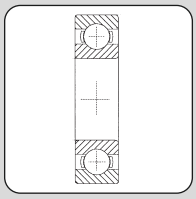
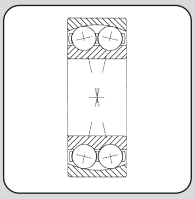
Bearings and steel balls

Deep groove ball bearings DIN 625 T1	P. 2-5
Deep groove ball bearings stainless steel DIN 625 T1	P. 2-15
Angular ball bearings DIN 628 T1	P. 2-17
Spindle bearings DIN 628 T1	P. 2-19
Self aligning ball bearings DIN 630	P. 2-20
Self aligning roller bearings DIN 635 T2	P. 2-22
McGill Self aligning roller bearings	P. 2-23
Taper roller bearings with cylindrical bore DIN ISO 355 and DIN 720	P. 2-25
Deep groove ball thrust bearing DIN 711	P. 2-26
Steel balls	P. 2-27

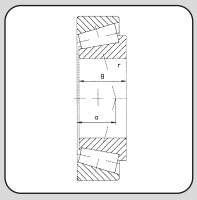
Deep groove ball bearings
Deep groove ball bearings stainless steel



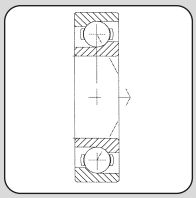
Self aligning ball bearings



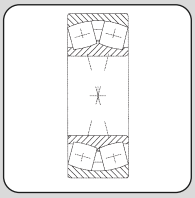
Taper roller bearings with cylindrical bore



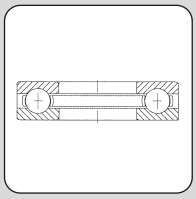
Angular ball bearings



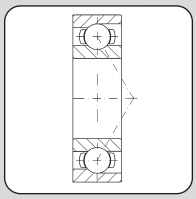
Self aligning roller bearings



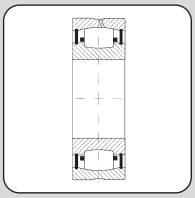
Deep groove ball thrust bearing



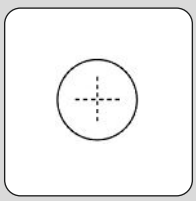
Spindle bearings



McGill Self aligning roller bearings



Steel balls



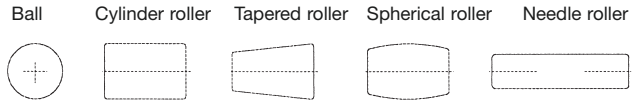
Technical information

Rolling bearing

- Blanket term for all bearings with roller bodies

Shapes of rolling bearings

- Rolling bearings are first and foremost categorized as ball bearings or roller bearings according to the shape of the roller body. Rolling bearings can generally withstand far greater forces than ball bearings. On the other hand, ball bearings have higher speeds than roller bearings.



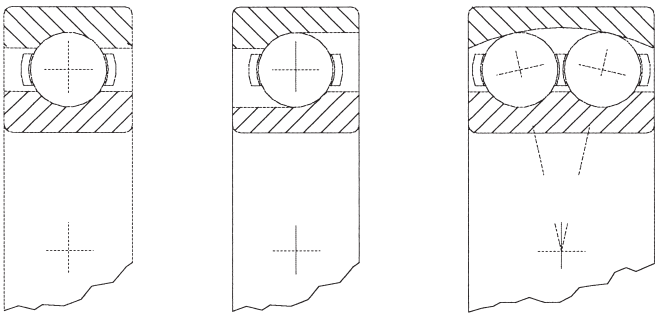
Ball bearing (radial bearing)

- Ball bearings are categorized according to their typical design characteristics:

Deep groove ball bearings:
one or two grooves in the inner and outer ring

Angular ball bearings:
the load is transferred from one ring to the other via an angle

Self-aligning ball bearings:
are able to compensate for misalignments of the shaft to the casing to a certain extent



Roller bearing (radial bearing)

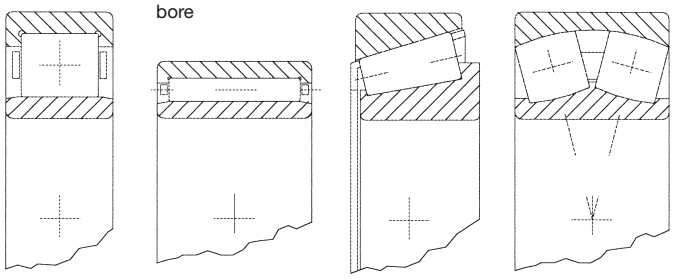
- Roller bearings are categorized according to the shape of the roller:

Cylinder roller bearings:
can withstand great forces radially exerted on the bearing

Needle roller bearings:
can withstand forces radially exerted on the bearing; considerably smaller outer diameter with the same nominal bore

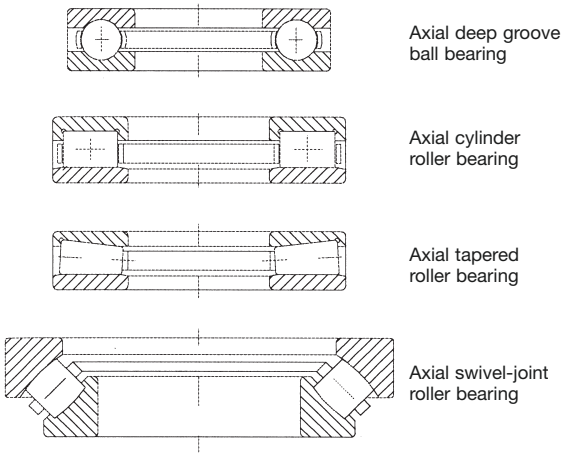
Tapered roller bearings:
can withstand forces radially and axially exerted on the bearing

Self-aligning roller bearings:
formerly called spherical roller bearings; able to compensate for misalignments of the shaft to the casing to a certain extent



Axial bearing

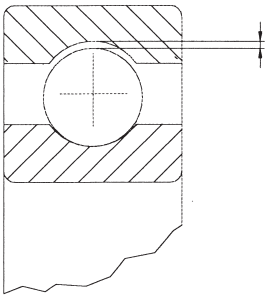
- Only the axial bearings are marked with the prefix **axial.** I.e., if a designation does not contain this word, the bearing is radial!



Bearing clearance

- The bearing clearance is the gap between the parts in a roller bearing axially or radially. The bearing clearance is standardized. Roller bearings are offered with various bearing clearances depending on the type of bearing. Generally, one speaks of standard clearance, greater than standard clearance, and less than standard clearance.

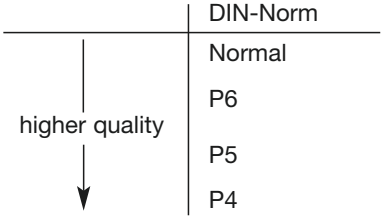
Added designation	Bearing clearance
C2	less than standard
C0	standard
C3	greater than standard
C4	greater than C3
C5	greater than C4



Rolling bearing tolerances

- The tolerances of roller bearings are standardized according to DIN 620 T1 to T6 and divided into various accuracy classes. The accuracy classes are marked in the DIN norm as **normal, P6, P5, P4.**

The accuracy increases as the number decreases!



Tolerances are the admissible values that deviate from the nominal sizes.

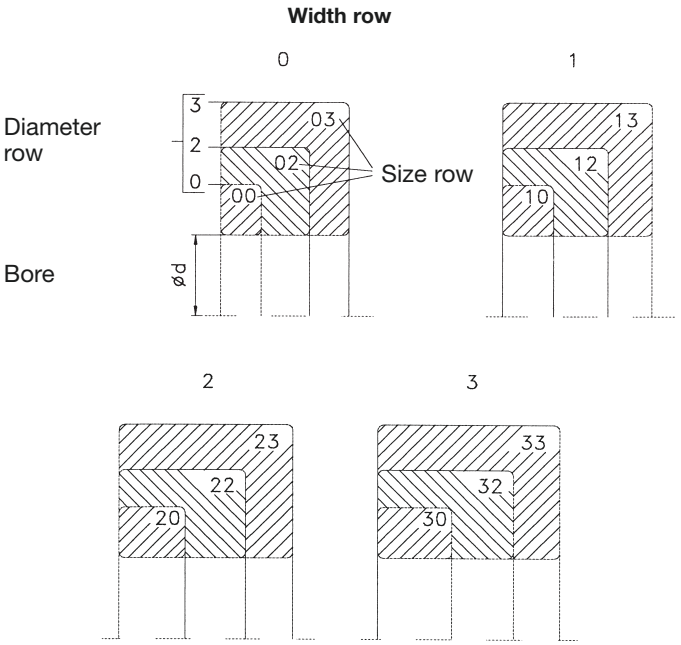
Designation of the rolling bearings

The outer dimensions of the rolling bearings are set forth in DIN 616 in accordance with DIN ISO 355.

