	6	A3	VU.10.1235F	12	18	367
	18	12	6	A2	VU.10.1355V	13	19	214
	52	52	9	A3	VU.10.2920	14	20	3415

n_i = number of holes in inner ring
n_e = number of holes in outer ring

Single Row ball slewing bearings without gear, VU.10 type





Single Row ball slewing bearings Non-standardized

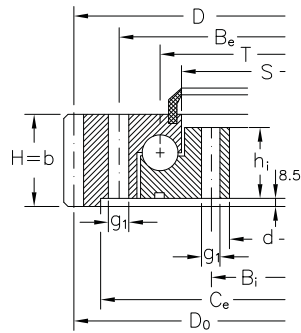


Fig. 1

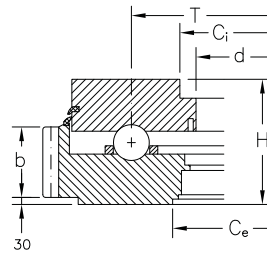


Fig. 2

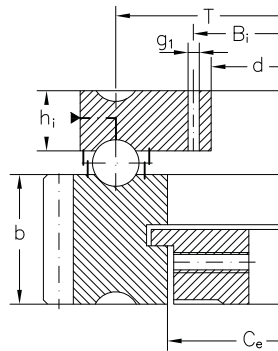


Fig. 3

- with external gear, VE.10 type

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	g ₂	t
mm														
1338	1225	1542	65	1265	1306	1456		46	1415			18		24
3700	3370	4200	340			3510	3445			225				
5000	4730	5218	310	4770		4360		90				22		60

- without gear, VU.10 type

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t	n _i
mm														
1500	1380	1620	120	1420		1400	1600	72	1580	72	M16		25	24
1600		1880	240	1950									26	12 ¹⁾
2115	2030	2200	65	2060					2170			18		36

► grease nipple

1) non equidistant holes

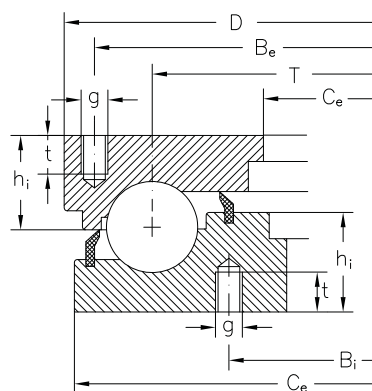


Fig. 4

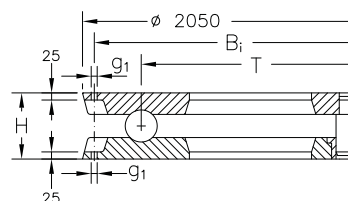


Fig. 5

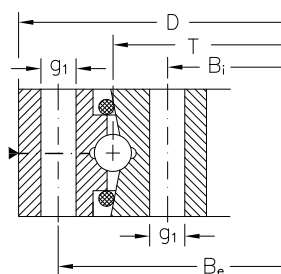


Fig. 6

t_1	D_0	m	Z	b	x m	Grease nipples no. type	Designation	Axial load stat C_{0a}	Weight	Fig.
						pcs. -		kN	kg.	-
24	1530	6	255	65			VE.10.1338VF81	400	302	1
	4140	30	138	180			VE.10.3700	1000	8794	2
	5192	22	236	180	-9	12 A3	VE.10.5000	1090	7200	3

n_e	D_0	m	Z	b	x m	Grease nipples no. type	Designation	Axial load stat C_{0a}	Weight	Fig.	Diagram position
						pcs. -		kN	kg.	-	
24							VU.10.1500TN	2100	475	4	21
12 ¹⁾							M-VU.10.1600V	264	5		
18 ¹⁾						2 A3	VU.10.2115F	261	6	22	

n_i = number of holes in inner ring

n_e = number of holes in outer ring

Ball slewing bearings

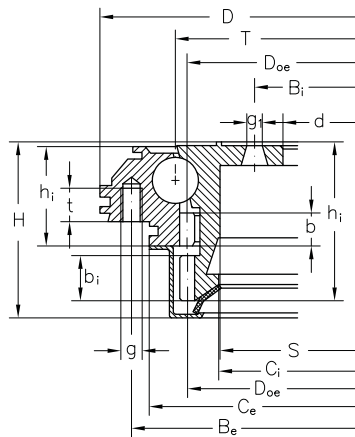


Fig. 1

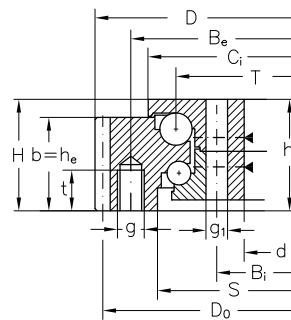


Fig. 2

- single row, with internal and external gear, VIE.10 type

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t
mm													
2127,4	1924	2275	165	1978	2048	2158	2066	150	2208	94	M24	34	27

- double row, with external gear, VE.20 type

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t	n _i
mm														
1735	1625	1906	128	1665	1765	-	1785	118	1805	99	M24	26	45	44
1790	1695	1965	107	1730	1820	1890	1840	94	1850	85	M20	22	45	44

- double row, without gear, VU.20 type

Dimensions

T	d	D	H	B _i	C _e	C _i	h _i	B _e	B	S _i	S _e	h _e	A	A1
mm														
884	700	1000	86	730	932	768	47	970	850	812	888	47	8	9

► grease nipple
1) non equidistant holes

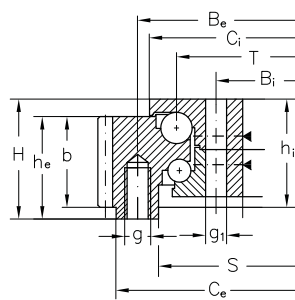


Fig. 3

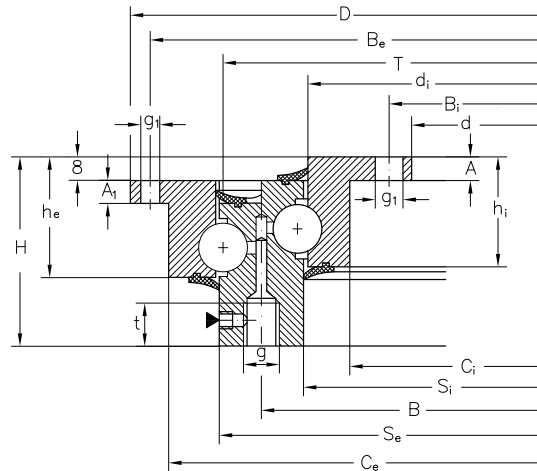


Fig. 4

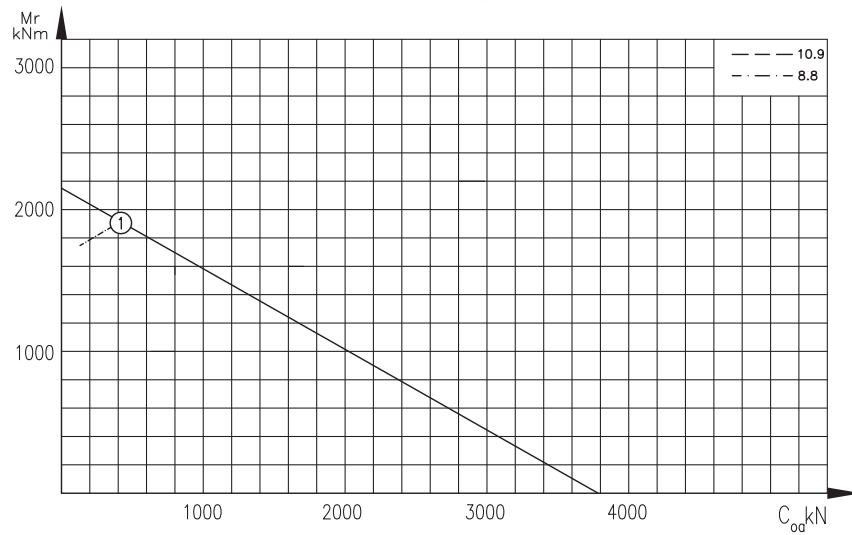
Designation										Fig.	Diagram position	Weight
n_i	n_e	D_{0i}	D_{0e}	$m_{i,e}$	$Z_{i,e}$	b	b_i	$x_{i,e}$	m			kg.
44 ¹⁾	46 ¹⁾	2100	2100	5	420	38	45	+5	VIE.10.2128F	1	1	450

						Grease nipples		Designation	Fig.	Diagram position	Weight
n _e	D ₀	m	Z	b	x m	no.	type				
						pcs. -					kg.
44	1872	12	156	99	+5	8+8	A3	VE.20.1735F	2	1	596
44	1935	15	129	80	-	3+3	A3	VE.20.1790F	3	2	440

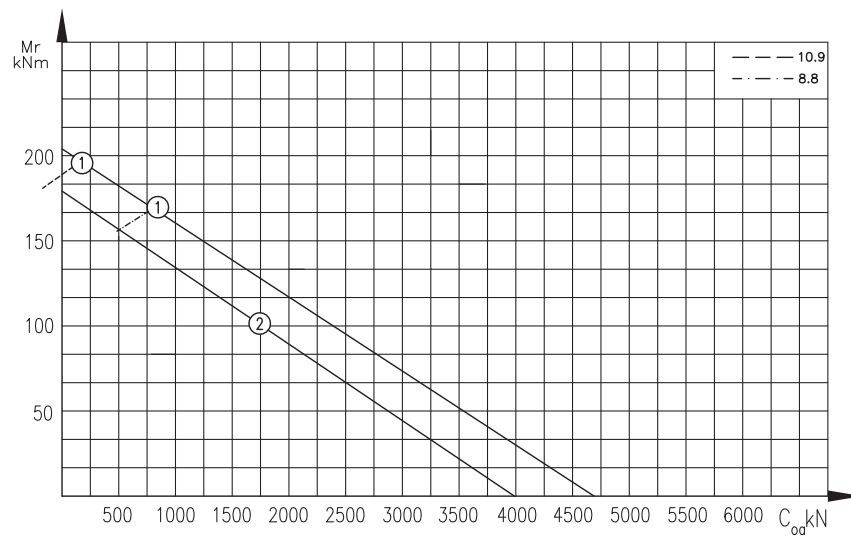
						Grease nipples		Designation	Fig.	Diagram position	Weight
g	g ₁	t	n	n ₀	n _e	no.	type				
						pcs.	-				kg.
M16	16,5	22	8 ¹⁾	12 ¹⁾	8	6+6	(A1+U2)+A2	VU.20.0884AV	4	1	99

n_i = number of holes in inner ring
 n_0 = number of holes in intermediate ring
 n_e = number of holes in outer ring

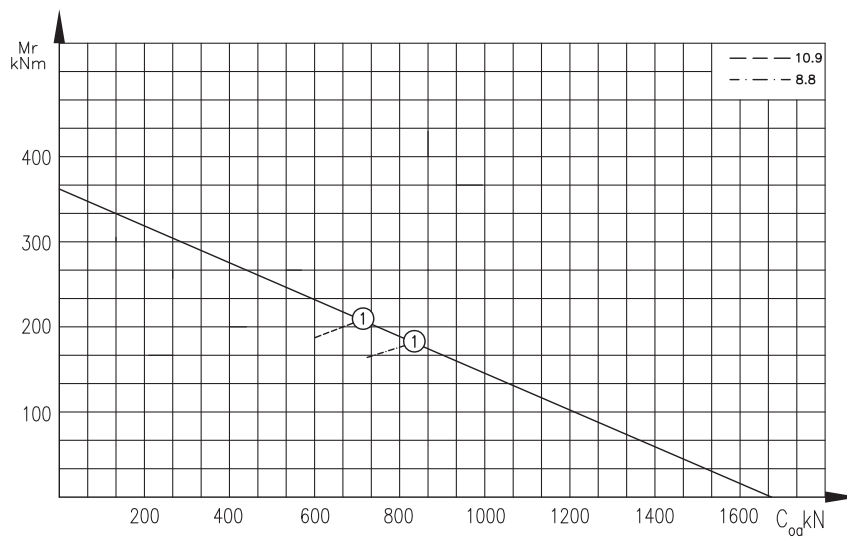
Single row ball slewing bearings with internal and external gear, VIE.10 type



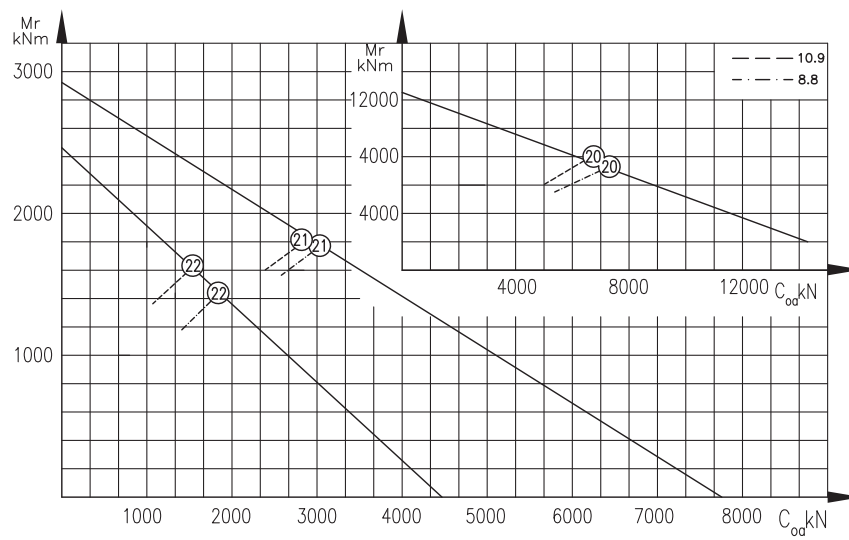
Double row ball slewing bearings with external gear, VE.20 type



Double row ball slewing bearings without gear, VU.20 type



Single row ball slewing bearings without gear, VU.10 type



Crossed cylindrical roller slewing bearings with internal gear, XE.10 type

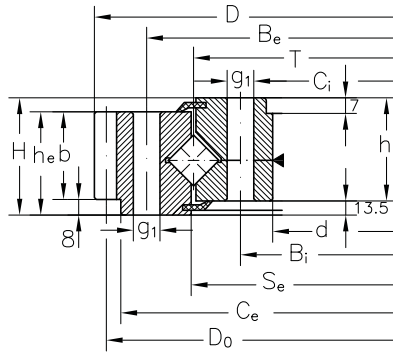


Fig. 1

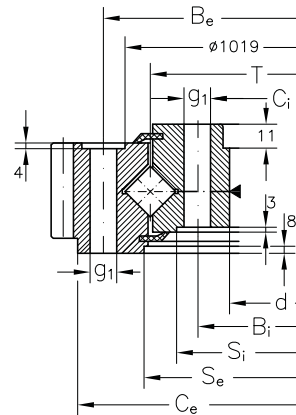


Fig. 2

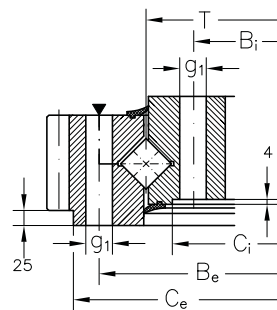


Fig. 3

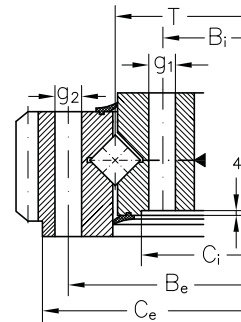


Fig. 4

Dimensions

T	d	D	H	B _i	S _e	C _e	S _i	C _i	h _i	B _e	h _e	g ₁	g ₂	t
mm														
675	570	822	93	605	678	782		575	79,5	754	79,5	22		
980	868	1144	100	910	993	1090	943	870	80	1050	79	22		
	868	1144	100	910	993	1088		870	88	1050	81	22		
1418	1270	1620	134	1330	1570			1375	118	1510	117	33	26	
1782	1580	2040	142	1650	1782	1470		1585	126	1910	120	39		
	1580	2040	142	1650	1782	1470		1585	126	1910	120	39		
2236	2042	2492	164	2112	2260	2420		2049	142	2360	148	34	M30	59