They are designed so that several outer diameters and widths are assigned to each bearing bore to provide a large range of load capacity for bearings with the same bore and design. This designation system is also set forth in DIN 623.

A distinction is made between the diameter rows:	and the width rows:
0 (very light)	**0**
2 (light)	**1**
3 (medium)	**2**
4 (heavy)	**3**

These relations are made clear in the following graphic. It should, however, be kept in mind that the standardized bearing designations do not correspond to this system in all cases.



Bearing abbreviations

A bearing abbreviation consists of numbers or of letters and numbers. The first number or letter group indicates the bearing design (deep groove ball bearing, tapered roller bearing, self-aligning roller bearings, etc.)
and the width and diameter row (light, medium, heavy, etc.); the second number group indicates the bore code.
The size of the bore of the bearing is a function of the multiplication of the code by 5
(above a bore diameter ≥ 20 mm).

Sample designation: 2 2 3 16 (Normally written 22316)

- 16 x 5 = 80 mm Bore
- Diameter row 3
- Width row 2

Size row

- Swivel-joint roller bearing

The bearing designations without the added designation indicate normal bearings, for instance with normal size, shape and run accuracy in accordance with the tolerances in DIN 620. Deviations are described by the added designations. These prefixes indicate bearing components (rings, cages), while suffixes indicate special aspects of the interior construction, size tolerances, run accuracy, bearing clearance, etc.

Prefixes

Prefixes are used very rarely. They normally mark single parts of complete bearings.

Suffixes

Suffixes mark special models that deviate from the standard. In particular, they include information about:

- interior design
- outer shape
- bearing clearance
- cage model
- lubricant
- tolerances
- seals

Selection of rolling bearings

The design engineer can select the best type of bearing based on the characteristic properties of the various types of roller bearings and the operating conditions of the arrangement of the bearings. Here, the special or most important conditions of each case for the bearings that could influence the selection of the best bearing for the task are to be taken into consideration. Various types of bearings may be best for the given operating conditions in many cases.

The effective outer forces and the demands for service life and operating safety determine the size of the bearing needed. Above all, the decisive factors for the selection of the type and size of the bearing are the size, direction and type of loads that will be exerted on the bearing and the operating speed. Space limitations often require the selection of bearings with small cross-sections or even multiple rows of bearings to attain the necessary load-bearing capacity and service life.

If the bearings have to be very accurate, bearings with great accuracy, especially ball bearings and cylinder roller bearings, should be used as they are produced in the highest accuracy classes.

The operating temperature of the bearings influences the design of the arrangement of the bearings both from the viewpoint of the selection of lubricant and the model of the bearing when the operating temperature continually rises above 100°C. The inner bearing clearance must be suited to the operating conditions, which are mostly determined by the temperature difference between the inner and outer ring, by the effects of the heat fed to the bearing, or by the effect of the high speed.

Furthermore, the selection of the bearing is also influenced by the simplicity of the installation, demands on lubrication and seals, and demands for low friction and low running noise.

A distinction is made for roller bearings between static and dynamic loads.

Service life

The service life of a bearing is the number of revolutions or the running number in operating hours that a bearing works at a set speed before the first signs of material fatigue (peeling) appear on the roller bodies or the running paths. There can, however be great differences in the service life of the same type and size of bearing under the same operating conditions. For this reason, the term service life was clearly defined for a calculation, and the **nominal service life** was used as the basis with an eye to operating safety and to fulfill the ISO recommendation. That means that this service life is met or exceeded by 90% of a large number of the same bearings under the same operating conditions.
We thus do not use the term service life to mean the time until a bearing fails due only to the dynamic material fatigue of the bearing rings or the roller bodies. Unforeseen failures due, for instance, to improper installation, errors in the design of the bearing, errors in maintenance, and the entrance of dirt and moisture.

Load rating

- The **static load rating C0** corresponds to the load under which the entire remaining deformation of roller bodies and running paths is maximally 0.0001 of the roller body's diameter. The calculation is based on surface pressure in the center of the pressure field.

- The **dynamic load rating C** corresponds to the load under which 90% of a large number of the same roller bearings attain a nominal service life of 1 million revolutions before they fail due to the fatigue of the roller surface. For radial bearings, the dynamic load rating refers to the purely radial, unchanging load and the rotating inner ring, while the purely axial, unchanging load is used for axial bearings.
  For each bearing, the dynamic load rating C is indicated in the bearing tables. This number depends on the dimensions of the bearing, the number of roller bodies, the material, and the model of the bearing.

Note:
The showed load ratings are only valid if bearings are mounted into housings or on shafts. Therefore the mounting place of bearing has to be designed (fit, roundness of components) in such way that a deformation of bearing can be prevent resp. a appropriate stability (stiffness) of housing and shaft can be reached.

Lubrication of rolling bearings

Rolling bearings must be lubricated for three reasons:

1. To prevent metallic contact between the roller bodies, bearing rings, and cages.
2. To prevent corrosion.
3. To prevent wear.

Normally, roller bearings are lubricated with grease. During installing, only 30-50% of the empty space where the bearing is being installed should be filled with grease.

In the course of time, lubricants lose their lubrication. Used or dirty lubricants therefore have to be renewed or replaced. For this lubrication, only greases and oils suitable for bearings may be used.

Sealed bearings are generally lubricated with high-performance lithium-saponified greases. These greases normally have a temperature range from -20°C to +110°C, withstanding operating temperatures of +110°C for short times. Under constant operation above 70°C, these standard lithium-saponified greases tend to be effective for shorter periods.

For sufficient values under constant use at higher temperatures, use special greases.

Keep in mind, though, that the use limits of the contact seals used is +110°C. For use above this limit, make sure that seals made of heat-resistant materials can be used.

Non-marked bearings are generally dimensionally stable up to a limit temperature of 120°C. Operating temperatures above 120°C require special heat treatment (stabilization) to prevent inadmissible changes in the bearing dimensions due to crystallization. Such treated bearings are marked with special marks.

As already mentioned, always make sure that the use limit of the contact seals used in the standard is at +110°C. For use above this limit, make sure that seals made of heat-resistant materials can be used.

Regreasing intervals

The usable life of the grease is influenced by many factors. The regreasing intervals in our table thus can only be seen as very rough estimates.

Experience with comparable bearings or ones already used is therefore very important as not all operating conditions and influential factors that affect the service life of a lubricant – and hence also the bearing – are known or determinable in many cases.

Operating temperature of the bearing in °C	Lubrication interval		
	Operating conditions		
	clean	dirty	very dirty most dirty
50	3 years	6 months	3 months
70	1 year	2 months	1 month
100	3 months	2 weeks	1 week
110	6 weeks	1 weeks	3 days

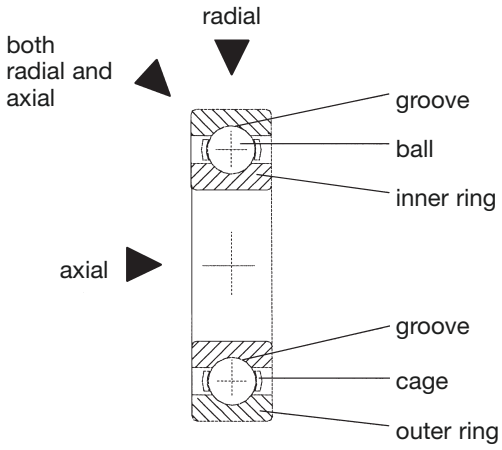
Speed limit

The bearing load, the bearing clearance, the lubricant, and the heat elimination and heat supply influence the speed limit. The speed limit given in the tables apply for purely radial loads on radial bearings and purely axial loads on axial bearings, normal tolerance of the bearing clearance, no external heat, no excessive operating temperatures, and low, absolutely shock-free loads.