► grease nipple

*) greasing by pipe

1) non equidistant holes

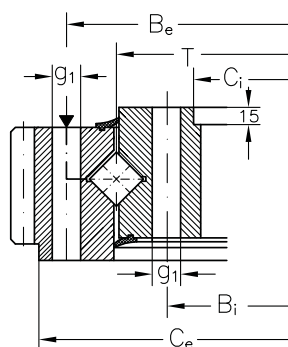


Fig. 5

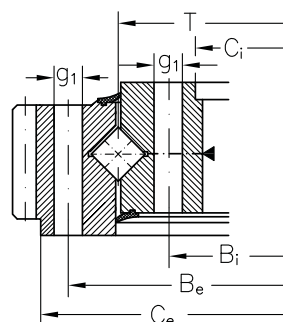


Fig. 6

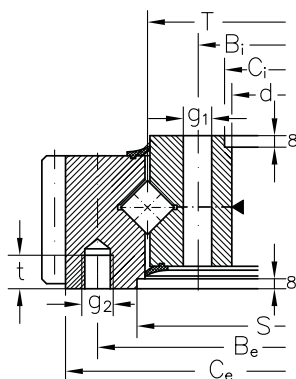


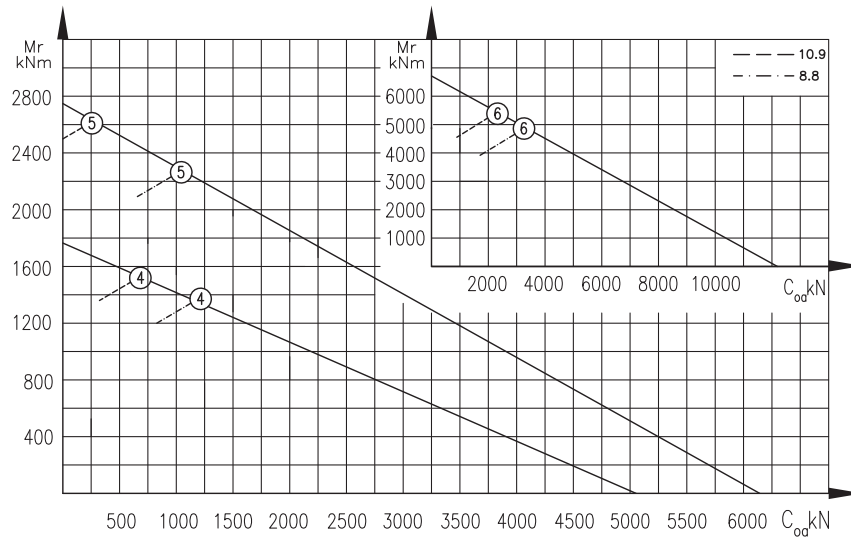
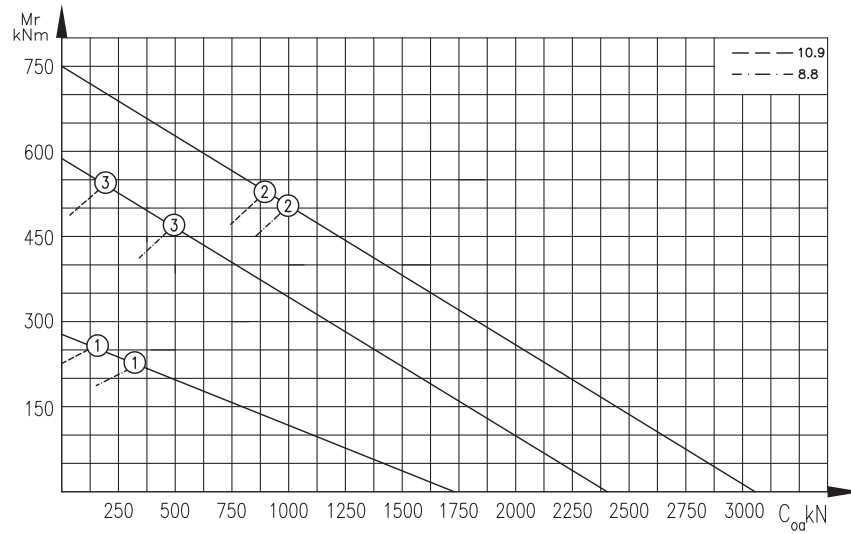
Fig. 7

							Grease nipples		Designation	Fig.	Diagram position	Weight
n _i	n _e	D ₀	m	Z	b	x m	no.	type				
							pcs.	-		-		kg.
18	18	810	6	135	71,5	4	A2	XE.10.0675F	1	1	147	
24 ¹⁾	18	1136	8	142	66	-4	3	*)	XE.10.0980V	2	2	226
26 ¹⁾	28 ¹⁾	1122	11	102	68		4+4	A2+A3	XE.10.0980ATNF81	3	3	232
23	36	1600	10	160	85		3	*)	XE.10.1418V	4	4	537
24	24	2016	12	168	110		6	A1+U3	XE.10.1782FF81	5	5	1060
24	24	2016	12	168	110		6	A3	XE.10.1782AFF81	6	5	1060
45	45	2464	14	176	147		4	A3	XE.10.2236V	7	6	1668

n_i = number of holes in inner ring

n_e = number of holes in outer ring

Crossed cylindrical roller slewing bearings with external gear, XE.10 type





Crossed cylindrical roller slewing bearings with internal gear, XI.10 type

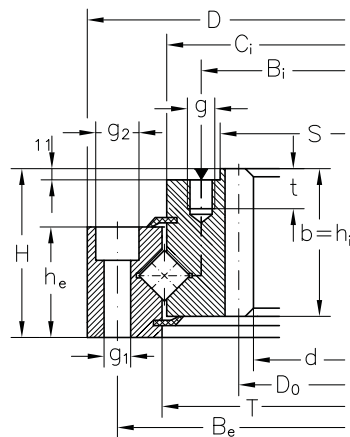


Fig. 1

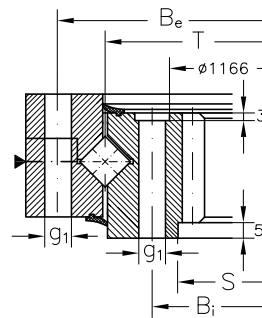


Fig. 2

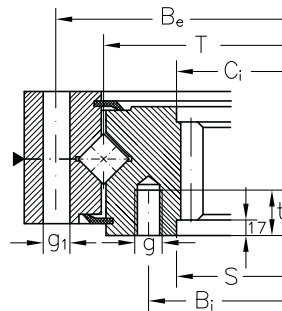


Fig. 3

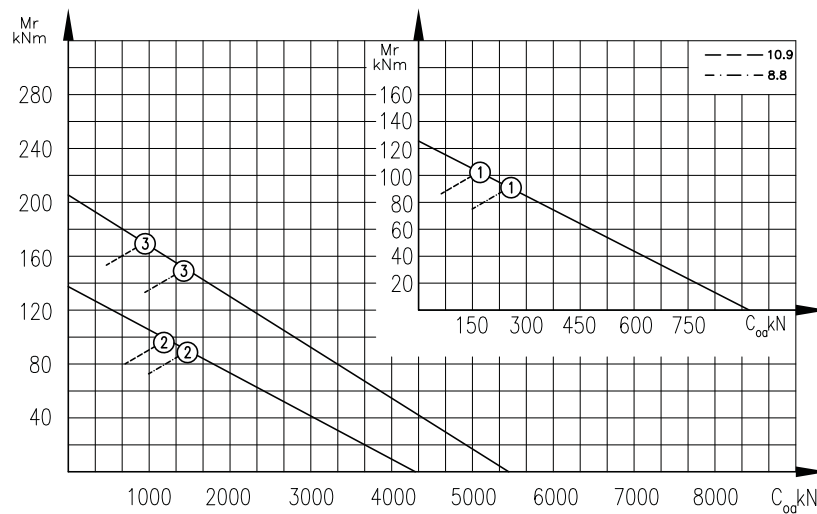
Dimensions

T	d	D	H	B _i	S	C _i	h _i	B _e	h _e	g	g ₁	g ₂	t	η _i
mm														
543	441,5	632	102	508	477	543	92	602	46	M12	18	26	25	20
1277	1088	1400	95	1195	1165		80	1360	80		22			24
1465	1308	1600	120	1404	1360	1392	110	1550	110	25,4	27		30	36

► grease nipple

*) greasing by pipe

Three-row cylindrical roller slewing bearings with external gear, type YE.30



n_e	D_0	m	Z	b	x	Grease nipples		Designation	Fig.	Diagram position	Weight
						no.	type				
						pcs.	-		-		kg.
12	450	4,5	100	92	+0,37	4	*)	XI.10.0543TNP4	1	1	73,4
24	1104	12	92	75		8	A1	XI.10.1277V	2	2	357
36	1320	12	110	88	-6	4	A3	XI.10.1465TN	3	3	505

n_i = number of holes in inner ring

n_e = number of holes in outer ring

Crossed cylindrical roller slewing bearings without gear, XU.10 type

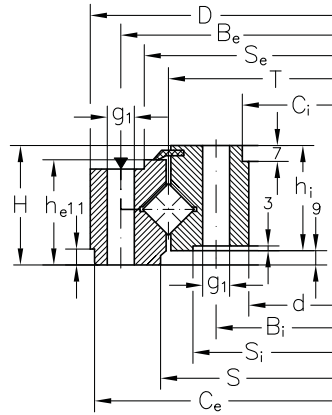


Fig. 1

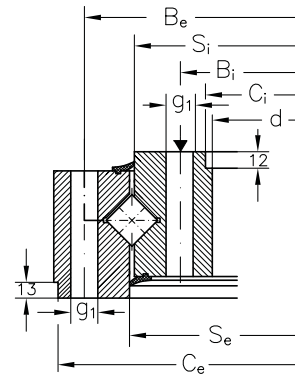


Fig. 2

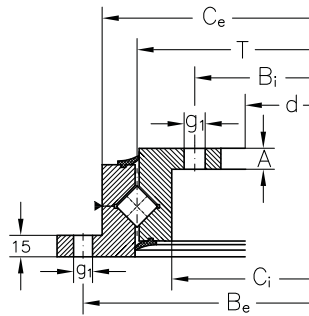


Fig. 3

Dimensions

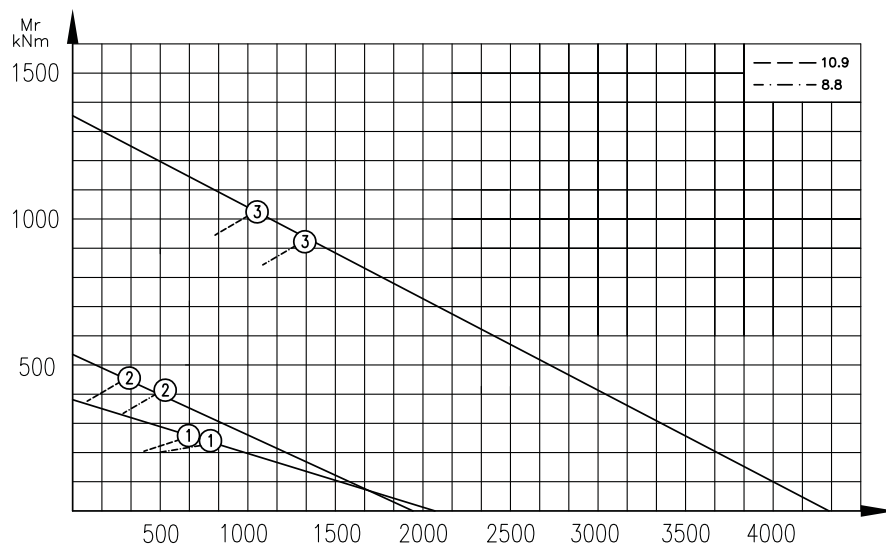
T	d	D	H	B _i	S	S _i	S _e	C _e	C _i	h _i	B _e	h _e
mm												
675	570	783	91,5	605	683	645	717	782	575	79,5	754	78
1093	985	1200	56	1015				1134	1052	46	1170	46
1250	1080	1475,5	110	1150		1247	1249	1415	1085	100	1350	89

► grease nipple

*) greasing by pipe

1) non equidistant holes

Three-row cylindrical roller slewing bearings with internal gear, type YI.30



g_1	n_i	n_e	Grease nipples		Designation	Fig.	Diagram position	Weight
			no.	type				
			pcs.	-		-		kg.
21	18	18	4	A2	XU.10.0675V	1	1	120
18	32 ¹⁾	32 ¹⁾	4	A1+U2	XU.10.1093V	2	2	71
27	24	24	4	*)	XU.10.1250TN	3	3	557

n_i = number of holes in inner ring

n_e = number of holes in outer ring

Three-row cylindrical roller slewing bearings

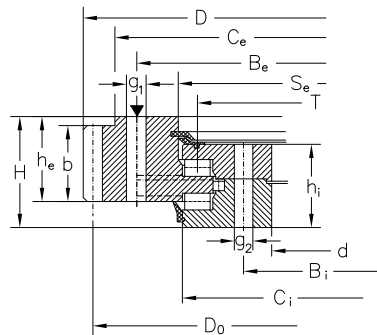


Fig. 1

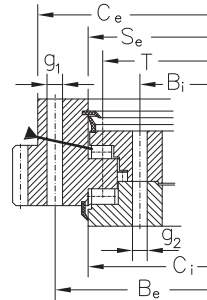


Fig. 2

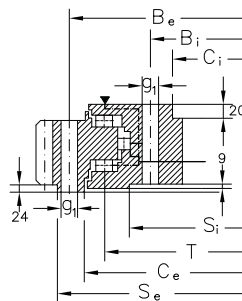


Fig. 3

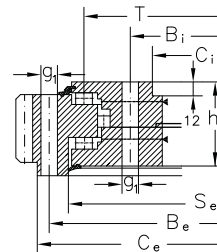


Fig. 4

- with external gear, type YE.30

Dimensions

T	d	D	H	B _i	S _i	S _e	C _e	C _i	h _i	B _e	h _e	g ₁	g ₂
mm													
1228	1070	1440	137	1125		1258	1385	1256	112	1320	107	26	33
1320	1115	1584	223	1195		1371	1520	1378	179	1455	179	33	45
1763,5	1616	1988	138	1670	1706	1913	1812	1618	129	1860	104	26	
2106	1882	2394	172	1962		2320	2142	1890	150	2242	142	33	

- with external gear, type YI.30

Dimensions

T	d	D	H	B _i	S	C _e	C _i	h _i	B _e	h _e	g	g ₁	t	t ₁
mm														
1400	1164,46		1547	128	1295		1373	1379	102	1495	123	26		
1563	1255,2	1790	218	1400	1312	1519	1532	170	1704	205	-	42		
	1255,2	1790	218	1400	1312	1519	1532	170	1704	205	M39	42		120
1800	1524	1981	147	1675	1600	1763	1774	117	1915	138	-	33		
2233	1980	2410	183	2140		2195	2206	153	2345	138	M30	33	60	45

► grease nipple

*) greasing by pipe

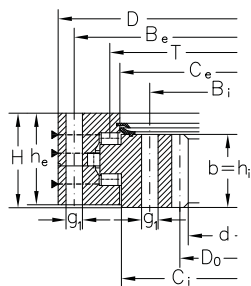


Fig. 5

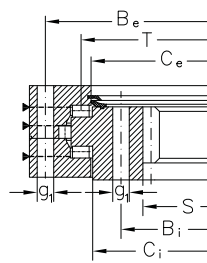


Fig. 6

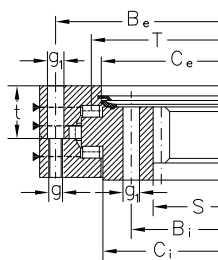


Fig. 7

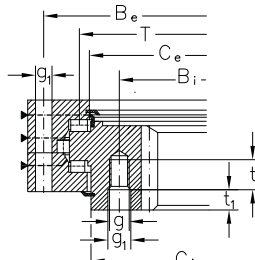


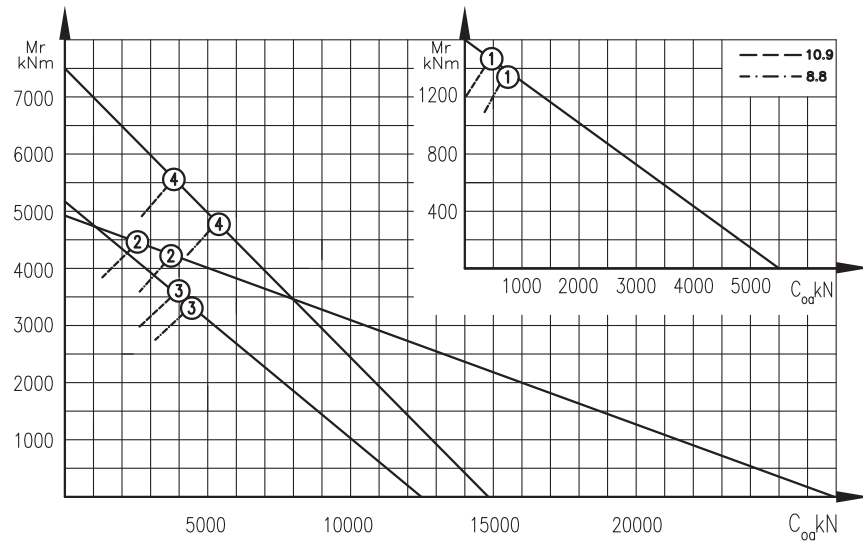
Fig. 8

						Grease nipples		Designation	Fig.	Diagram position	Weight
n_i	n_e	D_0	m	Z	b	no.	type				
						pcs.	-		-		kg.
26	36	1420	10	142	100	3+3+3	A3	YE.30.1228TN	1	1	532
36	56	1560	12	130	100	3+3	A3	YE.30.1320TN	2	2	1042
44	44	1960	14	140	80	10+5	*)	YE.30.1765F	3	3	760
40	40	2366	14	169	130	6+6	A3	YE.30.2100F	4	4	1657