Deep groove ball bearing single-row (DIN 625 T1)

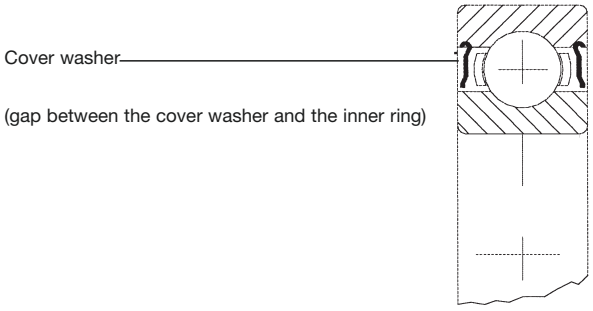
The deep groove bearing is the most commonly used roller bearing due to its great versatility. It can withstand loads both radially and axially.

Design characteristics



Seal with cover washer

Deep groove ball bearing with 1 or 2 cover washers (Z or 2Z model) for shafts Ø 3 to 120 mm. Sealing effects for standard applications, low friction, for high speeds, ready for installation, greased, low noise. These seals do not, however, replace overpressure seals. The temperature range for standard lubrication with lithium-saponified lubricant at between -20° to +110°C. These greases withstand operating temperatures of +110°C for short periods. Under constant operation above 70°C, these greases tend to be effective for shorter periods.

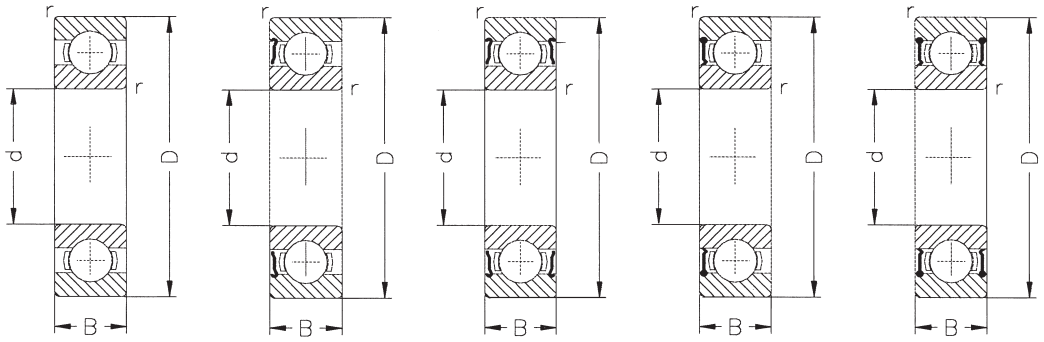


Seal with sealing washer

Deep groove ball bearings with 1 or 2 sealing washers (RS or 2RS models) for shafts Ø 6 to 80 mm. Sealing effect for standard applications. The seals do not, however, replace overpressure seals. The use limit of the contact seals used in the standard is +110°C. Low noise, ready for installation, greased, maintenance-free operation. The temperature range for standard lubrication with lithium-saponified lubricants is from -20°C to +110°C.
These greases withstand operating temperatures of +110°C for short periods. Under constant operation above 70°C, these greases tend to be effective for shorter periods.

Warning:
The deep groove ball bearings with cover washers and sealing washers must not be washed off!
For both styles of sealing it may occur a small loss of grease during running-in.

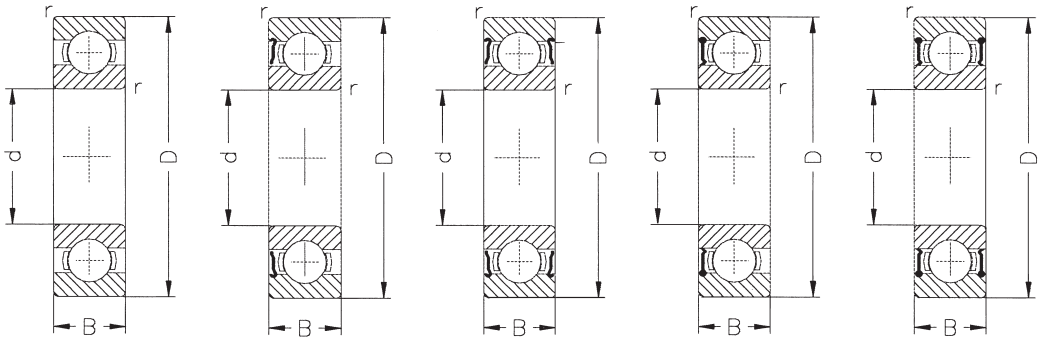
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing No.	Weight
d mm	D mm	B mm	r min. mm	dynamic C kN	static C_0 kN	grease min^{-1}	oil min^{-1}		kg
3	10	4	0.15	**0.51**	**0.22**	40000	48000	623	0.002
3	10	4	0.15	**0.51**	**0.22**	40000		623-Z	0.002
3	10	4	0.15	**0.51**	**0.22**	40000		623-ZZ	0.002
4	13	5	0.20	**0.90**	**0.40**	38000	45000	624	0.003
4	13	5	0.20	**0.90**	**0.40**	38000		624-Z	0.003
4	13	5	0.20	**0.90**	**0.40**	38000		624-ZZ	0.003
4	16	5	0.30	**1.46**	**0.67**	26000	43000	634	0.005
4	16	5	0.30	**1.46**	**0.67**	26000		634-Z	0.005
4	16	5	0.30	**1.46**	**0.67**	26000		634-ZZ	0.005
5	16	5	0.30	**1.32**	**0.44**	36000	43000	625	0.006
5	16	5	0.30	**1.32**	**0.44**	36000		625-Z	0.006
5	16	5	0.30	**1.32**	**0.44**	36000		625-ZZ	0.006
5	19	6	0.30	**2.20**	**1.04**	32000	38000	635	0.009
5	19	6	0.30	**2.20**	**1.04**	32000		635-Z	0.009
5	19	6	0.30	**2.20**	**1.04**	32000		635-ZZ	0.009
6	19	6	0.30	**1.76**	**0.86**	32000	38000	626	0.008
6	19	6	0.30	**1.76**	**0.86**	32000		626-Z	0.008
6	19	6	0.30	**1.76**	**0.86**	32000		626-ZZ	0.008
6	19	6	0.30	**1.76**	**0.86**	22000		626-RS	0.008
6	19	6	0.30	**1.76**	**0.86**	22000		626-2RS	0.008
7	19	6	0.30	**1.76**	**0.86**	36000	43000	607	0.009
7	19	6	0.30	**1.76**	**0.86**	36000		607-Z	0.009
7	19	6	0.30	**1.76**	**0.86**	36000		607-ZZ	0.009
7	19	6	0.30	**1.76**	**0.86**	32000		607-RS	0.009
7	19	6	0.30	**1.76**	**0.86**	32000		607-2RS	0.009
7	22	7	0.30	**1.76**	**0.86**	36000	43000	627	0.012
7	22	7	0.30	**1.76**	**0.86**	36000		627-Z	0.012
7	22	7	0.30	**1.76**	**0.86**	36000		627-ZZ	0.012
7	22	7	0.30	**1.76**	**0.86**	32000		627-RS	0.012
7	22	7	0.30	**1.76**	**0.86**	32000		627-2RS	0.012
8	22	7	0.30	**2.60**	**1.32**	30000	36000	608	0.013
8	22	7	0.30	**2.60**	**1.32**	30000		608-Z	0.013
8	22	7	0.30	**2.60**	**1.32**	30000		608-ZZ	0.013
8	22	7	0.30	**2.60**	**1.32**	19000		608-RS	0.013
8	22	7	0.30	**2.60**	**1.32**	19000		608-2RS	0.013
9	24	7	0.30	**2.65**	**1.37**	30000	36000	609	0.015
9	24	7	0.30	**2.65**	**1.37**	30000		609-Z	0.015
9	24	7	0.30	**2.65**	**1.37**	30000		609-ZZ	0.015
9	24	7	0.30	**2.65**	**1.37**	18000		609-RS	0.015
9	24	7	0.30	**2.65**	**1.37**	18000		609-2RS	0.015
9	26	8	0.60	**3.55**	**1.86**	28000	34000	629	0.020
9	26	8	0.60	**3.55**	**1.86**	28000		629-Z	0.020
9	26	8	0.60	**3.55**	**1.86**	28000		629-ZZ	0.020
9	26	8	0.60	**3.55**	**1.86**	19000		629-RS	0.020
9	26	8	0.60	**3.55**	**1.86**	19000		629-2RS	0.020

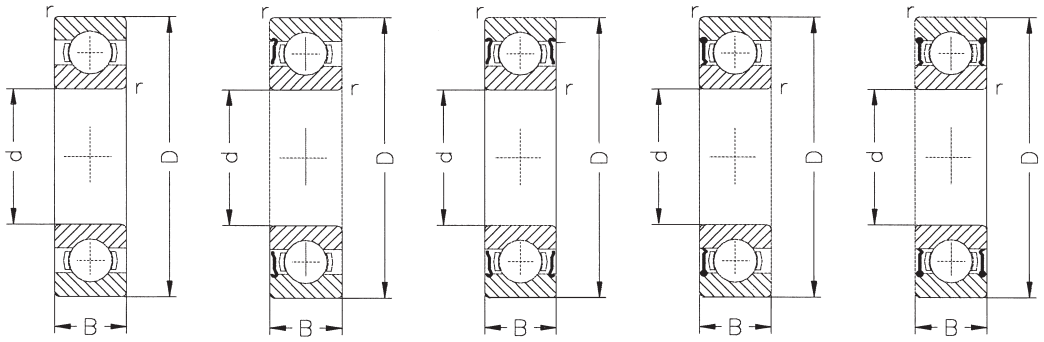
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
10	19	5	0.30	**1.38**	**0.59**	36000	43000	61800	0.005
10	19	5	0.30	**1.38**	**0.59**	36000		61800-ZZ	0.005
10	19	5	0.30	**1.38**	**0.59**	20000		61800-2RS	0.005
10	22	6	0.30	**1.95**	**0.75**	34000	40000	61900	0.010
10	22	6	0.30	**1.95**	**0.75**	34000		61900-ZZ	0.010
10	22	6	0.30	**1.95**	**0.75**	19000		61900-2RS	0.010
10	26	8	0.30	**3.98**	**1.96**	28000	34000	6000	0.020
10	26	8	0.30	**3.98**	**1.96**	28000		6000-Z	0.020
10	26	8	0.30	**3.98**	**1.96**	28000		6000-ZZ	0.020
10	26	8	0.30	**3.98**	**1.96**	17000		6000-RS	0.020
10	26	8	0.30	**3.98**	**1.96**	17000		6000-2RS	0.020
10	30	9	0.60	**4.42**	**2.60**	24000	30000	6200	0.032
10	30	9	0.60	**4.42**	**2.60**	24000		6200-Z	0.032
10	30	9	0.60	**4.42**	**2.60**	24000		6200-ZZ	0.032
10	30	9	0.60	**4.42**	**2.60**	17000		6200-RS	0.032
10	30	9	0.60	**4.42**	**2.60**	17000		6200-2RS	0.032
10	35	11	0.60	**7.58**	**3.45**	20000	25000	6300	0.057
10	35	11	0.60	**7.58**	**3.45**	20000		6300-Z	0.057
10	35	11	0.60	**7.58**	**3.45**	20000		6300-ZZ	0.057
10	35	11	0.60	**7.58**	**3.45**	15000		6300-RS	0.057
10	35	11	0.60	**7.58**	**3.45**	15000		6300-2RS	0.057
12	21	5	0.30	**1.43**	**0.67**	32000	38000	61801	0.006
12	21	5	0.30	**1.43**	**0.67**	32000		61801-ZZ	0.006
12	21	5	0.30	**1.43**	**0.67**	19000		61801-2RS	0.006
12	24	6	0.30	**2.25**	**0.98**	28000	34000	61901	0.011
12	24	6	0.30	**2.25**	**0.98**	28000		61901-ZZ	0.011
12	24	6	0.30	**2.25**	**0.98**	18000		61901-2RS	0.011
12	28	8	0.30	**4.42**	**2.36**	25500	32000	6001	0.022
12	28	8	0.30	**4.42**	**2.36**	25500		6001-Z	0.022
12	28	8	0.30	**4.42**	**2.36**	25500		6001-ZZ	0.022
12	28	8	0.30	**4.42**	**2.36**	17000		6001-RS	0.022
12	28	8	0.30	**4.42**	**2.36**	17000		6001-2RS	0.022
12	32	10	0.60	**6.00**	**3.10**	22000	28000	6201	0.040
12	32	10	0.60	**6.00**	**3.10**	22000		6201-Z	0.040
12	32	10	0.60	**6.00**	**3.10**	22000		6201-ZZ	0.040
12	32	10	0.60	**6.00**	**3.10**	15000		6201-RS	0.040
12	32	10	0.60	**6.00**	**3.10**	15000		6201-2RS	0.040
12	37	12	1.00	**8.50**	**4.15**	18500	23000	6301	0.065
12	37	12	1.00	**8.50**	**4.15**	18500		6301-Z	0.065
12	37	12	1.00	**8.50**	**4.15**	18500		6301-ZZ	0.065
12	37	12	1.00	**8.50**	**4.01**	13000		6301-RS	0.065
12	37	12	1.00	**8.50**	**4.15**	13000		6301-2RS	0.065
15	24	5	0.30	**1.56**	**0.80**	28000	34000	61802	0.007
15	24	5	0.30	**1.56**	**0.80**	28000		61802-ZZ	0.007
15	24	5	0.30	**1.56**	**0.80**	17000		61802-2RS	0.007
15	28	7	0.30	**4.03**	**2.04**	24000	30000	61902	0.016
15	28	7	0.30	**4.03**	**2.04**	24000		61902-ZZ	0.016
15	28	7	0.30	**4.03**	**2.04**	16000		61902-2RS	0.016
15	32	8	0.30	**5.60**	**2.85**	24000	30000	16002	0.027