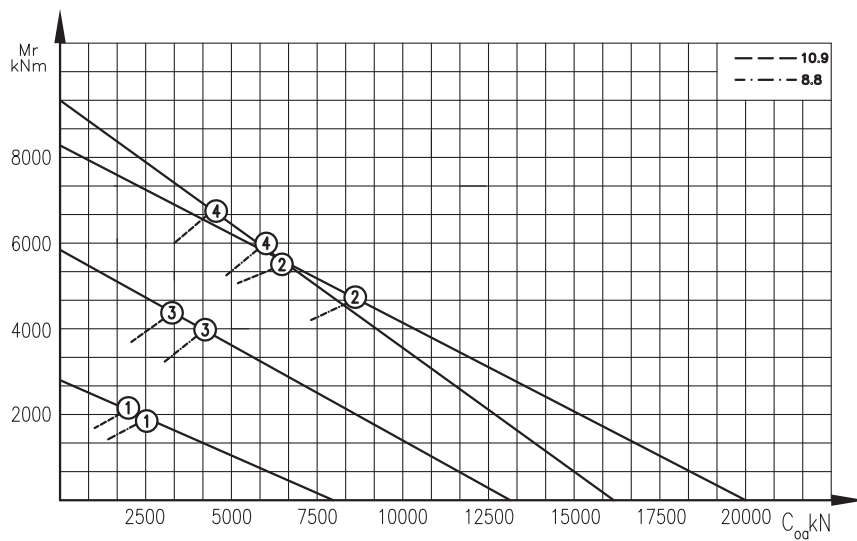
							Grease nipples		Designation	Fig.	Diagram position	Weight
n _i	n _e	D ₀	m	Z	b	x m	no.	type				
							pcs.	-		-		kg.
36	36	1176	12	98	102	-6	3+3+3	A3	YI.30.1400FF81	5	1	631
40	25	1260	12	105	145	-9,6	2+2+2	A3	YI.30.1563ATNF81	6	2	1610
40	25	1260	12	105	145	-9,6	2+2+2	A3	YI.30.1563TNF81	7	2	1617
36	36	1536	12	128	108	-6	6+6+6	A3	YI.30.1800F	7	3	1124
48	48	1980	18	110	150	-18	6+6+6	A3	YI.30.2233FF81	8	4	1433

n_i = number of holes in inner ring
 n_e = number of holes in outer ring

Three-row cylindrical roller slewing bearings with external gear, type YE.30



Three-row cylindrical roller slewing bearings with internal gear, type YI.30







Pillow blocks

Feature

The spherical outside surface ball bearings of DAS LAGER 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 DAS LAGER housing are mainly casting housing. There are pressed steel plate housing as well align with ease during operation and can be conveniently mounted or dismantled.

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 DAS LAGER 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		
		bore diameter dm		d deviations		width Bi deviations		
d over	incl.	high	low	high	low	high	low	max.
mm								
10	18	+18	0	+22	-4	0	-120	12
18	30	+21	0	+25	-4	0	-120	15
30	50	+25	0	+30	-5	0	-120	18
50	80	+30	0	+36	-6	0	-150	22
80	120	+35	0	+42	-7	0	-200	28
120	150	+40	0	+48	-8	0	-250	35

Note: dm is defined as the arithmetical mean of the largest and smallest diameter obtained by two-point measurements.

Tolerances on inner rings of bearings with tapered bore					
Unit: 0.001 mm					
Table 3					
Nominal bore diameter		Δd		$\Delta d1 - \Delta d$	
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

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.

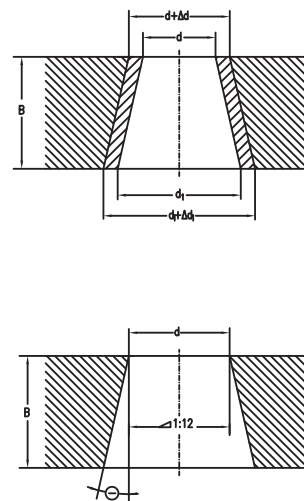


Fig. 1

Tolerances on outer ring Unit: 0.001 mm				
Nominal bore diameter		D_m		Radial run-out
D	incl.	deviations	low	max.
over		high		
mm				
40	50	0	-11	20
50	80	0	-13	25
80	120	0	-15	35
120	150	0	-18	40
150	160	0	-25	45

Note: 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	incl.	deviations
over		
mm		
40	50	± 200
50	80	± 250
80	120	± 300
120	160	± 350

Please refer to the figures 2.

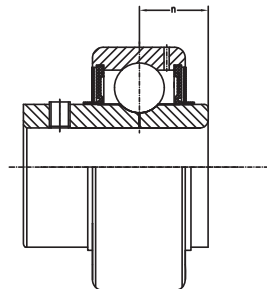


Fig. 2

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

Please refer to the figures 3.

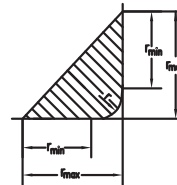


Fig. 3

Center height tolerances for pillow block type housing

Please refer to below figures 4 and table 7

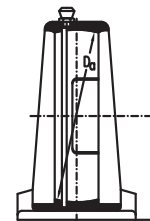


Fig. 4

Tolerances for flanged type housing (F, FS, FL, FT, FA, FB, FC)

Please refer below figures 5a, 5b and table 8a, 8b.

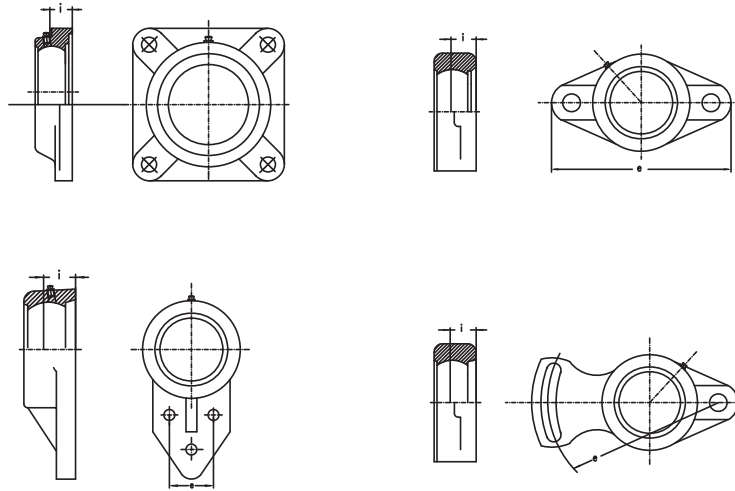


Fig. 5a

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			±150
P203			AK205	PA203		
P204			AK206	PA204	PH204	
P205		P305	AK207	PA205	PH205	
P206	PX05	P306	AK208	PA206	PH206	
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	±200
P212	PX11	P312	AK214	PA212	PH212	
P213	PX12	P313	AK215	PA213	PH213	
P214	PX13	P314			PH214	
P215	PX14	P315			PH215	
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							

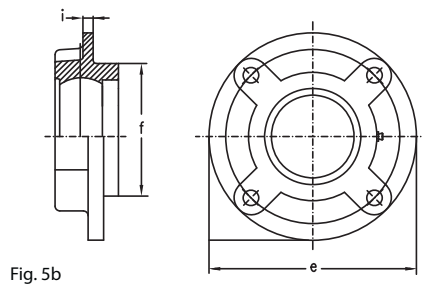


Fig. 5b

Tolerance for take-up type housing (T,ST)

Please refer to below figure 6 and table 9a, 9b.

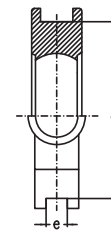


Fig. 6

Tolerance for flaged 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	e deviations	Parallelism of guide	
	high	low	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
over	incl.	tolerance
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 length

Table 12

Nominal dimension		Dimensional tolerance
over	incl.	
mm		
up	100	± 1,5
100	200	± 2,0
200	400	± 3,0
400	800	± 4.0

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 length 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							
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

Table 15

Radial internal clearance of tapered bore bearings (with adapter sleeve) Unit: 0,001 mm							
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

Table 16

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 ($n < 10$ r/min) condition is defined as dynamic load.

The load capacity of the bearing is expressed by the basic dynamic load rating which is shown in the spherical outside surface ball bearing's table.

Under normal mounting, lubricating and maintaining conditions, the operating bearing will have fatigue flaking due to the repeating action of variable load charged on the contact area between the rings and rolling elements. Generally, the fatigue flaking is the cause of normal damage of rolling bearings. Therefore, the usual bearing life refers to the bearing fatigue life. The life of group of apparently identical bearings operating under a considerable dispersion. For this reason, the bearing life is closely connected with the damaging probability or the reliability requirement.

The radial rating load of ball bearing with 90% reliability and 500 hours minimum life is shown in figure 7.

Life: The life of a rolling bearing is defined as the total number of revolution which the bearing is capable of enduring before the first evidence of fatigue flaking develops on any one rings or rolling elements.

Reliability: The reliability is the percentage of the bearings of a group of apparently identical bearings operating under identical conditions which can expect to attain or exceed a certain defined life. The reliability of individual bearings is the probability of the bearing to attain or exceed a defined life.

Basic rating life: For a group of apparently identical rolling bearings operating under identical conditions, the basic rating life is defined as the total number of revolutions that 90% of the bearings can be expected to complete or exceed.

Basic rating life

The fatigue rating life of spherical outside surface ball bearings is calculated by the following formula:

$$L_{10} = \left(\frac{C}{P} \right)^3, \text{ or } \frac{C}{P} = L_{10}^{1/3}$$

where:

L_{10} - basic rating life, $10^6 r$

P - basic dynamic load rating, N

N - equivalent dynamic bearing load, N

The basic dynamic load rating C is a hypothetical constant load with a fixed direction under which the bearing can attain a basic life of one million revolutions theoretically. For radial bearings, the load refers to the radial load.

The equivalent dynamic bearing load P is a constant load with a fixed direction under which the bearing life is identical to that of the bearing operating under actual load.

For a bearing operating with a constant rotation speed, the basic rating life can be expressed in terms of operating hours:

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P} \right)^3 \text{ or } L_{10h} = \frac{10^6}{60n} L_{10} = \frac{16666}{n} \left(\frac{C}{P} \right)^3,$$

where:

L_{10h} - basic rating life, h

n - bearing operating speed of rotation, r/min

For easier calculation, 500 hours as base of rating life is taken, and the speed factor f_n and the life factor f_h is introduced.

$$f_n = \left(\frac{331/3}{n} \right), \quad f_h = \left(\frac{L_{10h}}{500} \right)$$

In this, the formula is simplified to:

$$C = \frac{f_h}{f_n} P,$$

The values of f_n and f_h 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:

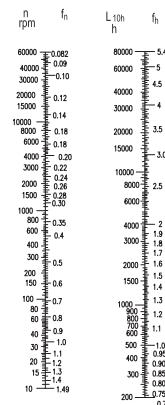
$$P_m = \sqrt[3]{\frac{1}{N} \int_0^N P^3 dN}$$

where:

P_m - mean equivalent dynamic bearing load, N

P - equivalent dynamic bearing load, N

N - total revolution numbers 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).

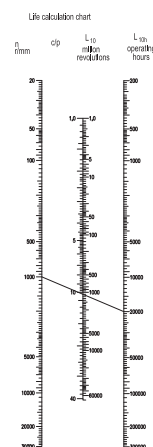
Under only radial load, i.e.

$$P = F_r = 3000 \text{ N}$$

Therefore,

$$C = \frac{\int h}{\int n} P = \frac{3,42}{0,322} = 31,863 \text{ N}$$

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				
$\frac{F_a}{C_a}$	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$		e	$\frac{F_a}{F_r} \leq e$	$\frac{F_a}{F_r} > e$		e	
	X	Y	X	Y		X	Y	X	Y	
0,025	1	0	0,56	2	0,22	1	0	0,46	1,74	0,3
0,04	1	0	0,56	1,8	0,24	1	0	0,46	1,61	0,33
0,07	1	0	0,56	1,6	0,27	1	0	0,46	1,46	0,36
0,13	1	0	0,56	1,4	0,31	1	0	0,46	1,3	0,41
0,25	1	0	0,56	1,2	0,37	1	0	0,46	1,14	0,47
0,5	1	0	0,56	1	0,44	1	0	0,46	1	0,54

By connecting n and the required basic rating life L_{10h} with a straight line, it can be found that C/P value is 10,6.

As is known, $P = F_r = 3000$ 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 L_{10} calculated with bearing life calculation formula can be applied to calculate the rating life of bearings made of ordinary bearing steel (i.e. bearing life with reliability of 90%)

Due to more and more of machinery products demanding higher reliability and better quality steel (ISO 281/1-1977), an adjusted rating life calculation equation is suggested. i.e.

$$L_n = a_1 a_2 a_3 L_{10}$$

For spherical outside surface ball bearing:

$$L_n = a_1 a_2 a_3 (C/P)^3$$

where:

L_n - under specified material and lubricating conditions, bearing life with (100-n)% no breaking probability (i.e. reliability).

a_1 - life adjustment factor for reliability (table 18)

a_2 - life adjustment factor materials (table 19)

a_3 - life adjustment factor for operating conditions (table 20)

Life adjustment factor for reliability 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							
		For lower speed		For medium speed		For rather high speed		For high speed	
over	incl.	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							
		Higher speed		Rather heavy load		Highest load		Heavy load	
over	incl.	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.

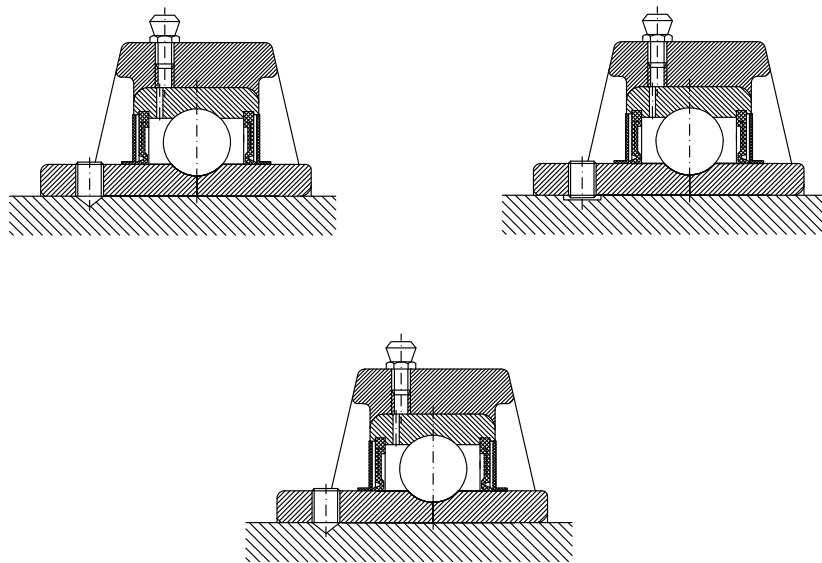


Fig. 9

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 heavy.

Mounting processes of these units as follows:

First, the sleeve is installed to an arbitrary position. After the shark proof washer is inserted, the nut is tightened.

The proper nut tightening condition can be obtained if it is tightened enough by hand and then rotated by $2/5$ to $3/5$ revolution with a spanner.

After tightening the nut, bend the shark proof washer within the slot. Otherwise, the nut may be loosened and creep may be caused between the shaft and sleeve. It is necessary the nut can not be tightened too much.

Bearings units with eccentric locking collar

The eccentric part of the collar mates with the inner ring of the bearing which is made eccentric with the collar. When locked to the shaft by hand in direction of the shaft rotation, the eccentric locking collar tightens automatically to the shaft by force of working radial load. Then, lock the set-screws provided on the collar to fix the eccentric collar to the shaft. At the shaft rotation force or load is not charged on the set-screws directly, it will not loosen during operation.

Bearing units with set-screws

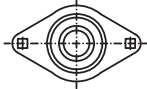
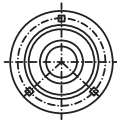
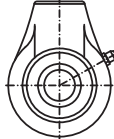
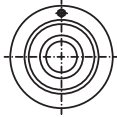
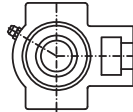
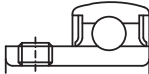
There are two set-screws located at two places on one side of the wide inner ring 120 apart with which the bearing units can be mounted to the shaft. When mounting the bearing to the shaft, the torque shown in the following table 23 is recommended to tighten the set screws to shaft.

The material for cast iron housing

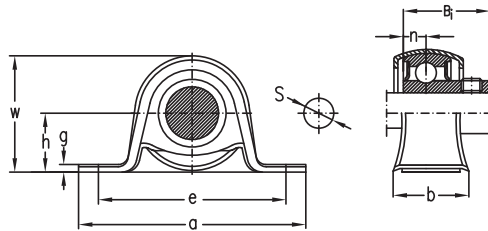
The material of cast iron housing under ISO/DIS GG20, the mechanical properties please refer to table 24.

Proper tightening torque of set-screws				
Table 23				
Set-screws type	Bearing type	Tightening torque		
mm	inch		N.m	lbf.in
M 5x0,8	No. 10-32 UNF	SB 201 - SB 203, UC 201 - UC 203	3 - 3,5	28
M 6x1	1/4-28 UNF	SB 204 - SB 207, UC 204 - UC 206 SA 201 - SA 206, 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			
Table 24			
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 721	
Flanged units type	page 737	
Two bolts flanged units type	page 748	
Flanged cartridge units type	page 763	
Hanger units type	page 770	
Cylindrical cartridge units type	page 772	
Take up units type	page 775	
Insert bearings	page 782	

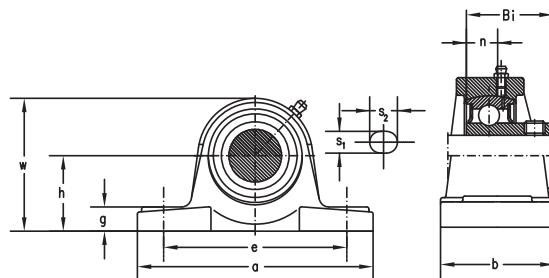
Standard duty pillow blocks pressed steel housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s	g	w	Bi	n						
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.

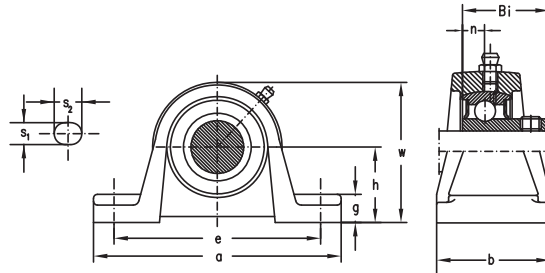
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
20	31,8	128	98	38	11	14	14	63	25	7	M10	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.

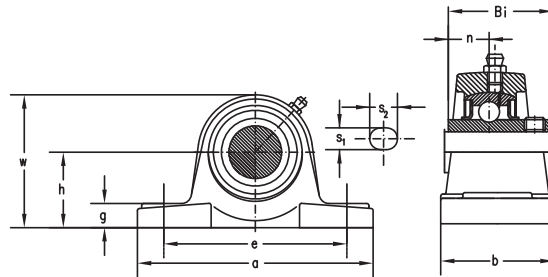
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

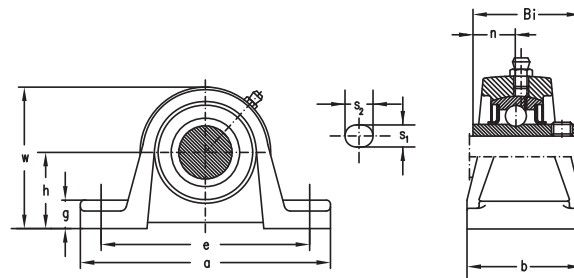
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
20	31,8	128	98	38	11	14	14	63	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.

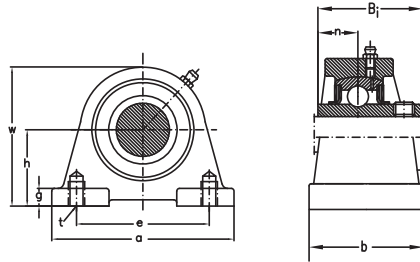
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	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	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.

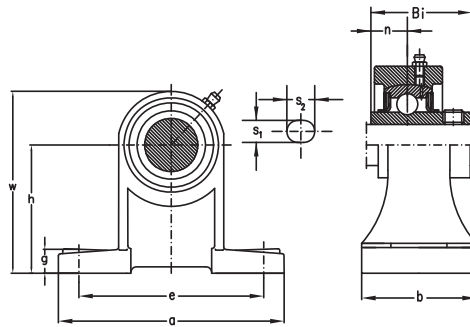
Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

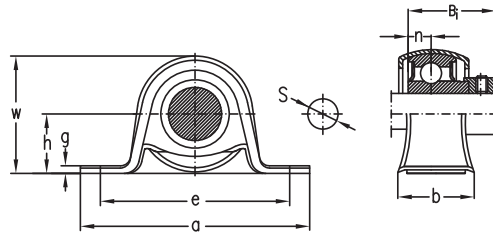
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight	
	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.

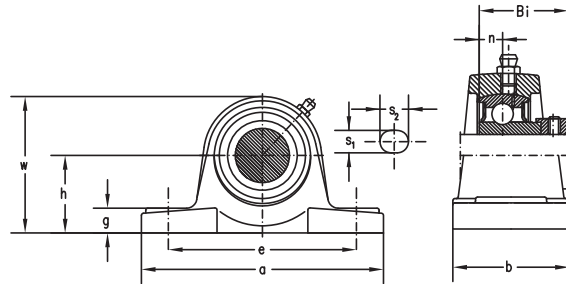
Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

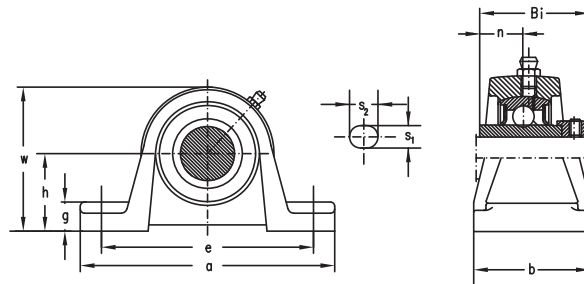
Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
20	31,8	128	98	38	11	14	14	63,0	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.

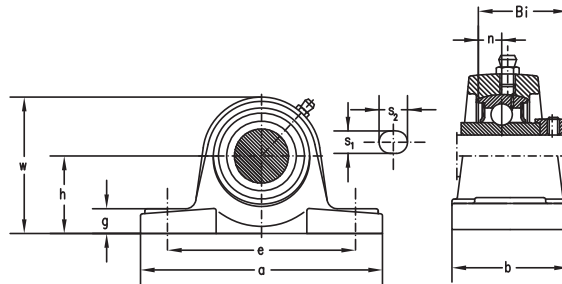
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n							
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.

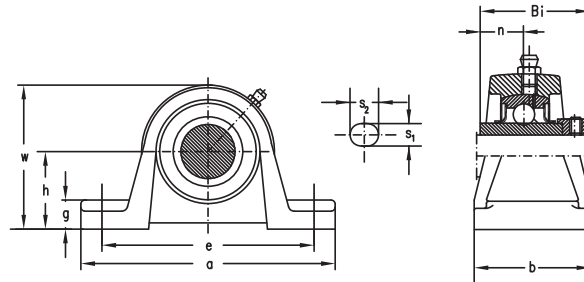
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n							
mm													-				Kg
20	31,8	128	98	38	11	14	14	63,0	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.

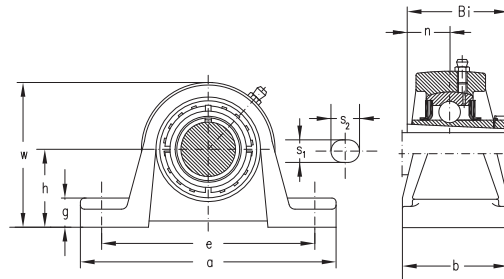
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number		Housing number	Weight
	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.

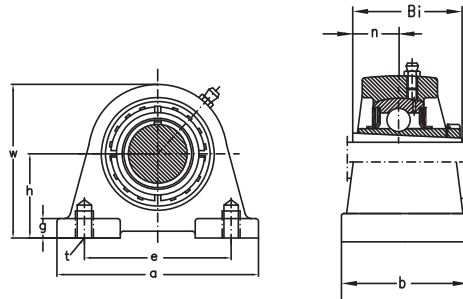
Standard duty pillow blocks cast housing adapter type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi					
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.

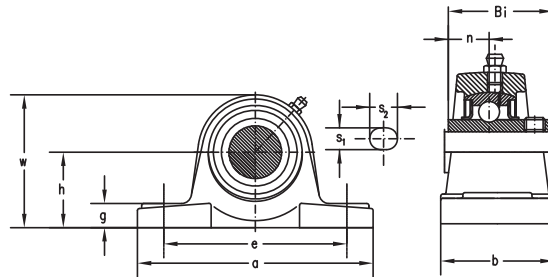
Standard duty pillow blocks cast housing adapter type



Shaft Nominal dia.	Dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	g	w	f	t	Bi					
mm										-				Kg
20	36,5	84	56	38	12	72	15	M10	35	M10	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.

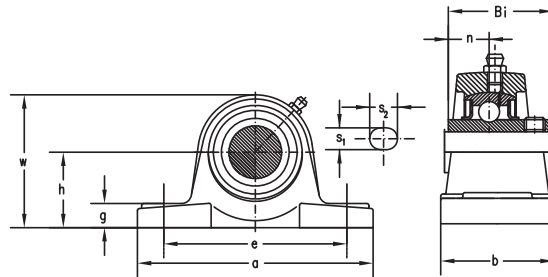
Medium duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
25	44,4	159	119	51	17	20	17	85	38,1	15,9	M14	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.

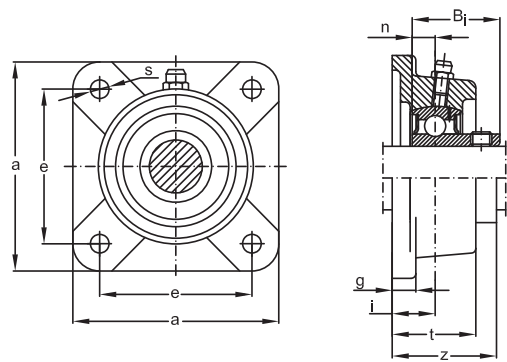
Heavy duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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

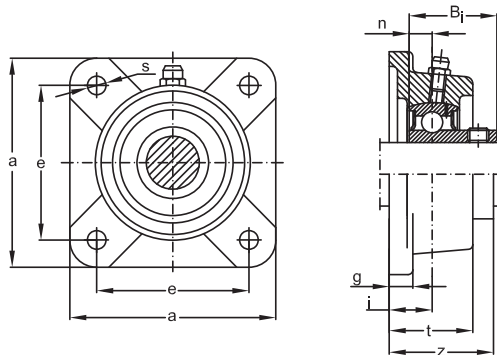


Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n					
mm										-				Kg
20	86	63,5	19	15	29,5	11,5	37,0	25	7,0	M10	SBFS204	SB204	FS204	0,59
25	93	70,0	19	15	30,0	11,5	38,5	27	7,5	M10	SBFS205	SB205	FS205	0,72
30	106	82,5	20	16	32,5	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.



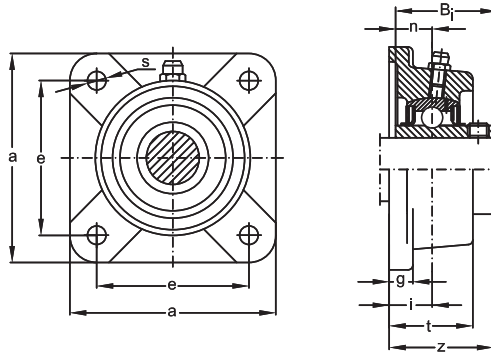
Standard duty flanged units cast housing set screws type



Shaft Nominal dia.	Dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n						
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.

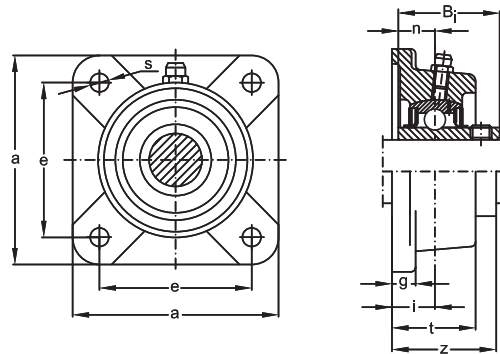
Standard duty flanged units cast housing set screws type



Shaft Nominal dia.	Dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

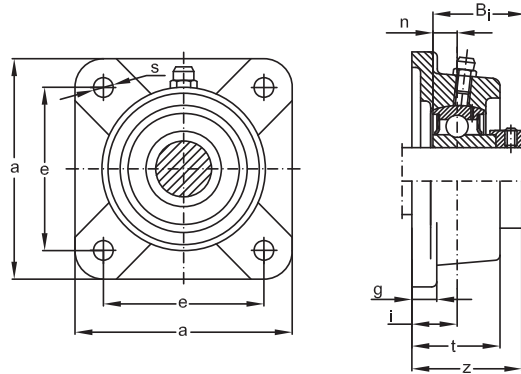
Standard duty flanged units cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n						
mm										-					Kg
12	86	64	15	12	25,5	12	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.

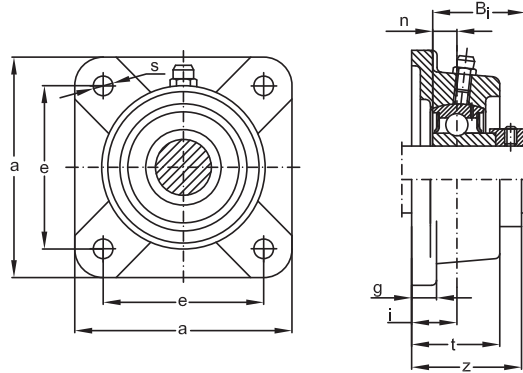
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

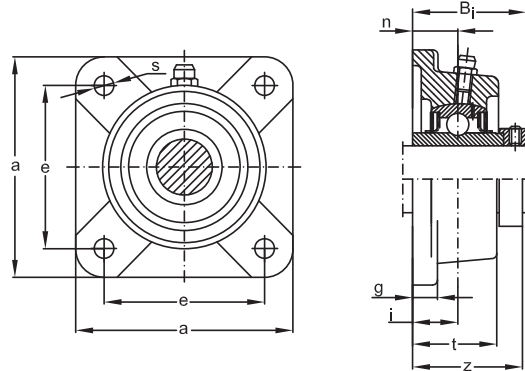
Standard duty flanged units cast housing eccentric locking collar type



Shaft Nominal dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n					
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.