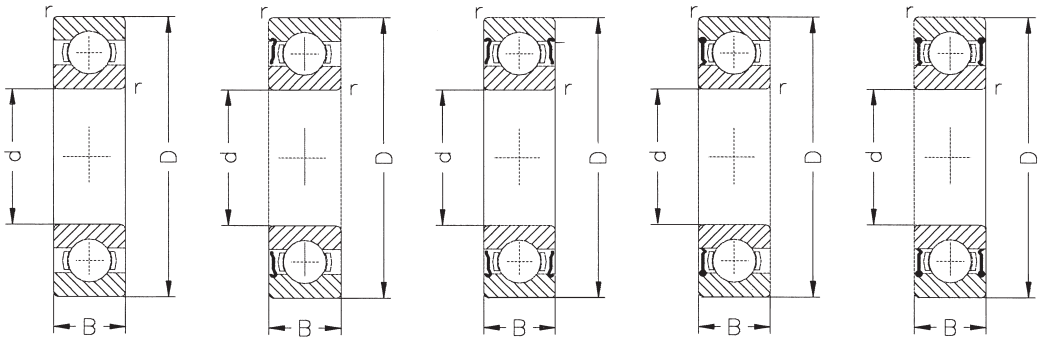
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	dynamic C kN	static C_0 kN	grease min^{-1}	oil min^{-1}		kg
15	32	9	0.30	**4.82**	**2.85**	22000	28000	6002	0.032
15	32	9	0.30	**4.82**	**2.85**	22000		6002-Z	0.032
15	32	9	0.30	**4.82**	**2.85**	22000		6002-ZZ	0.032
15	32	9	0.30	**4.82**	**2.85**	14000		6002-RS	0.032
15	32	9	0.30	**4.82**	**2.85**	14000		6002-2RS	0.032
15	35	11	0.60	**6.70**	**3.75**	19000	24000	6202	0.048
15	35	11	0.60	**6.70**	**3.75**	19000		6202-Z	0.048
15	35	11	0.60	**6.70**	**3.75**	19000		6202-ZZ	0.048
15	35	11	0.60	**6.70**	**3.75**	13000		6202-RS	0.048
15	35	11	0.60	**6.70**	**3.75**	13000		6202-2RS	0.048
15	42	13	1.00	**9.88**	**5.40**	15500	20000	6302	0.092
15	42	13	1.00	**9.88**	**5.40**	15500		6302-Z	0.092
15	42	13	1.00	**9.88**	**5.40**	15500		6302-ZZ	0.092
15	42	13	1.00	**9.88**	**5.40**	12000		6302-RS	0.092
15	42	13	1.00	**9.88**	**5.40**	12000		6302-2RS	0.092
17	26	5	0.30	**1.68**	**0.93**	24000	30000	61803	0.008
17	26	5	0.30	**1.68**	**0.93**	24000		61803-ZZ	0.008
17	26	5	0.30	**1.68**	**0.93**	16000		61803-2RS	0.008
17	30	7	0.30	**4.36**	**2.32**	22000	28000	61903	0.018
17	30	7	0.30	**4.36**	**2.32**	22000		61903-ZZ	0.018
17	30	7	0.30	**4.36**	**2.32**	14000		61903-2RS	0.018
17	35	8	0.30	**6.00**	**3.25**	22000	28000	16003	0.032
17	35	10	0.30	**5.15**	**3.25**	20000	25000	6003	0.042
17	35	10	0.30	**5.15**	**3.25**	20000		6003-Z	0.042
17	35	10	0.30	**5.15**	**3.25**	20000		6003-ZZ	0.042
17	35	10	0.30	**5.15**	**3.25**	13000		6003-RS	0.042
17	35	10	0.30	**5.15**	**3.25**	13000		6003-2RS	0.042
17	40	12	0.60	**8.28**	**4.75**	17000	21000	6203	0.069
17	40	12	0.60	**8.28**	**4.75**	17000		6203-Z	0.069
17	40	12	0.60	**8.28**	**4.75**	17000		6203-ZZ	0.069
17	40	12	0.60	**8.28**	**4.75**	12000		6203-RS	0.069
17	40	12	0.60	**8.28**	**4.75**	12000		6203-2RS	0.069
17	47	14	1.00	**11.80**	**6.55**	14000	17000	6303	0.121
17	47	14	1.00	**11.80**	**6.55**	14000		6303-Z	0.121
17	47	14	1.00	**11.80**	**6.55**	14000		6303-ZZ	0.121
17	47	14	1.00	**11.80**	**6.55**	11000		6303-RS	0.121
17	47	14	1.00	**11.80**	**6.55**	11000		6303-2RS	0.121
20	32	7	0.30	**2.70**	**1.50**	19000	24000	61804	0.018
20	32	7	0.30	**2.70**	**1.50**	19000		61804-ZZ	0.018
20	32	7	0.30	**2.70**	**1.50**	13000		61804-2RS	0.018
20	37	9	0.30	**6.37**	**3.65**	18000	22000	61904	0.038
20	37	9	0.30	**6.37**	**3.65**	18000		61904-ZZ	0.038
20	37	9	0.30	**6.37**	**3.65**	12000		61904-2RS	0.038
20	42	8	0.30	**6.95**	**4.05**	18000	22000	16004	0.049
20	42	12	0.60	**8.09**	**5.00**	16500	20000	6004	0.072
20	42	12	0.60	**8.09**	**5.00**	16500		6004-Z	0.072
20	42	12	0.60	**8.09**	**5.00**	16500		6004-ZZ	0.072
20	42	12	0.60	**8.09**	**5.00**	11000		6004-RS	0.072
20	42	12	0.60	**8.09**	**5.00**	11000		6004-2RS	0.072

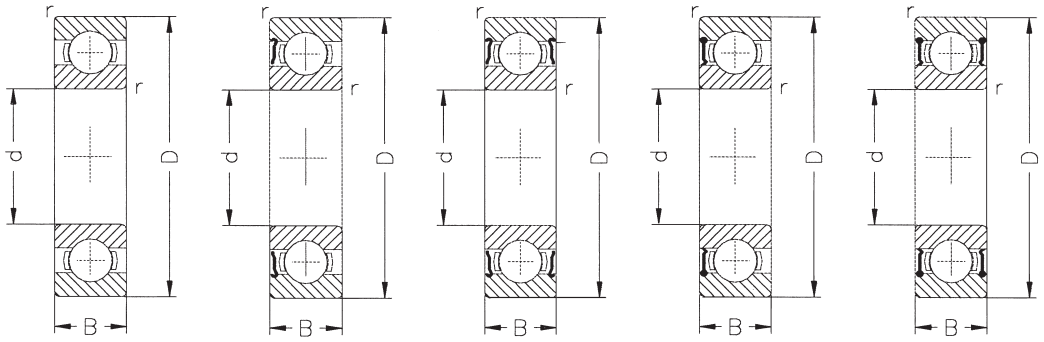
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	oil min^{-1}	oil min^{-1}		kg
20	47	14	1.00	**11.10**	**6.55**	14000	17000	6204	0.117
20	47	14	1.00	**11.10**	**6.55**	14000		6204-Z	0.117
20	47	14	1.00	**11.10**	**6.55**	14000		6204-ZZ	0.117
20	47	14	1.00	**11.10**	**6.55**	10000		6204-RS	0.117
20	47	14	1.00	**11.10**	**6.55**	10000		6204-2RS	0.117
20	52	15	1.10	**13.90**	**7.80**	12000	15000	6304	0.158
20	52	15	1.10	**13.90**	**7.80**	12000		6304-Z	0.158
20	52	15	1.10	**13.90**	**7.80**	12000		6304-ZZ	0.158
20	52	15	1.10	**13.90**	**7.80**	9000		6304-RS	0.158
20	52	15	1.10	**13.90**	**7.80**	9000		6304-2RS	0.158
25	37	7	0.30	**4.36**	**2.60**	17000	20000	61805	0.022
25	37	7	0.30	**4.36**	**2.60**	17000		61805-ZZ	0.022
25	37	7	0.30	**4.36**	**2.60**	11000		61805-2RS	0.022
25	42	9	0.30	**6.63**	**4.00**	16000	19000	61905	0.045
25	42	9	0.30	**6.63**	**4.00**	16000		61905-ZZ	0.045
25	42	9	0.30	**6.63**	**4.00**	10000		61905-2RS	0.045
25	47	8	0.30	**7.20**	**4.65**	16000	19000	16005	0.056
25	47	12	0.60	**8.62**	**5.85**	14500	18000	6005	0.086
25	47	12	0.60	**8.62**	**5.85**	14500		6005-Z	0.086
25	47	12	0.60	**8.62**	**5.85**	14500		6005-ZZ	0.086
25	47	12	0.60	**8.62**	**5.85**	9500		6005-RS	0.086
25	47	12	0.60	**8.62**	**5.85**	9500		6005-2RS	0.086
25	52	15	1.00	**12.10**	**7.80**	12000	14500	6205	0.142
25	52	15	1.00	**12.10**	**7.80**	12000		6205-Z	0.142
25	52	15	1.00	**12.10**	**7.80**	12000		6205-ZZ	0.142
25	52	15	1.00	**12.10**	**7.80**	8500		6205-RS	0.142
25	52	15	1.00	**12.10**	**7.80**	8500		6205-2RS	0.142
25	62	17	1.10	**20.60**	**11.40**	10000	12000	6305	0.248
25	62	17	1.10	**20.60**	**11.40**	10000		6305-Z	0.248
25	62	17	1.10	**20.60**	**11.40**	10000		6305-ZZ	0.248
25	62	17	1.10	**20.60**	**11.40**	7500		6305-RS	0.248
25	62	17	1.10	**20.60**	**11.40**	7500		6305-2RS	0.248
30	42	7	0.30	**4.49**	**2.90**	15000	18000	61806	0.027
30	42	7	0.30	**4.49**	**2.90**	15000		61806-ZZ	0.027
30	42	7	0.30	**4.49**	**2.90**	9500		61806-2RS	0.027
30	47	9	0.30	**7.28**	**4.55**	14000	17000	61906	0.051
30	47	9	0.30	**7.28**	**4.55**	14000		61906-ZZ	0.051
30	47	9	0.30	**7.28**	**4.55**	8500		61906-2RS	0.051
30	55	9	0.30	**11.20**	**7.35**	13000	16000	16006	0.084
30	55	13	1.00	**11.30**	**8.00**	12000	15000	6006	0.128
30	55	13	1.00	**11.30**	**8.00**	12000		6006-Z	0.128
30	55	13	1.00	**11.30**	**8.00**	12000		6006-ZZ	0.128
30	55	13	1.00	**11.30**	**8.00**	8000		6006-RS	0.128
30	55	13	1.00	**11.30**	**8.00**	8000		6006-2RS	0.128
30	62	16	1.00	**16.80**	**11.20**	10000	12500	6206	0.192
30	62	16	1.00	**16.80**	**11.20**	10000		6206-Z	0.192
30	62	16	1.00	**16.80**	**11.20**	10000		6206-ZZ	0.192
30	62	16	1.00	**16.80**	**11.20**	7500		6206-RS	0.192
30	62	16	1.00	**16.80**	**11.20**	7500		6206-2RS	0.192

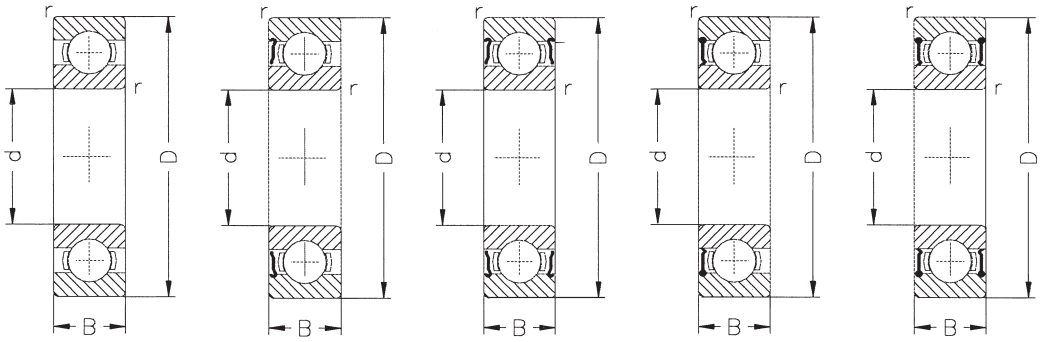
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
30	72	19	1.10	**24.40**	**16.30**	8400	10000	6306	0.348
30	72	19	1.10	**24.40**	**16.30**	8400		6306-Z	0.348
30	72	19	1.10	**24.40**	**16.30**	8400		6306-ZZ	0.348
30	72	19	1.10	**24.40**	**16.30**	6300		6306-RS	0.348
30	72	19	1.10	**24.40**	**16.30**	6300		6306-2RS	0.348
35	47	7	0.30	**4.75**	**3.20**	13000	16000	61807	0.030
35	47	7	0.30	**4.75**	**3.20**	13000		61807-ZZ	0.030
35	47	7	0.30	**4.75**	**3.20**	8000		61807-2RS	0.030
35	55	10	0.60	**9.56**	**6.20**	11000	14000	61907	0.080
35	55	10	0.60	**9.56**	**6.20**	11000		61907-ZZ	0.080
35	55	10	0.60	**9.56**	**6.20**	7500		61907-2RS	0.080
35	62	9	0.30	**12.20**	**8.80**	11000	14000	16007	0.107
35	62	14	1.00	**13.60**	**10.40**	10500	13000	6007	0.167
35	62	14	1.00	**13.60**	**10.40**	10500		6007-Z	0.167
35	62	14	1.00	**13.60**	**10.40**	10500		6007-ZZ	0.167
35	62	14	1.00	**13.60**	**10.40**	7000		6007-RS	0.167
35	62	14	1.00	**13.60**	**10.40**	7000		6007-2RS	0.167
35	72	17	1.00	**22.20**	**15.30**	8800	11000	6207	0.315
35	72	17	1.00	**22.20**	**15.30**	8800		6207-Z	0.315
35	72	17	1.00	**22.20**	**15.30**	8800		6207-ZZ	0.315
35	72	17	1.00	**22.20**	**15.30**	6300		6207-RS	0.315
35	72	17	1.00	**22.20**	**15.30**	6300		6207-2RS	0.315
35	80	21	1.10	**28.90**	**19.00**	7300	9000	6307	0.503
35	80	21	1.10	**28.90**	**19.00**	7300		6307-Z	0.503
35	80	21	1.10	**28.90**	**19.00**	7300		6307-ZZ	0.503
35	80	21	1.10	**28.90**	**19.00**	5600		6307-RS	0.503
35	80	21	1.10	**28.90**	**19.00**	5600		6307-2RS	0.503
40	52	7	0.30	**4.94**	**3.45**	11000	14000	61808	0.034
40	52	7	0.30	**4.94**	**3.45**	11000		61808-ZZ	0.034
40	52	7	0.30	**4.94**	**3.45**	7500		61808-2RS	0.034
40	62	12	0.60	**13.80**	**9.30**	10000	13000	61908	0.120
40	62	12	0.60	**13.80**	**9.30**	10000		61908-ZZ	0.120
40	62	12	0.60	**13.80**	**9.30**	6700		61908-2RS	0.120
40	68	9	0.30	**13.20**	**10.20**	10000	13000	16008	0.126
40	68	15	1.00	**14.30**	**11.50**	9500	12000	6008	0.213
40	68	15	1.00	**14.30**	**11.50**	9500		6008-Z	0.213
40	68	15	1.00	**14.30**	**11.50**	9500		6008-ZZ	0.213
40	68	15	1.00	**14.30**	**11.50**	6300		6008-RS	0.213
40	68	15	1.00	**14.30**	**11.50**	6300		6008-2RS	0.213
40	80	18	1.10	**25.10**	**18.00**	7800	9500	6208	0.402
40	80	18	1.10	**25.10**	**18.00**	7800		6208-Z	0.402
40	80	18	1.10	**25.10**	**18.00**	7800		6208-ZZ	0.402
40	80	18	1.10	**25.10**	**18.00**	5600		6208-RS	0.402
40	80	18	1.10	**25.10**	**18.00**	5600		6208-2RS	0.402
40	90	23	1.50	**35.30**	**25.00**	6700	8000	6308	0.685
40	90	23	1.50	**35.30**	**25.00**	6700		6308-Z	0.685
40	90	23	1.50	**35.30**	**25.00**	6700		6308-ZZ	0.685
40	90	23	1.50	**35.30**	**25.00**	5000		6308-RS	0.685
40	90	23	1.50	**35.30**	**25.00**	5000		6308-2RS	0.685