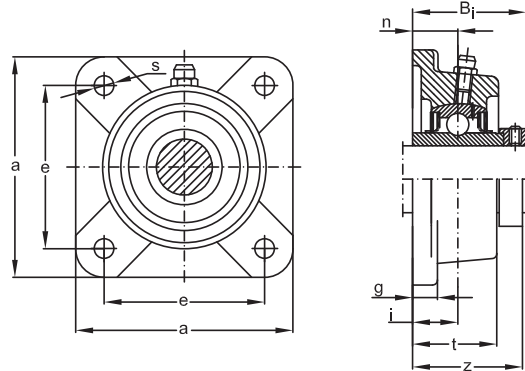
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

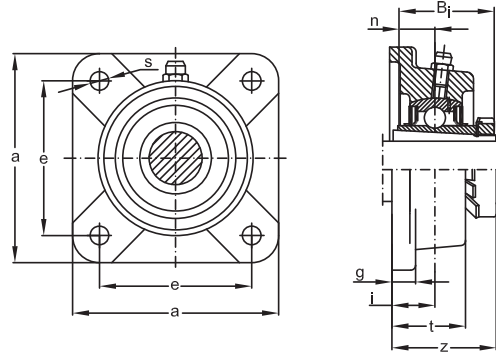
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n					
mm										-				Kg
12	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF201	UEL201	F204	0,63
15	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF202	UEL202	F204	0,61
17	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF203	UEL203	F204	0,60
20	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF204	UEL204	F204	0,58
25	95	70	16	13	27	12	42,9	44,3	17,4	M10	UELF205	UEL205	F205	0,78
30	108	83	18	13	31	12	48,1	48,3	18,2	M10	UELF206	UEL206	F206	1,14
35	117	92	19	15	34	14	51,3	51,1	18,8	M12	UELF207	UEL207	F207	1,47
40	130	102	21	15	36	16	55,9	56,3	21,4	M14	UELF208	UEL208	F208	1,91
45	137	105	22	16	38	16	56,9	56,3	21,4	M14	UELF209	UEL209	F209	2,22
50	143	111	22	16	40	16	60,1	62,7	24,6	M14	UELF210	UEL210	F210	2,56
55	162	130	25	18	43	19	68,6	71,3	27,7	M16	UELF211	UEL211	F211	3,27
60	175	143	29	18	48	19	75,8	77,7	30,9	M16	UELF212	UEL212	F212	3,91
65	187	149	30	22	50	19	81,6	85,7	34,1	M16	UELF213	UEL213	F213	5,47
70	193	152	31	22	54	19	82,6	85,7	34,1	M16	UELF214	UEL214	F214	6,14
75	200	159	34	22	56	19	88,8	92,1	37,3	M16	UELF215	UEL215	F215	6,18

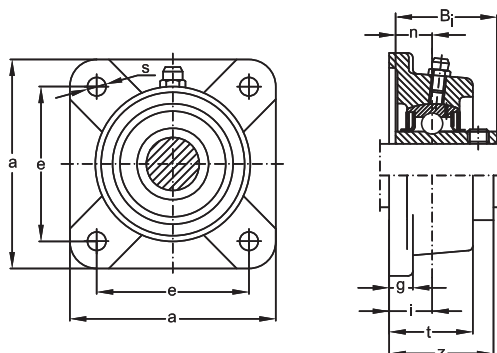
Note: Inch sizes available on request.

Standard duty flanged units cast housing adapter type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	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

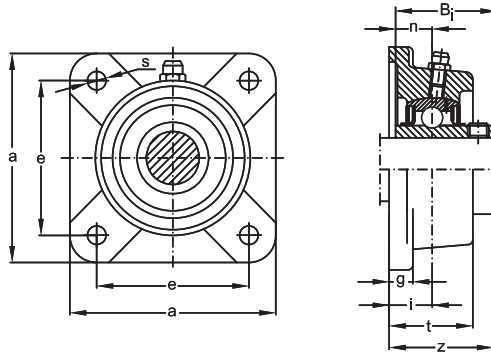
Medium duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n						
mm											-				Kg
25	108	82,5	18	13	30	12	40,2	38,1	15,9	M10	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.

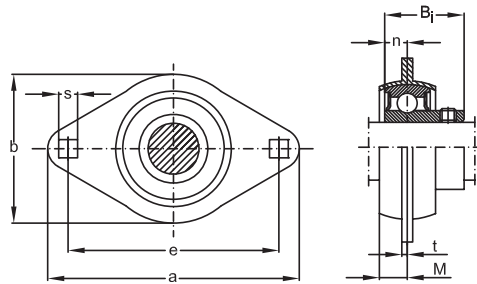
Heavy duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n						
mm										-					Kg
25	108	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.

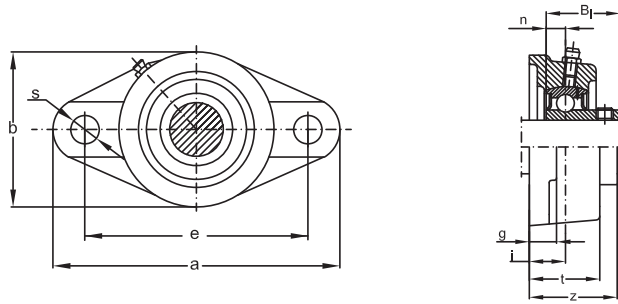
Standard duty two bolts flanged units pressed steel housing set screws type



Shaft dia.	Nominal dimensions								Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	M	t	s	b	Bi	n					
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.

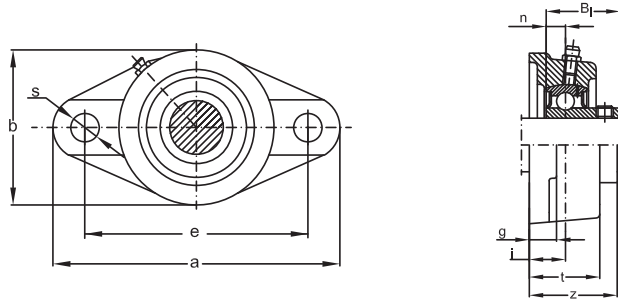
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	b	z	Bi	n					
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.

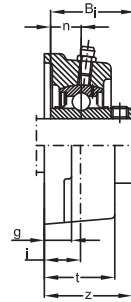
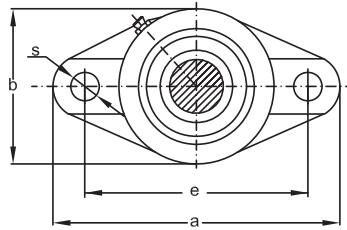
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

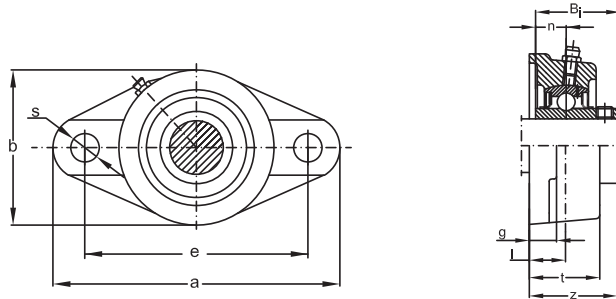
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

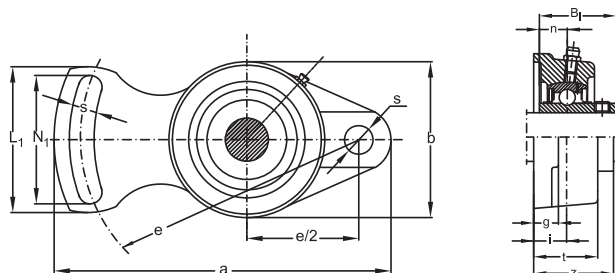
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

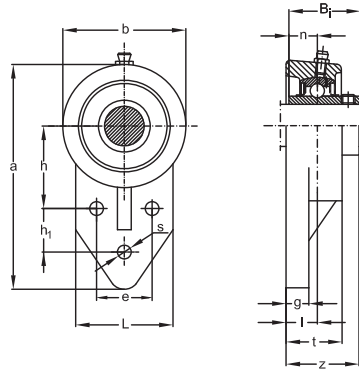
Standard duty flanged units cast housing special type set screws type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

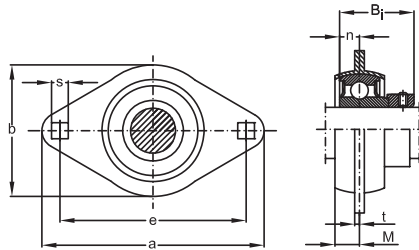
Standard duty flanged units cast housing special type set screws type



Shaft dia.	Nominal dimensions													Bolt size	Unit number	Bearing Housing			Weight
	a	e	i	g	t	s	h	h ₁	L	b	z	Bi	n			number	number		
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.

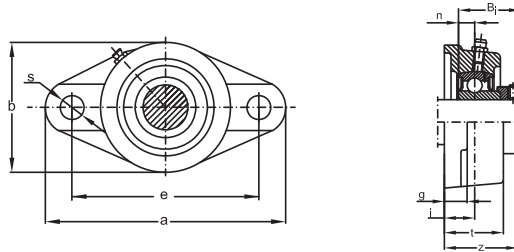
Standard duty two bolts flanged units pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	M	t	s	b	Bi	n						
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.

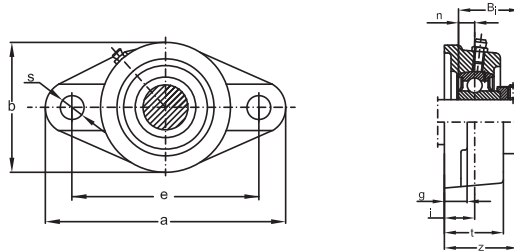
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

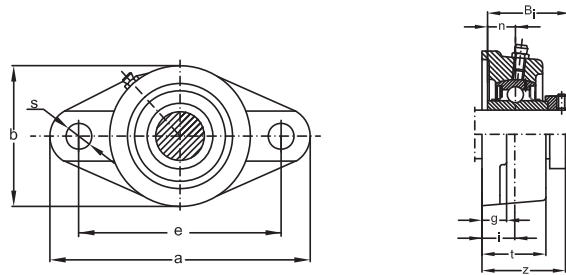
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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.

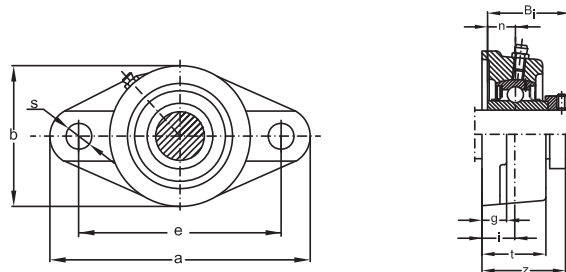
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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	UELFT 204	UEL 204	FT 204	0,56
25	123	99	19	15	30	11,5	70	45,9	44,3	17,4	M10	UELFT 205	UEL 205	FT 205	0,64
30	142	116,5	20	16	32,5	11,5	82	50,1	48,3	18,2	M10	UELFT 206	UEL 206	FT 206	0,94
35	158	130	21	17	36	13	94	53,3	51,1	18,8	M10	UELFT 207	UEL 207	FT 207	1,40
40	172	143,5	24	17	39	13	103	58,9	56,3	21,4	M10	UELFT 208	UEL 208	FT 208	1,63
45	180	148,5	24	18	40	15	108	58,9	56,3	21,4	M12	UELFT 209	UEL 209	FT 209	1,88
50	190	157	28	20	45	15	114	66,1	62,7	24,6	M12	UELFT 210	UEL 210	FT 210	2,18
55	217	184	31	21	48	16,5	128	74,6	71,3	27,7	M14	UELFT 211	UEL 211	FT 211	3,06
60	237	202	34	21	53	16,5	138	80,8	77,7	30,9	M14	UELFT 212	UEL 212	FT 212	3,96
65	256	210	38	22	56	21	152	89,6	85,7	34,1	M20	UELFT 213	UEL 213	FT 213	5,06
70	264	216	38	23	58	21	157	89,6	85,7	34,1	M20	UELFT 214	UEL 214	FT 214	5,33

Note: Inch sizes available on request.

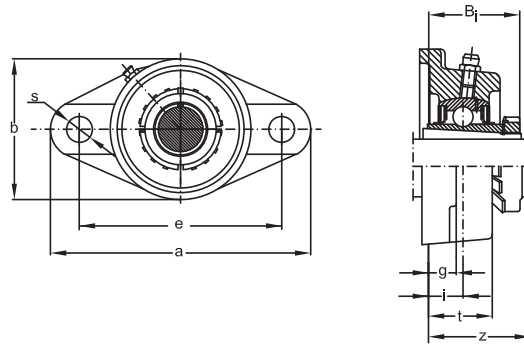
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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	UELFL 201	UEL 201	FL 201	0,53
15	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL 202	UEL 202	FL 202	0,51
17	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL 203	UEL 203	FL 203	0,50
20	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL 204	UEL 204	FL 204	0,48
25	130	99	16	13	27	68	16	42,9	44,3	17,4	M14	UELFL 205	UEL 205	FL 205	0,64
30	148	117	18	13	31	80	16	48,1	48,3	18,2	M14	UELFL 206	UEL 206	FL 206	1,00
35	161	130	19	14	34	90	16	51,3	51,1	18,8	M14	UELFL 207	UEL 207	FL 207	1,27
40	175	144	21	14	36	100	16	55,9	56,3	21,4	M14	UELFL 208	UEL 208	FL 208	1,57
45	188	148	22	16	38	108	19	56,9	56,3	21,4	M16	UELFL 209	UEL 209	FL 209	1,97
50	197	157	22	16	40	115	19	60,1	62,7	24,6	M16	UELFL 210	UEL 210	FL 210	2,34
55	224	184	25	18	43	130	19	68,6	71,3	27,7	M16	UELFL 211	UEL 211	FL 211	3,13
60	250	202	29	18	48	140	23	75,8	77,3	30,9	M20	UELFL 212	UEL 212	FL 212	4,10
65	258	210	30	20	50	155	23	81,6	85,7	34,1	M20	UELFL 213	UEL 213	FL 213	5,18
70	265	216	31	20	54	160	23	82,6	85,7	34,1	M20	UELFL 214	UEL 214	FL 214	5,74
75	275	255	34	20	56	165	23	88,8	92,1	37,3	M20	UELFL 215	UEL 215	FL 215	5,99

Note: Inch sizes available on request.

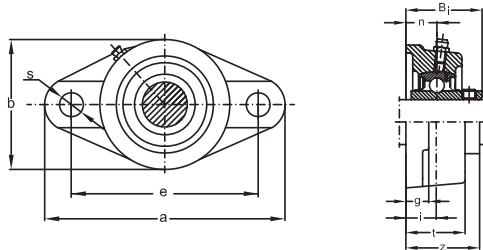
Standard duty two bolts flanged units cast housing adapter type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	b	s	z	Bi					
mm														
20	130	99	16	13	27	68	16	35,5	35	M14	UKFL 205	UK 205	FL 205	0,54
25	148	117	18	13	31	80	16	39	38	M14	UKFL 206	UK 206	FL 206	0,84
30	161	130	19	14	34	90	16	42,5	43	M14	UKFL 207	UK 207	FL 207	1,04
35	175	144	21	14	36	100	16	46,5	46	M14	UKFL 208	UK 208	FL 208	1,27
40	188	148	22	16	38	108	19	48,5	50	M16	UKFL 209	UK 209	FL 209	1,65
45	197	157	22	16	40	115	19	50	55	M16	UKFL 210	UK 210	FL 210	1,92
50	224	184	25	18	43	130	19	54,5	59	M16	UKFL 211	UK 211	FL 211	2,51
55	250	202	29	18	48	140	23	61	62	M20	UKFL 212	UK 212	FL 212	3,26
60	258	210	30	20	50	155	23	64	65	M20	UKFL 213	UK 213	FL 213	4,13

Note: Inch sizes available on request.

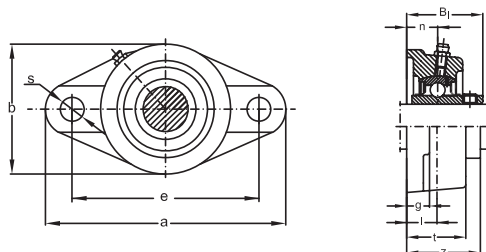
Medium duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	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	UCFL X05	UC X05	FL X05	0,95
30	156	130	19	15	34	95	16	44,4	42,9	17,5	M14	UCFL X06	UC X06	FL X06	1,34
35	171	144	22	16	38	105	16	51,2	49,2	19	M14	UCFL X07	UC X07	FL X07	1,74
40	179	148	22	16	40	111	16	52,2	49,2	19	M14	UCFL X08	UC X08	FL X08	1,97
45	189	157	23	16	40	116	16	55,6	51,6	19	M14	UCFL X09	UC X09	FL X09	2,18
50	216	184	26	18	44	133	19	59,4	55,6	22,2	M16	UCFL X10	UC X10	FL X10	3,19

Note: Inch sizes available on request.

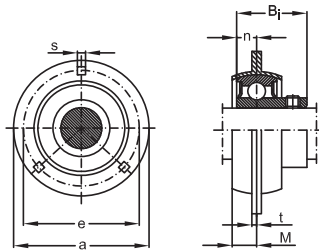
Heavy duty two bolts flanged units cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	b	s	z	Bi	n					
mm															
25	150	113	16	13	29	80	19	39	38	15	M16	UCFL 305	UC 305	FL 305	0,88
30	180	134	18	15	32	90	23	44	43	17	M20	UCFL 306	UC 306	FL 306	1,34
35	185	141	20	16	36	100	23	49	48	19	M20	UCFL 307	UC 307	FL 307	1,59
40	200	158	23	17	40	112	23	56	52	19	M20	UCFL 308	UC 308	FL 308	2,11
45	230	177	25	18	44	125	25	60	57	22	M22	UCFL 309	UC 309	FL 309	3,07
50	240	187	28	19	48	140	25	67	61	22	M22	UCFL 310	UC 310	FL 310	3,83
55	250	198	30	20	52	150	25	71	66	25	M22	UCFL 311	UC 311	FL 311	4,66
60	270	212	33	22	56	160	31	78	71	26	M27	UCFL 312	UC 312	FL 312	5,59
65	295	240	33	25	58	175	31	78	75	30	M27	UCFL 313	UC 313	FL 313	6,99
70	315	250	36	28	61	185	35	81	78	33	M30	UCFL 314	UC 314	FL 314	8,42
75	320	260	39	30	66	195	35	89	82	32	M30	UCFL 315	UC 315	FL 315	9,80
80	355	285	38	32	68	210	38	90	86	34	M33	UCFL 316	UC 316	FL 316	13,00

Note: Inch sizes available on request.

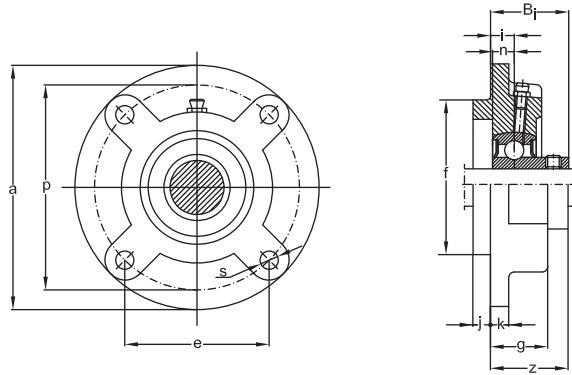
Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions							Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	t	s	M	Bi	n					
mm												
12	81	63,5	2	7,1	7	22	6	M6	SBPF 203	SB 201	PF 201	0,23
15	81	63,5	2	7,1	7	22	6	M6	SBPF 203	SB 202	PF 202	0,22
17	81	63,5	2	7,1	7	22	6	M6	SBPF 203	SB 203	PF 203	0,21
20	90	71,5	2	9	8	25	7	M8	SBPF 204	SB 204	PF 204	0,29
25	95	76	2	9	9	27	7,5	M8	SBPF 205	SB 205	PF 205	0,37
30	113	90,5	2,6	11	9,5	29	8	M10	SBPF 206	SB 206	PF 206	0,58
35	122	100	2,6	11	11	32	8,5	M10	SBPF 207	SB 207	PF 207	0,74

Note: Inch sizes available on request.

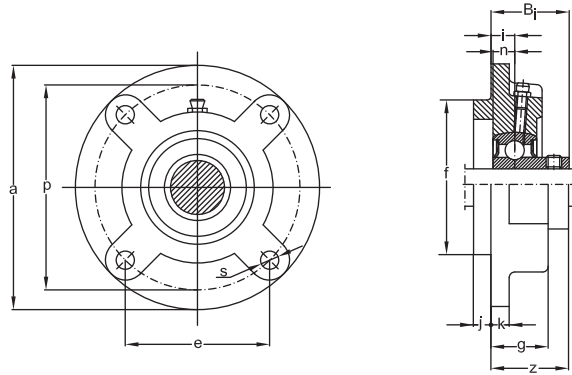
Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	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	SB 204	SBFC 204	FC 204	0,65
25	115	90	63,6	10	12	6	7	21	70	29,5	27	7,5	M10	SB 205	SBFC 205	FC 205	0,95
30	125	100	70,7	10	12	8	8	23	80	31	29	8	M10	SB 206	SBFC 206	FC 206	1,19
35	135	110	77,8	11	14	9	9	26	90	34,5	32	8,5	M12	SB 207	SBFC 207	FC 207	1,55
40	145	120	84,8	11	14	9	9	26	100	35,5	34	9,5	M12	SB 208	SBFC 208	FC 208	1,87

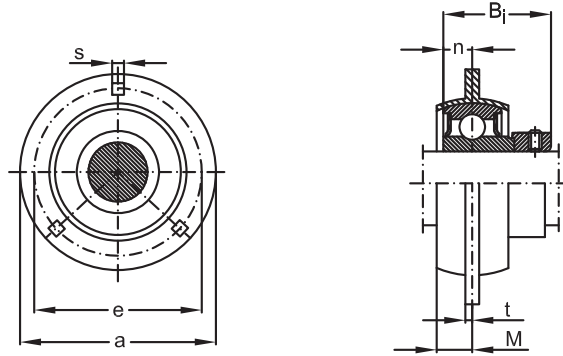
Note: Inch sizes available on request.

Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	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	UCFC 201	UC 201	FC 201	0,73
15	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC 202	UC 202	FC 202	0,72
17	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC 203	UC 203	FC 203	0,71
20	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC 204	UC 204	FC 204	0,69
25	115	90	63,6	10	12	6	7	21	70	29,7	34	14,3	M10	UCFC 205	UC 205	FC 205	0,99
30	125	100	70,7	10	12	8	8	23	80	32,2	38,1	15,9	M10	UCFC 206	UC 206	FC 206	1,25
35	135	110	77,8	11	14	8	9	26	90	36,4	42,9	17,5	M12	UCFC 207	UC 207	FC 207	1,64
40	145	120	84,8	11	14	10	9	26	100	41,2	49,2	19	M12	UCFC 208	UC 208	FC 208	2,01
45	160	132	93,3	10	16	12	10	26	105	40,2	49,2	19	M14	UCFC 209	UC 209	FC 209	2,57
50	165	138	97,6	10	16	12	14	28	110	42,6	51,6	19	M14	UCFC 210	UC 210	FC 210	2,85
55	185	150	106,1	13	19	12	13	30	125	46,4	55,6	22,2	M16	UCFC 211	UC 211	FC 211	3,92
60	195	160	113,1	17	19	12	15	36	135	56,7	65,1	25,4	M16	UCFC 212	UC 212	FC 212	5,03
65	205	170	120,2	16	19	14	15	35	145	55,7	65,1	25,4	M16	UCFC 213	UC 213	FC 213	5,52
70	215	177	125,1	17	19	14	16	38	150	61,4	74,6	30,2	M16	UCFC 214	UC 214	FC 214	6,55
75	220	184	130,1	18	19	16	17	39	160	62,5	77,8	33,3	M16	UCFC 215	UC 215	FC 215	7,01
80	240	200	141,4	18	23	16	18	42	170	67,3	82,6	33,3	M20	UCFC 216	UC 216	FC 216	8,94
85	250	208	147,1	18	23	18	20	45	180	69,6	85,7	34,1	M20	UCFC 217	UC 217	FC 217	10,68
90	265	220	155,5	22	23	20	18	50	190	78,3	96	39,7	M20	UCFC 218	UC 218	FC 218	12,95

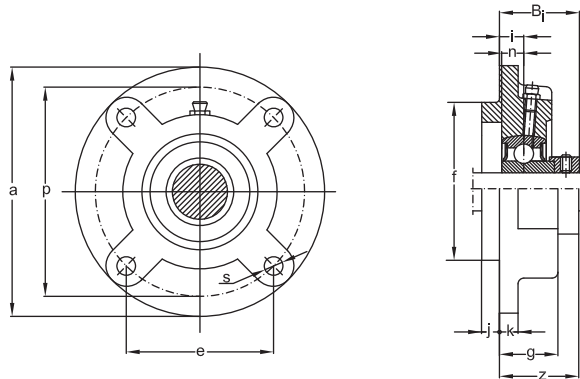
Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions							Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	t	s	M	Bi	n					
mm									-			
12	81	63,5	2	7,1	7	28,5	6	M6	SAPF 201	SA 201	PF 201	0,27
15	81	63,5	2	7,1	7	28,5	6	M6	SAPF 202	SA 202	PF 202	0,26
17	81	63,5	2	7,1	7	28,5	6	M6	SAPF 203	SA 203	PF 203	0,25
20	90	71,5	2	9	8	29,5	7	M8	SAPF 204	SA 204	PF 204	0,34
25	95	76	2	9	9	30,5	7,5	M8	SAPF 205	SA 205	PF 205	0,40
30	113	90,5	2,6	11	9,5	33,9	8	M10	SAPF 206	SA 206	PF 206	0,65
35	122	100	2,6	11	11	37,5	8,5	M10	SAPF 207	SA 207	PF 207	0,86

Note: Inch sizes available on request.

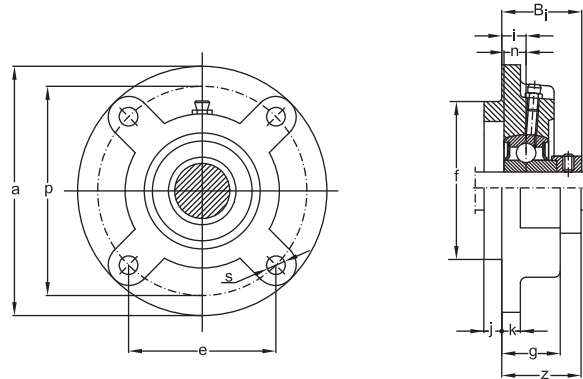
Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	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	SAFC 204	SA204	FC 204	0,70
25	115	90	63,6	10	12	6	7	21	70	33	30,5	7,5	M10	SAFC 205	SA 205	FC 205	0,98
30	125	100	70,7	10	12	8	8	23	80	35,9	33,9	8	M10	SAFC 206	SA 206	FC 206	1,26
35	135	110	77,8	11	14	8	9	26	90	40	37,5	8,5	M12	SAFC 207	SA 207	FC 207	1,67
40	145	120	84,8	11	14	10	9	26	100	42	40,5	9,5	M12	SAFC 208	SA 208	FC 208	2,02
45	160	132	93,3	10	16	12	10	26	105	42,2	42,2	10	M14	SAFC 209	SA 209	FC 209	2,58
50	165	138	97,6	10	16	12	14	28	110	43,2	43,7	10,5	M14	SAFC 210	SA 210	FC 210	2,85
55	185	150	106,1	13	19	12	13	30	125	49,9	48,4	11,5	M16	SAFC 211	SA 211	FC 211	3,67

Note: Inch sizes available on request.

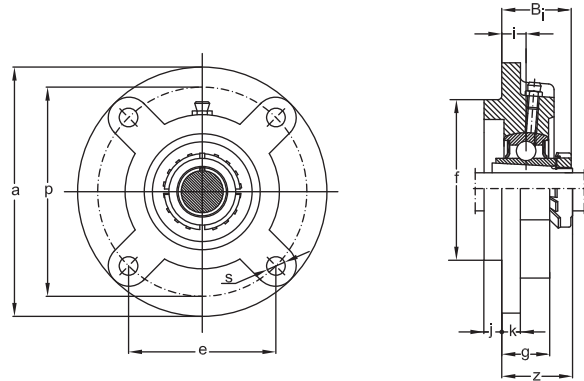
Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Weight
	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	UELFC 201	UEL 201	FC 201	0,79
15	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC 202	UEL 202	FC 202	0,77
17	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC 203	UEL 203	FC 203	0,76
20	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC 204	UEL 204	FC 204	0,74
25	115	90	63,6	10	12	6	7	21	70	36,9	44,3	17,4	M10	UELFC 205	UEL 205	FC 205	1,03
30	125	100	70,7	10	12	8	8	23	80	40,1	48,3	18,2	M10	UELFC 206	UEL 206	FC 206	1,34
35	135	110	77,8	11	14	8	9	26	90	43,3	51,1	18,8	M12	UELFC 207	UEL 207	FC 207	1,77
40	145	120	84,8	11	14	10	9	26	100	45,9	56,3	21,4	M12	UELFC 208	UEL 208	FC 208	2,15
45	160	132	93,3	10	16	12	10	26	105	44,9	56,3	21,4	M14	UELFC 209	UEL 209	FC 209	2,74
50	165	138	97,6	10	16	12	14	28	110	48,1	62,7	24,6	M14	UELFC 210	UEL 210	FC 210	3,06
55	185	150	106,1	13	19	12	13	30	125	56,6	71,3	27,7	M16	UELFC 211	UEL 211	FC 211	4,19
60	195	160	113,1	17	19	12	15	36	135	63,8	77,7	30,9	M16	UELFC 212	UEL 212	FC 212	5,37
65	205	170	120,2	16	19	14	15	35	145	67,6	85,7	34,1	M16	UELFC 213	UEL 213	FC 213	6,07
70	215	177	125,1	17	19	14	16	38	150	68,6	85,7	34,1	M16	UELFC 214	UEL 214	FC 214	7,07
75	220	184	130,1	18	19	16	17	39	160	72,8	92,1	37,3	M16	UELFC 215	UEL 215	FC 215	7,64

Note: Inch sizes available on request.

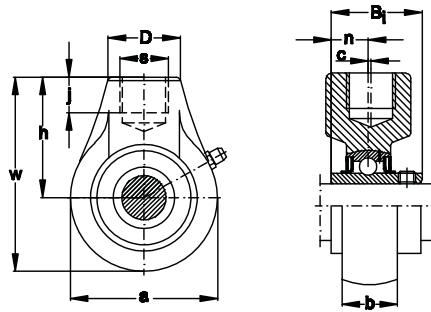
Standard duty flanged cartridge units cast housing adapter type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
	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	UKFC 205	UK 205	FC 205	0,93
25	125	100	70,7	10	12	8	8	23	80	31	38	M10	UKFC 206	UK 206	FC 206	1,18
30	135	110	77,8	11	14	8	9	26	90	34,5	43	M12	UKFC 207	UK 207	FC 207	1,54
35	145	120	84,8	11	14	10	9	26	100	36,5	46	M12	UKFC 208	UK 208	FC 208	1,85
40	160	132	93,3	10	16	12	10	26	105	36,5	50	M14	UKFC 209	UK 209	FC 209	2,42
45	165	138	97,6	10	16	12	14	28	110	38	55	M14	UKFC 210	UK 210	FC 210	2,64
50	185	150	106,1	13	19	12	13	30	125	42,5	59	M16	UKFC 211	UK 211	FC 211	3,57
55	195	160	113,1	17	19	12	15	36	135	49	62	M16	UKFC 212	UK 212	FC 212	4,53
60	205	170	120,2	16	19	14	15	35	145	50	65	M16	UKFC 213	UK 213	FC 213	5,02

Note: Inch sizes available on request.

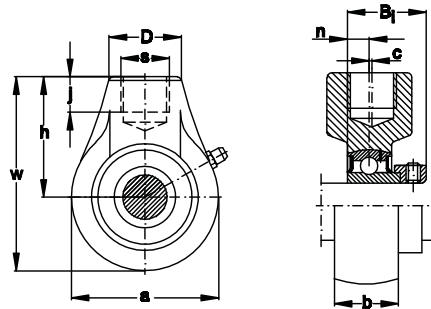
Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions										Unit number	Bearing number	Housing number	Weight
	a	w	c	b	h	s	D		j	Bi				
mm														
12	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA 201	UC 201	HA 201	0,66
15	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA 202	UC 202	HA 202	0,65
17	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA 203	UC 203	HA 203	0,64
20	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA 204	UC 204	HA 204	0,62
25	78	103	0	23	64	RP 3/4	40	19	34	14,3	UCHA 205	UC 205	HA 205	0,83
30	78	103	0	25	64	RP 3/4	40	19	38,1	15,9	UCHA 206	UC 206	HA 206	0,78
35	92	116	0	26	70	RP 3/4	40	19	42,9	17,5	UCHA 207	UC 207	HA 207	1,11
40	96	121	2	30	73	RP 3/4	40	19	49,2	19	UCHA 208	UC 208	HA 208	1,25
45	108	136	5	30	82	RP 1	48	21	49,2	19	UCHA 209	UC 209	HA 209	1,65
50	115	140,5	5	32	83	RP 1	48	21	51,6	19	UCHA 210	UC 210	HA 210	1,95
55	126	150	7	33	87	RP 1-1/4	60	24	55,6	22,2	UCHA 211	UC 211	HA 211	2,48
60	142	173	9	36	102	RP 1-1/4	60	28	65,1	25,4	UCHA 212	UC 212	HA 212	3,59
65	166	200	9,5	38	117	RP 1-1/2	70	32	65,1	25,4	UCHA 213	UC 213	HA 213	5,37
70	166	200	9,5	40	117	RP 1-1/2	70	32	74,6	30,2	UCHA 214	UC 214	HA 214	5,47
75	166	200	9,5	40	117	RP 1-1/2	70	32	77,8	33,3	UCHA 215	UC 215	HA 215	5,11

Note: Inch sizes available on request.