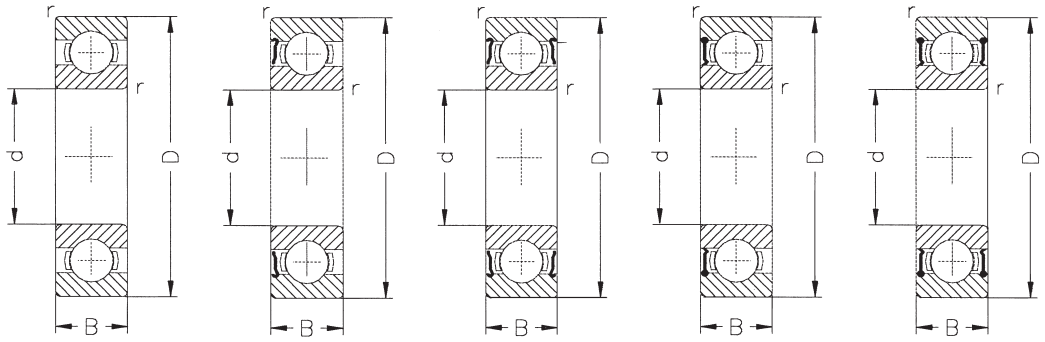
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
45	58	7	0.30	**6.05**	**4.30**	9500	12000	61809	0.040
45	58	7	0.30	**6.05**	**4.30**	9500		61809-ZZ	0.040
45	58	7	0.30	**6.05**	**4.30**	6700		61809-2RS	0.040
45	68	12	0.60	**10.10**	**6.70**	9000	11000	61909	0.140
45	68	12	0.60	**10.10**	**6.70**	9000		61909-ZZ	0.140
45	68	12	0.60	**10.10**	**6.70**	6000		61909-2RS	0.140
45	75	10	0.60	**15.60**	**12.20**	9000	11000	16009	0.168
45	75	16	1.00	**17.80**	**14.30**	8500	10500	6009	0.263
45	75	16	1.00	**17.80**	**14.30**	8500		6009-Z	0.263
45	75	16	1.00	**17.80**	**14.30**	8500		6009-ZZ	0.263
45	75	16	1.00	**17.80**	**14.30**	5600		6009-RS	0.263
45	75	16	1.00	**17.80**	**14.30**	5600		6009-2RS	0.263
45	85	19	1.10	**28.20**	**20.40**	7300	8800	6209	0.446
45	85	19	1.10	**28.20**	**20.40**	7300		6209-Z	0.446
45	85	19	1.10	**28.20**	**20.40**	7300		6209-ZZ	0.446
45	85	19	1.10	**28.20**	**20.40**	5000		6209-RS	0.446
45	85	19	1.10	**28.20**	**20.40**	5000		6209-2RS	0.446
45	100	25	1.50	**45.80**	**32.00**	5900	7100	6309	0.914
45	100	25	1.50	**45.80**	**32.00**	5900		6309-Z	0.914
45	100	25	1.50	**45.80**	**32.00**	5900		6309-ZZ	0.914
45	100	25	1.50	**45.80**	**32.00**	4500		6309-RS	0.914
45	100	25	1.50	**45.80**	**32.00**	4500		6309-2RS	0.914
50	65	7	0.30	**6.24**	**4.75**	9000	11000	61810	0.052
50	65	7	0.30	**6.24**	**4.75**	9000		61810-ZZ	0.052
50	65	7	0.30	**6.24**	**4.75**	6000		61810-2RS	0.052
50	72	12	0.60	**14.60**	**10.40**	8500	10000	61910	0.140
50	72	12	0.60	**14.60**	**10.40**	8500		61910-ZZ	0.140
50	72	12	0.60	**14.60**	**10.40**	5600		61910-2RS	0.140
50	80	10	0.60	**16.00**	**13.20**	8500	10000	16010	0.180
50	80	16	1.00	**18.50**	**15.60**	8000	10000	6010	0.293
50	80	16	1.00	**18.50**	**15.60**	8000		6010-Z	0.293
50	80	16	1.00	**18.50**	**15.60**	8000		6010-ZZ	0.293
50	80	16	1.00	**18.50**	**15.60**	5000		6010-RS	0.293
50	80	16	1.00	**18.50**	**15.60**	5000		6010-2RS	0.293
50	90	20	1.10	**30.10**	**23.90**	6600	8300	6210	0.506
50	90	20	1.10	**30.10**	**23.90**	6600		6210-Z	0.506
50	90	20	1.10	**30.10**	**23.90**	6600		6210-ZZ	0.506
50	90	20	1.10	**30.10**	**23.90**	4800		6210-RS	0.506
50	90	20	1.10	**30.10**	**23.90**	4800		6210-2RS	0.506
50	110	27	2.00	**53.60**	**38.00**	5300	6500	6310	1.170
50	110	27	2.00	**53.60**	**38.00**	5300		6310-Z	1.170
50	110	27	2.00	**53.60**	**38.00**	5300		6310-ZZ	1.170
50	110	27	2.00	**53.60**	**38.00**	4000		6310-RS	1.170
50	110	27	2.00	**53.60**	**38.00**	4000		6310-2RS	1.170
55	90	11	0.60	**19.30**	**16.30**	7500	9000	16011	0.263
55	90	18	1.10	**24.00**	**21.00**	7200	9000	6011	0.462
55	90	18	1.10	**24.00**	**21.00**	7200		6011-Z	0.462
55	90	18	1.10	**24.00**	**21.00**	7200		6011-ZZ	0.462
55	90	18	1.10	**24.00**	**21.00**	4500		6011-RS	0.462

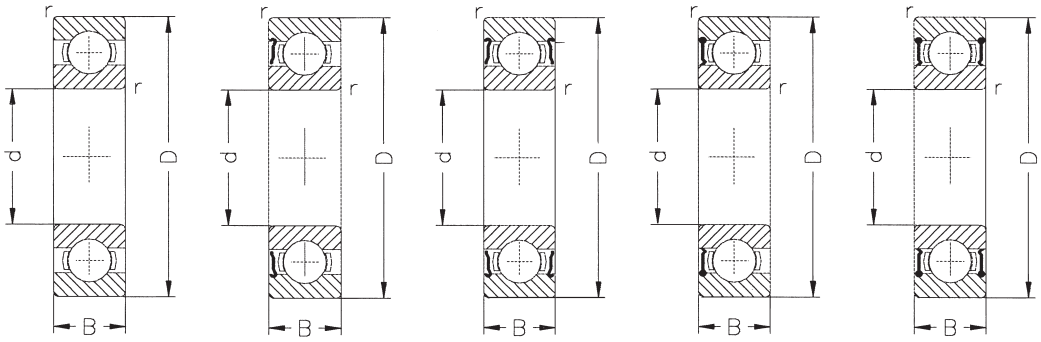
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
55	90	18	1.10	**24.00**	**21.00**	4500		6011-2RS	0.462
55	100	21	1.50	**37.30**	**29.00**	6100	7500	6211	0.667
55	100	21	1.50	**37.30**	**29.00**	6100		6211-Z	0.667
55	100	21	1.50	**37.30**	**29.00**	6100		6211-ZZ	0.667
55	100	21	1.50	**37.30**	**29.00**	4300		6211-RS	0.667
55	100	21	1.50	**37.30**	**29.00**	4300		6211-2RS	0.667
55	120	29	2.10	**62.00**	**47.50**	4800	6000	6311	1.500
55	120	29	2.10	**62.00**	**47.50**	4800		6311-Z	1.500
55	120	29	2.10	**62.00**	**47.50**	4800		6311-ZZ	1.500
55	120	29	2.10	**62.00**	**47.50**	3600		6311-RS	1.500
55	120	29	2.10	**62.00**	**47.50**	3600		6311-2RS	1.500
60	95	11	0.60	**20.00**	**17.60**	7000	8500	16012	0.279
60	95	18	1.10	**24.90**	**22.80**	6700	8000	6012	0.459
60	95	18	1.10	**24.90**	**22.80**	6700		6012-Z	0.459
60	95	18	1.10	**24.90**	**22.80**	6700		6012-ZZ	0.459
60	95	18	1.10	**24.90**	**22.80**	4300		6012-RS	0.459
60	95	18	1.10	**24.90**	**22.80**	4300		6012-2RS	0.459
60	110	22	1.50	**45.10**	**36.00**	5400	6700	6212	0.852
60	110	22	1.50	**45.10**	**36.00**	5400		6212-Z	0.852
60	110	22	1.50	**45.10**	**36.00**	5400		6212-ZZ	0.852
60	110	22	1.50	**45.10**	**36.00**	4000		6212-RS	0.852
60	110	22	1.50	**45.10**	**36.00**	4000		6212-2RS	0.852
60	130	31	2.10	**70.90**	**52.00**	4500	5500	6312	1.880
60	130	31	2.10	**70.90**	**52.00**	4500		6312-Z	1.880
60	130	31	2.10	**70.90**	**52.00**	4500		6312-ZZ	1.880
60	130	31	2.10	**70.90**	**52.00**	3400		6312-RS	1.880
60	130	31	2.10	**70.90**	**52.00**	3400		6312-2RS	1.880
65	100	11	0.60	**21.20**	**19.60**	6700	8000	16013	0.298
65	100	18	1.10	**26.60**	**24.00**	6300	7500	6013	0.435
65	100	18	1.10	**26.60**	**24.00**	6300		6013-ZZ	0.436
65	100	18	1.10	**26.60**	**24.00**	4000		6013-2RS	0.436
65	120	23	1.50	**49.10**	**41.30**	5000	6200	6213	1.080
65	120	23	1.50	**49.10**	**41.30**	5000		6213-ZZ	1.080
65	120	23	1.50	**49.10**	**41.30**	3600		6213-2RS	1.080
65	140	33	2.10	**80.30**	**60.00**	4200	5000	6313	2.320
65	140	33	2.10	**80.30**	**60.00**	4200		6313-ZZ	2.320
65	140	33	2.10	**80.30**	**60.00**	3000		6313-2RS	2.320
70	110	13	0.60	**28.00**	**25.00**	6000	7000	16014	0.434
70	110	20	1.10	**32.20**	**30.30**	5700	6800	6014	0.675
70	110	20	1.10	**32.20**	**30.30**	5700		6014-ZZ	0.675
70	110	20	1.10	**32.20**	**30.30**	3600		6014-2RS	0.675
70	125	24	1.50	**53.40**	**44.00**	4700	5800	6214	1.170
70	125	24	1.50	**53.40**	**44.00**	4700		6214-ZZ	1.170
70	125	24	1.50	**53.40**	**44.00**	3400		6214-2RS	1.170
70	150	35	2.10	**90.20**	**68.00**	3800	4500	6314	1.820
70	150	35	2.10	**90.20**	**68.00**	3800		6314-ZZ	1.820
70	150	35	2.10	**90.20**	**68.00**	2800		6314-2RS	1.820