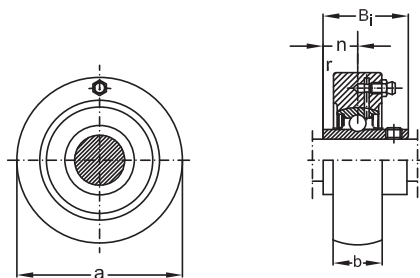
Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions										Unit number	Bearing number	Housing number	Weight
	a	w	c	b	h	s	D		j	Bi				
mm														
20	64	96	0	22	64	RP 3/4	40	19	29,5	7	SAHA 204	SA 204	HA 204	0,63
25	78	103	0	23	64	RP 3/4	40	19	30,5	7,5	SAHA 205	SA 205	HA 205	0,82
30	78	103	0	25	64	RP 3/4	40	19	33,9	8	SAHA 206	SA 206	HA 206	0,79
35	92	116	0	26	70	RP 3/4	40	19	37,5	8,5	SAHA 207	SA 207	HA 207	1,14
40	96	121	2	30	73	RP 3/4	40	19	40,5	9,5	SAHA 208	SA 208	HA 208	1,26
45	108	136	5	30	82	RP 1	48	21	42,2	10	SAHA 209	SA 209	HA 209	1,66
50	115	140,5	5	32	83	RP 1	48	21	43,7	10,5	SAHA 210	SA 210	HA 210	1,95
55	126	150	7	33	87	RP 1-1/4	60	24	48,4	11,5	SAHA 211	SA 211	HA 211	2,23

Note: Inch sizes available on request.

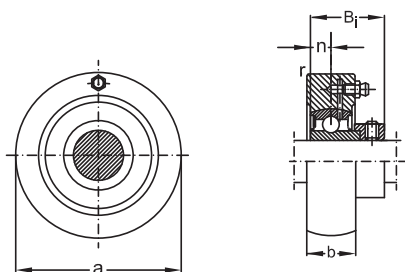
Standard duty cylindrical cartridge units set screws type



Shaft dia.	Nominal dimensions					Unit number	Bearing number	Housing number	Weight
	a	b	r	Bi	n				
mm						-			Kg
12	72	20	2	31	12,7	UCC 201	UC 201	C 204	0,53
15	72	20	2	31	12,7	UCC 202	UC 202	C 204	0,52
17	72	20	2	31	12,7	UCC 203	UC 203	C 204	0,51
20	72	20	2	31	12,7	UCC 204	UC 204	C 204	0,49
25	80	22	2	34	14,3	UCC 205	UC 205	C 205	0,65
30	85	27	2	38,1	15,9	UCC 206	UC 206	C 206	0,81
35	90	28	2	42,9	17,5	UCC 207	UC 207	C 207	0,90
40	100	30	2,5	49,2	19	UCC 208	UC 208	C 208	1,19
45	110	31	2,5	49,2	19	UCC 209	UC 209	C 209	1,49
50	120	33	2,5	51,6	19	UCC 210	UC 210	C 210	1,92
55	125	35	2,5	55,6	22,2	UCC 211	UC 211	C 211	2,21
60	130	38	2,5	65,1	25,4	UCC 212	UC 212	C 212	2,48
65	140	40	3	65,1	25,4	UCC 213	UC 213	C 213	2,97

Note: Inch sizes available on request.

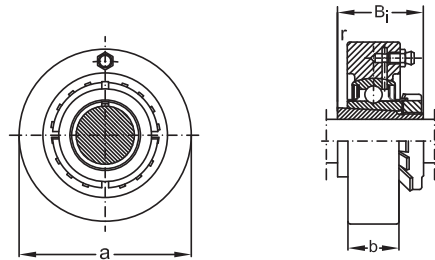
Standard duty cylindrical cartridge units eccentric locking collar type



Shaft dia.	Nominal dimensions					Unit number	Bearing number	Housing number	Weight
	a	b	r	Bi	n				
mm						-			Kg
20	72	20	2	7	29,5	SAC 204	SA 204	C 204	0,50
25	80	22	2	7,5	30,5	SAC 205	SA 205	C 205	0,64
30	85	27	2	8	33,9	SAC 206	SA 206	C 206	0,82
35	90	28	2	8,5	37,5	SAC 207	SA 207	C 207	0,93
40	100	30	2,5	9,5	40,5	SAC 208	SA 208	C 208	1,20
45	110	31	2,5	10	42,2	SAC 209	SA 209	C 209	1,50
50	120	33	2,5	10,5	43,7	SAC 210	SA 210	C 210	1,92
55	125	35	2,5	11,5	48,4	SAC 211	SA 211	C 211	1,96

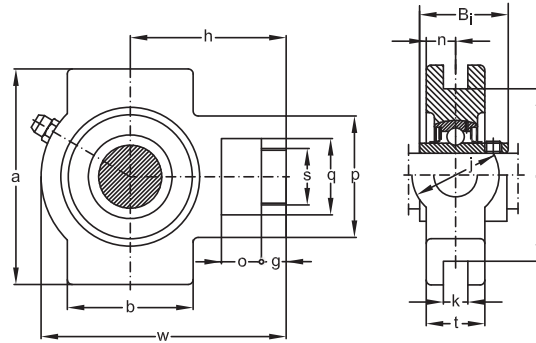
Note: Inch sizes available on request.

Standard duty cylindrical cartridge units adapter type



Shaft dia.	Nominal dimensions				Unit number	Bearing number	Housing number	Weight
	a	b	r	Bi				
mm					-			Kg
20	80	22	2	35	UKC 205	UK 205	C 205	0,59
25	85	27	2	38	UKC 206	UK 206	C 206	0,74
30	90	28	2	43	UKC 207	UK 207	C 207	0,80
35	100	30	2,5	46	UKC 208	UK 208	C 208	1,03
40	110	31	2,5	50	UKC 209	UK 209	C 209	1,34
45	120	33	2,5	55	UKC 210	UK 210	C 210	1,71
50	125	35	2,5	59	UKC 211	UK 211	C 211	1,86
55	130	38	2,5	62	UKC 212	UK 212	C 212	1,98
60	140	40	3	65	UKC 213	UK 213	C 213	2,47

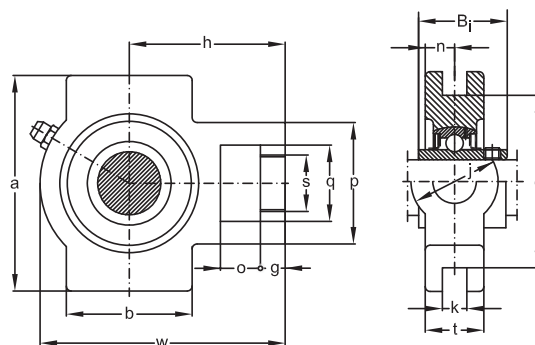
Standard duty take-up units cast housing set screws type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				
mm																-			Kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	31	12,7	UCST 204	UC 204	ST 204	0,73
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	34	14,3	UCST 205	UC 205	ST 205	0,83
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	38,1	15,9	UCST 206	UC 206	ST 206	1,26
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	42,9	17,5	UCST 207	UC 207	ST 207	1,58
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	49,2	19	UCST 208	UC 208	ST 208	2,30
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	49,2	19	UCST 209	UC 209	ST 209	2,27
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	51,6	19	UCST 210	UC 210	ST 210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	55,6	22,2	UCST 211	UC 211	ST 211	3,77
60	32	19	102	64	35	102	27	130	146	194	64	42	119	65,1	25,4	UCST 212	UC 212	ST 212	4,77
65	32	21	111	70	41	121	27	151	167	224	70	44	137	65,1	25,4	UCST 213	UC 213	ST 213	6,65
70	32	21	111	70	41	121	27	151	167	224	70	46	137	74,6	30,2	UCST 214	UC 214	ST 214	6,74
75	32	21	111	70	41	121	27	151	167	232	70	48	140	77,8	33,3	UCST 215	UC 215	ST 215	7,10

Note: Inch sizes available on request.

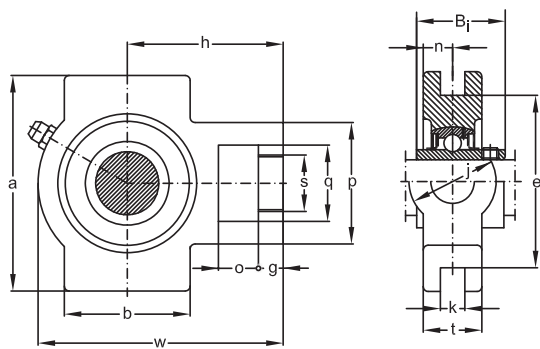
Standard duty take-up units cast housing set screws type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				
mm																-			Kg
12	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 201	UC 201	T 204	0,70
15	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 202	UC 202	T 204	0,76
17	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 203	UC 203	T 204	0,75
20	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 204	UC 204	T 204	0,73
25	16	10	51	32	19	51	12	76	89	97	32	24	62	34	14,3	UCT 205	UC 205	T 205	0,83
30	16	10	56	37	22	57	12	89	102	113	37	28	70	38,1	15,9	UCT 206	UC 206	T 206	1,26
35	16	13	64	37	22	64	12	89	102	129	37	30	78	42,9	17,5	UCT 207	UC 207	T 207	1,58
40	19	16	83	49	29	83	16	102	114	144	49	33	88	49,2	19	UCT 208	UC 208	T 208	2,31
45	19	16	83	49	29	83	16	102	117	144	49	35	87	49,2	19	UCT 209	UC 209	T 209	2,28
50	19	16	83	49	29	86	16	102	117	149	49	37	90	51,6	19	UCT 210	UC 210	T 210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	55,6	22,2	UCT 211	UC 211	T 211	3,79
60	32	19	102	64	35	102	22	130	146	194	64	42	119	65,1	25,4	UCT 212	UC 212	T 212	4,79
65	32	21	111	70	41	121	26	151	167	224	70	44	137	65,1	25,4	UCT 213	UC 213	T 213	6,66
70	32	21	111	70	41	121	26	151	167	224	70	46	137	74,6	30,2	UCT 214	UC 214	T 214	6,75
75	32	21	111	70	41	121	26	151	167	232	70	48	140	77,8	33,3	UCT 215	UC 215	T 215	7,11
80	32	21	111	70	41	121	26	165	184	235	70	51	140	82,6	33,3	UCT 216	UC 216	T 216	8,19
85	38	29	124	73	48	157	30	173	198	260	73	54	162	85,7	34,1	UCT 217	UC 217	T 217	10,58

Note: Inch sizes available on request.

Standard duty take-up units cast housing eccentric locking collar type

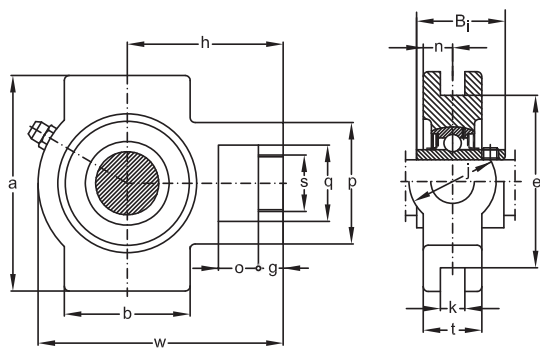


Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n			
mm															-			Kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	29,5	7	SAST 204	SA 204 ST 204	0,74
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	30,5	7,5	SAST 205	SA 205 ST 205	0,82
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	33,9	8	SAST 206	SA 206 ST 206	1,27
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	37,5	8,5	SAST 207	SA 207 ST 207	1,61
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	40,5	9,5	SAST 208	SA 208 ST 208	2,31
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	42,2	10	SAST 209	SA 209 ST 209	2,28
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	43,7	10,5	SAST 210	SA 210 ST 210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	48,4	11,5	SAST 211	SA 211 ST 211	3,52

Note: Inch sizes available on request.



Standard duty take-up units cast housing eccentric locking collar type

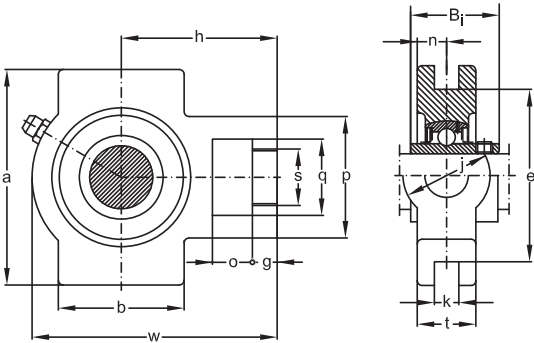


Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n			
mm																-		Kg
20	16	10	51	32	19	51	12	76	89	94	32	21	61	29,5	7	SAT 204	SA 204 T 204	0,74
25	16	10	51	32	19	51	12	76	89	97	32	24	62	30,5	7,5	SAT 205	SA 205 T 205	0,82
30	16	10	56	37	22	57	12	89	102	113	37	28	70	33,9	8	SAT 206	SA 206 T 206	1,27
35	16	13	64	37	22	64	12	89	102	129	37	30	78	37,5	8,5	SAT 207	SA 207 T 207	1,61
40	19	16	83	49	29	83	16	102	114	144	49	33	88	40,5	9,5	SAT 208	SA 208 T 208	2,32
45	19	16	83	49	29	83	16	102	117	144	49	35	87	42,2	10	SAT 209	SA 209 T 209	2,29
50	19	16	83	49	29	86	16	102	117	149	49	37	90	43,7	10,5	SAT 210	SA 210 T 210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	48,4	11,5	SAT 211	SA 211 T 211	3,54

Note: Inch sizes available on request.



Standard duty take-up units cast housing eccentric locking collar type

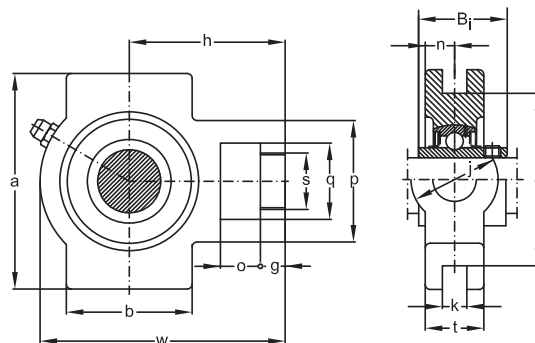


Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				
mm																-			Kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	43,5	17	UELST 204	UEL 204	ST 204	0,78
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	44,3	17,4	UELST 205	UEL 205	ST 205	0,87
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	48,3	18,2	UELST 206	UEL 206	ST 206	1,35
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	51,1	18,8	UELST 207	UEL 207	ST 207	1,71
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	56,3	21,4	UELST 208	UEL 208	ST 208	2,44
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	56,3	21,4	UELST 209	UEL 209	ST 209	2,44
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	62,7	24,6	UELST 210	UEL 210	ST 210	2,70
55	25	19	102	64	35	95	27	130	146	171	64	38	106	71,3	27,7	UELST 211	UEL 211	ST 211	4,04
60	32	19	102	64	35	102	27	130	146	194	64	42	119	77,7	30,9	UELST 212	UEL 212	ST 212	5,11
65	32	21	111	70	41	121	27	151	167	224	70	44	137	85,7	34,1	UELST 213	UEL 213	ST 213	7,20
70	32	21	111	70	41	121	27	151	167	224	70	46	137	85,7	34,1	UELST 214	UEL 214	ST 214	7,26
75	32	21	111	70	41	121	27	151	167	232	70	48	140	92,1	37,3	UELST 215	UEL 215	ST 215	7,73

Note: Inch sizes available on request.



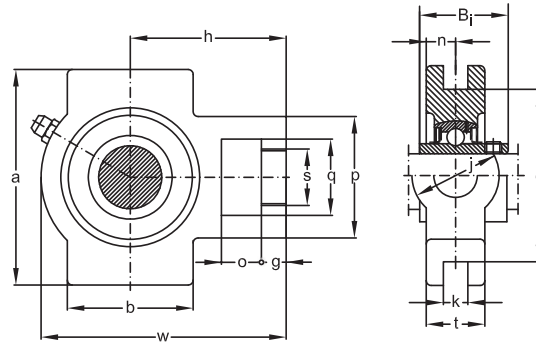
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi				
mm															-			Kg
12	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL 201	UEL 201 T 204	0,83
15	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL 202	UEL 202 T 204	0,81
17	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL 203	UEL 203 T 204	0,80
20	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL 204	UEL 204 T 204	0,78
25	16	12	51	32	19	51	12	76	89	97	32	24	62	44,3	17,4	UEL 205	UEL 205 T 205	0,87
30	16	12	56	37	22	57	12	89	102	113	37	28	70	48,3	18,2	UEL 206	UEL 206 T 206	1,35
35	16	15	64	37	22	64	12	89	102	129	37	30	78	51,1	18,8	UEL 207	UEL 207 T 207	1,71
40	19	18	83	49	29	83	16	102	114	144	49	33	88	56,3	21,4	UEL 208	UEL 208 T 208	2,45
45	19	18	83	49	29	83	16	102	117	144	49	35	87	56,3	21,4	UEL 209	UEL 209 T 209	2,45
50	19	18	83	49	29	86	16	102	117	149	49	37	90	62,7	24,6	UEL 210	UEL 210 T 210	2,71
55	25	21	102	64	35	95	22	130	146	171	64	38	106	71,3	27,7	UEL 211	UEL 211 T 211	4,06
60	32	21	102	64	35	102	22	130	146	194	64	42	119	77,7	30,9	UEL 212	UEL 212 T 212	5,13
65	32	23	111	70	41	121	26	151	167	224	70	44	137	85,7	34,1	UEL 213	UEL 213 T 213	7,21
70	32	23	111	70	41	121	26	151	167	224	70	46	137	85,7	34,1	UEL 214	UEL 214 T 214	7,27
75	32	23	111	70	41	121	26	151	167	232	70	48	140	92,1	37,3	UEL 215	UEL 215 T 215	7,74

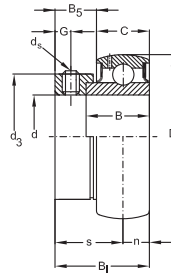
Note: Inch sizes available on request.

Standard duty take-up units cast housing adapter type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi				
mm															-			Kg
20	16	12	51	32	19	51	12	76	89	97	32	24	62	35	UKT 205	UK 205	T 205	0,77
25	16	12	56	37	22	57	12	89	102	113	37	28	70	38	UKT 206	UK 206	T 206	1,19
30	16	15	64	37	22	64	12	89	102	129	37	30	78	43	UKT 207	UK 207	T 207	1,48
35	19	18	83	49	29	83	16	102	114	144	49	33	88	46	UKT 208	UK 208	T 208	2,15
40	19	18	83	49	29	83	16	102	117	144	49	35	87	50	UKT 209	UK 209	T 209	2,13
45	19	18	83	49	29	86	16	102	117	149	49	37	90	55	UKT 210	UK 210	T 210	2,29
50	25	21	102	64	35	95	22	130	146	171	64	38	106	59	UKT 211	UK 211	T 211	3,44
55	32	21	102	64	35	102	22	130	146	194	64	42	119	62	UKT 212	UK 212	T 212	4,29
60	32	23	111	70	41	121	26	151	167	224	70	44	137	65	UKT 213	UK 213	T 213	6,16

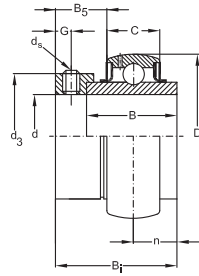
Standard duty spherical outside surface ball bearings set screws type



Shaft dia. d	Nominal dimensions			n	s	G	d _s	Bearing number	Basic load ratings		Weight
									dyn. C _r	stat. C _{or}	
mm	D	Bi	C					-	N		Kg
12	40	22	12	6	16	4	M5X0,8	SB 201	9,6	4,6	0,10
15	40	22	12	6	16	4	M5X0,8	SB 202	9,6	4,6	0,09
17	40	22	12	6	16	4	M5X0,8	SB 203	9,6	4,6	0,08
20	47	25	14	7	18	5	M6X1	SB 204	12,8	6,65	0,13
25	52	27	15	7,5	19,5	5,5	M6X1	SB 205	14	7,85	0,17
30	62	29	16	8	21	6	M6X1	SB 206	19,5	11,3	0,26
35	72	32	17	8,5	23,5	6,5	M6X1	SB 207	25,7	15,3	0,38
40	80	34	19	9,5	24,5	7	M8X1	SB 208	29,1	17,8	0,50

Note: Inch sizes available on request.

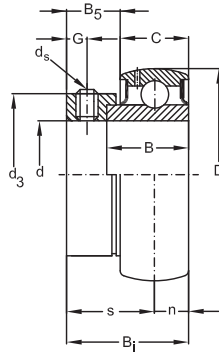
Standard duty spherical outside surface ball bearings set screws type



Shaft dia. d	Nominal dimensions								Bearing number	Basic load ratings		Weight
	D	Bi	C	n	s	G	F	d _s		dyn. C _r	stat. C _{or}	
mm									-	N		Kg
12	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC 201	12,8	6,65	0,21
15	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC 202	12,8	6,65	0,20
17	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC 203	12,8	6,65	0,19
20	47	31	16	12,7	18,3	5	3,5	M6X1	UC 204	12,8	6,65	0,17
25	52	34	17	14,3	19,7	5,5	4	M6X1	UC 205	14	7,85	0,21
30	62	38,1	19	15,9	22,2	6	4,2	M6X1	UC 206	19,5	11,3	0,32
35	72	42,9	20	17,5	25,4	6,5	4,3	M8X1	UC 207	25,7	15,3	0,47
40	80	49,2	21	19	30,2	8	4,2	M8X1	UC 208	29,1	17,8	0,64
45	85	49,2	22	19	30,2	8	4,2	M8X1	UC 209	32,5	20,4	0,68
50	90	51,6	23	19	32,6	9	4,8	M10X1,25	UC 210	35	23,2	0,80
55	100	55,6	25	22,2	33,4	9	5,3	M10X1,25	UC 211	43,5	29,2	1,12
60	110	65,1	27	25,4	39,7	10,5	5,3	M10X1,25	UC 212	52,5	36	1,53
65	120	65,1	28	25,4	39,7	12	6	M12X1,25	UC 213	57,5	40	1,86
70	125	74,6	30	30,2	44,4	12	6	M12X1,25	UC 214	62	44	2,05
75	130	77,8	30	33,3	44,5	12	6	M12X1,25	UC 215	66	49,5	2,21
80	140	82,6	33	33,3	49,3	14	6,3	M12X1,25	UC 216	72,5	53	2,79
85	150	85,7	35	34,1	51,6	14	6,5	M12X1,25	UC 217	83,5	64	3,38
90	160	96	37	39,7	56,3	14	6,5	M12X1,25	UC 218	96	71,5	4,45

Note: Inch sizes available on request.

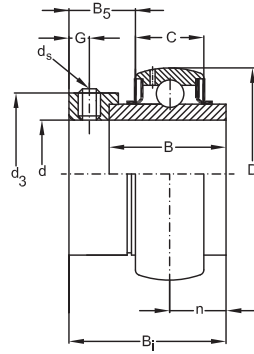
Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft dia.	Nominal dimensions										Bearing number	Basic load ratings		Weight
	d	D	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	SA 201	9,6	4,6	0,14
15	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA 202	9,6	4,6	0,13
17	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA 203	9,6	4,6	0,12
20	47	29,5	20	14	7	22,5	4,8	M6X1	33,3	13,5	SA 204	12,8	6,65	0,18
25	52	30,5	21	15	7,5	23	4,8	M6X1	38,1	13,5	SA 205	14	7,85	0,20
30	62	33,9	22	16	8	25,9	6	M6X1	44,5	15,9	SA 206	19,5	11,3	0,33
35	72	37,5	24	17	8,5	29	6,8	M8X1	55,6	17,5	SA 207	25,7	15,3	0,50
40	80	40,5	27	19	9,5	31	6,8	M8X1	60,3	18,3	SA 208	29,1	17,8	0,65
45	85	42,2	28,7	20	10	32,2	6,8	M8X1	63,5	18,3	SA 209	32,5	20,4	0,69
50	90	43,7	30,2	21	10,5	33,2	6,8	M8X1	69,9	18,3	SA 210	35	23,2	0,80
55	100	48,8	32,4	23	11,5	36,9	8	M10X1,25	76,2	18,3	SA 211	43,5	29,2	0,87

Note: Inch sizes available on request.

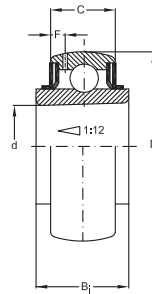
Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft dia.	Nominal dimensions										Bearing number	Basic load ratings		Weight
	d	D	B ₁	C	n	B	G	d ₃	B ₅	F		dyn C _r	stat. C _{0r}	
mm											-	N		kg
12	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 201	12,8	6,65	0,27
15	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 202	12,8	6,65	0,25
17	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 203	12,8	6,65	0,24
20	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 204	12,8	6,65	0,22
25	52	44,3	17	17,4	34,8	4,8	38,1	13,5	4	M6X1	UEL 205	14	7,85	0,25
30	62	48,3	19	18,2	36,4	6	44,5	15,9	4,2	M8X1	UEL 206	19,5	11,3	0,41
35	72	51,1	20	18,8	37,6	6,8	55,6	17,5	4,3	M8X1	UEL 207	25,7	15,3	0,60
40	80	56,3	21	21,4	42,8	6,8	60,3	18,3	4,2	M8X1	UEL 208	29,1	17,8	0,78
45	85	56,3	22	21,4	42,8	6,8	63,5	18,3	4,2	M8X1	UEL 209	32,5	20,4	0,85
50	90	62,7	23	24,6	49,2	6,8	69,9	18,3	4,8	M8X1	UEL 210	35	23,2	1,01
55	100	71,3	25	27,7	55,4	8	76,2	20,7	5,3	M10X1,25	UEL 211	43,5	29,2	1,39
60	110	77,7	27	30,9	61,8	8	84	22,3	5,3	M10X1,25	UEL 212	52,5	36	1,87
65	120	85,7	28	34,1	68,2	8,7	86	23,5	6	M10X1,25	UEL 213	57,5	40	2,41
70	125	85,7	30	34,1	68,2	8,7	96	23,9	6	M10X1,25	UEL 214	62	44	2,57
75	130	92,1	30	37,3	74,6	8,7	102	23,9	6	M10X1,25	UEL 215	66	49,5	2,84

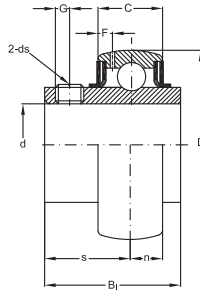
Note: Inch sizes available on request.

Standard duty spherical outside surface ball bearings adapter type



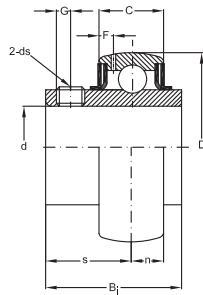
Shaft dia. d	Nominal dimensions				Bearing number	Basic load ratings		Weight
	D	B _i	C	F		dyn C _r	stat. C _{0r}	
mm					-	N		kg
20	52	21	17	4,2	UK 205	14	7,85	0,15
25	62	25	19	4,5	UK 206	19,5	11,3	0,25
30	72	27	20	4,2	UK 207	25,7	15,3	0,37
35	80	29	21	4,2	UK 208	29,1	17,8	0,48
40	85	30	22	4,2	UK 209	32,5	20,4	0,53
45	90	31	23	5	UK 210	35	23,2	0,59
50	100	33	27	6,3	UK 211	43,5	29,2	0,77
55	110	36	27	5,3	UK 212	52,5	36	1,03
60	120	36	28	6	UK 213	57,5	40	1,36

Medium duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions								Bearing number	Basic load ratings		Weight
d	D	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	UC X05	19,5	11,3	0,39
30	72	42,9	22	17,5	25,4	6,5	5,8	M8X1	UC X06	25,7	15,3	0,58
35	80	49,2	21	19	30,2	8	6,3	M8X1	UC X07	29,1	17,8	0,74
40	85	49,2	22	19	30,2	8	6,8	M8X1	UC X08	32,5	20,4	0,83
45	90	51,6	23	19	32,6	9	6,5	M10X1,25	UC X09	35	23,2	0,95
50	100	55,6	25	22,2	33,4	9	7,2	M10X1,25	UC X10	43,5	29,2	1,29
55	110	65,1	27	25,4	39,7	10,5	8,2	M10X1,25	UC X11	52,5	36	1,80
60	120	65,1	28	25,4	39,7	12	8	M12X1,25	UC X12	57,5	40	2,05
65	125	74,6	30	30,2	44,4	12	9	M12X1,25	UC X13	62	44	2,52
70	130	77,8	30	33,3	44,5	12	9	M12X1,25	UC X14	66	49,5	2,74
75	140	82,6	33	33,3	49,3	14	10,3	M12X1,25	UC X15	72,5	53	3,41
80	150	85,7	35	34,1	51,6	14	11	M12X1,25	UC X16	83,2	63,8	3,87

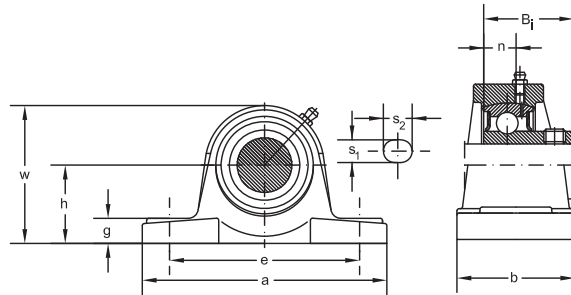
Heavy duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions								Bearing number	Basic load ratings		Weight
d	D	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	UC 305	21,2	10,9	0,35
30	72	43	24	17	26	6	5,5	M6X1	UC 306	26,7	15	0,56
35	80	48	25	19	29	8	5,3	M8X1	UC 307	33,5	19,1	0,71
40	90	52	28	19	33	10	5,5	M10X1,25	UC 308	40,5	24	0,96
45	100	57	30	22	35	10	6	M10X1,25	UC 309	53	32	1,28
50	110	61	32	22	39	12	6,1	M12X1,25	UC 310	62	38,5	1,65
55	120	66	34	25	41	12	6,4	M12X1,25	UC 311	71,5	45	1,90
60	130	71	36	26	45	12	6,7	M12X1,25	UC 312	82	52	2,60
65	140	75	38	30	45	12	6,9	M12X1,25	UC 313	92,5	60	3,25
70	150	78	40	33	47	12	7,2	M12X1,25	UC 314	104	68	3,95
75	160	82	42	32	50	14	7,5	M14X1,5	UC 315	113	77	4,33
80	170	86	44	34	52	14	7,5	M14X1,5	UC 316	122	86	5,57

SSUCP series pillow blocks

Normal duty with set screw lock and grease fitting

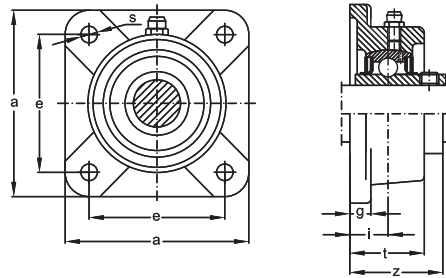


Dimensions											Unit no.	Bolt size	Bearing no.	Housing no.
d	B	n	b	h	g	w	a	e	s ₁	s ₂				
mm											-	mm		
12	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP201	M10	SSUC201	SSP203
15	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP202	M10	SSUC202	SSP203
17	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP203	M10	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

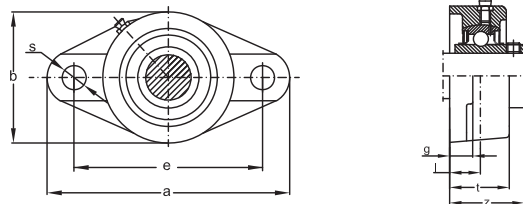
Normal duty with set screw lock and grease fitting



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

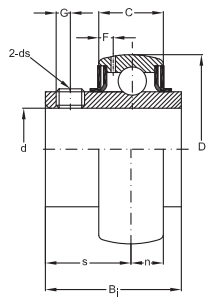
Normal duty with set screw lock and grease fitting



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.