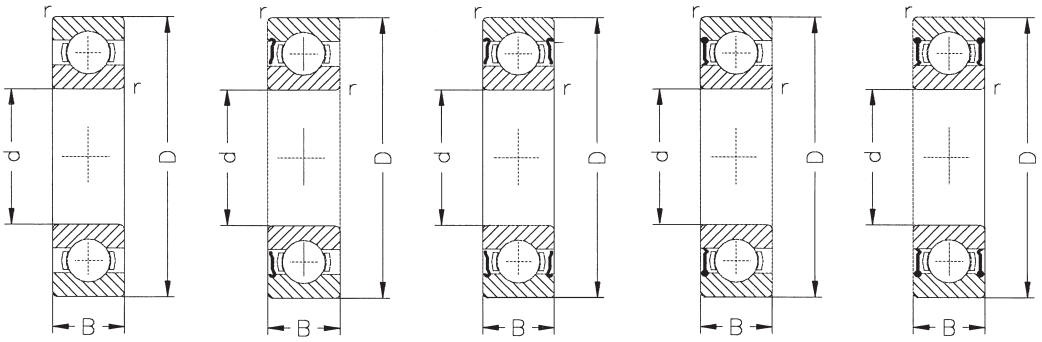
Deep groove ball bearings



open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
75	115	13	0.60	**28.50**	**27.00**	5600	6700	16015	0.456
75	115	20	1.10	**33.30**	**32.60**	5400	6500	6015	0.720
75	115	20	1.10	**33.30**	**32.60**	5400		6015-ZZ	0.720
75	115	20	1.10	**33.30**	**32.60**	3400		6015-2RS	0.720
75	130	25	1.50	**56.60**	**49.00**	4400	5400	6215	1.300
75	130	25	1.50	**56.60**	**49.00**	4400		6215-ZZ	1.300
75	130	25	1.50	**56.60**	**49.00**	4000		6215-2RS	1.300
75	160	37	2.10	**98.30**	**76.50**	3600	4200	6315	3.390
75	160	37	2.10	**98.30**	**76.50**	3600		6315-ZZ	3.390
75	160	37	2.10	**98.30**	**76.50**	3600		6315-2RS	0.390
80	125	14	0.60	**32.00**	**31.00**	5300	6300	16016	0.615
80	125	22	1.10	**40.30**	**39.00**	5000	6000	6016	0.850
80	125	22	1.10	**40.30**	**39.00**	5000		6016-ZZ	0.850
80	125	22	1.10	**40.30**	**39.00**	5000		6016-2RS	0.850
80	140	26	2.00	**62.20**	**53.00**	4200	5200	6216	1.420
80	140	26	2.00	**62.20**	**53.00**	4200		6216-ZZ	1.420
80	140	26	2.00	**62.20**	**53.00**	3000		6216-2RS	1.420
80	170	39	2.10	**106.00**	**86.50**	3400	4000	6316	3.730
80	170	39	2.10	**106.00**	**86.50**	3400		6316-ZZ	3.730
80	170	39	2.10	**106.00**	**86.50**	2600		6316-2RS	3.730
85	130	14	0.60	**34.20**	**33.50**	5000	6000	16017	0.641
85	130	22	1.10	**41.80**	**41.90**	4800	5600	6017	0.895
85	130	22	1.10	**41.80**	**41.90**	4800		6017-ZZ	0.895
85	150	28	2.00	**71.20**	**64.00**	3900	4800	6217	1.820
85	150	28	2.00	**71.20**	**64.00**	3900		6217-ZZ	1.820
85	180	41	3.00	**115.00**	**88.00**	3200	3800	6317	4.240
85	180	41	3.00	**115.00**	**88.00**	3200		6317-ZZ	4.240
90	140	16	1.00	**41.50**	**39.00**	4500	5300	16018	0.859
90	140	24	1.50	**49.20**	**48.70**	4500	5300	6018	1.180
90	140	24	1.50	**49.20**	**48.70**	4500		6018-ZZ	1.180
90	160	30	2.00	**82.30**	**72.00**	3700	4500	6218	2.200
90	160	30	2.00	**82.30**	**72.00**	3700		6218-ZZ	2.200
90	190	43	3.00	**123.00**	**102.00**	3000	3600	6318	5.270
90	190	43	3.00	**123.00**	**102.00**	3000		6318-ZZ	5.270
95	145	16	1.00	**40.00**	**40.50**	4500	5300	16019	0.905
95	145	24	1.50	**51.10**	**52.30**	4300	5000	6019	1.210
95	145	24	1.50	**51.10**	**52.30**	4300		6019-ZZ	1.210
95	170	32	2.10	**93.30**	**81.50**	3500	4300	6219	2.670
95	170	32	2.10	**93.30**	**81.50**	3500		6219-ZZ	2.670
95	200	45	3.00	**132.00**	**112.00**	2800	3400	6319	6.140
95	200	45	3.00	**132.00**	**112.00**	2800		6319-ZZ	6.140
100	150	16	1.00	**44.00**	**44.00**	4300	5000	16020	0.929
100	150	24	1.50	**50.60**	**52.50**	4000	4800	6020	1.260
100	150	24	1.50	**50.60**	**52.50**	4000		6020-ZZ	1.260
100	180	34	2.10	**105.00**	**93.00**	3300	4000	6220	3.220
100	180	34	2.10	**105.00**	**93.00**	3300		6220-ZZ	3.220

Deep groove ball bearings

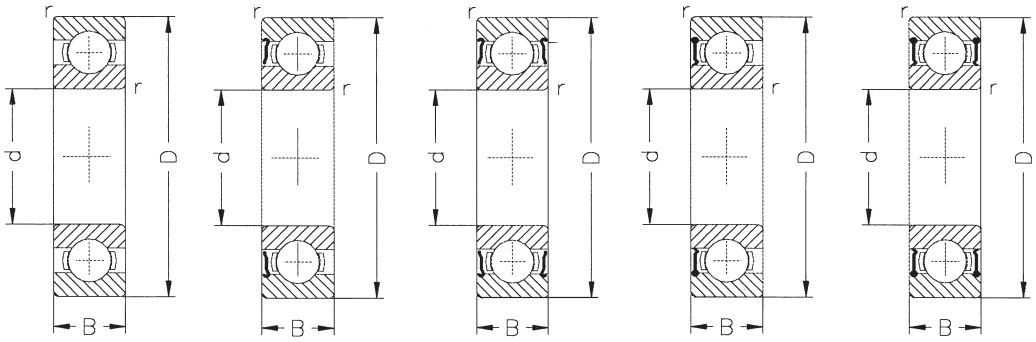


open Z ZZ RS 2RS

Dimensions				Load ratings		Limiting speed		Bearing no.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
100	215	47	3.00	**150.00**	**134.00**	2600	3200	6320	7.560
100	215	47	3.00	**150.00**	**134.00**	2600		6320-ZZ	7.560
105	160	18	1.00	**54.00**	**54.00**	4000	4800	16021	1.220
105	160	26	2.00	**61.10**	**63.90**	3900	4700	6021	1.580
105	160	26	2.00	**61.10**	**63.90**	3900		6021-ZZ	1.580
110	170	19	1.00	**57.00**	**57.00**	3800	4500	16022	1.490
110	170	28	2.00	**69.30**	**71.00**	3600	5300	6022	1.970
110	170	28	2.00	**69.30**	**71.00**	3600		6022-ZZ	1.970
110	200	38	2.10	**124.00**	**116.00**	3000	3600	6222	4.570
110	200	38	2.10	**124.00**	**116.00**	3000		6222-ZZ	4.570
110	240	50	3.00	**178.00**	**166.00**	2600	3200	6322	10.300
110	240	50	3.00	**178.00**	**166.00**	2600		6322-ZZ	10.300
120	180	19	1.00	**61.00**	**64.00**	3400	4800	16024	1.600
120	180	28	2.00	**71.50**	**76.90**	3400	4000	6024	2.110
120	180	28	2.00	**71.50**	**76.90**	3400		6024-ZZ	2.110
120	215	40	2.10	**133.00**	**122.00**	2800	3400	6224	5.600
120	215	40	2.10	**133.00**	**122.00**	2800		6224-ZZ	5.600
120	260	50	3.00	**178.00**	**190.00**	2400	3000	6324	12.800
120	260	50	3.00	**178.00**	**190.00**	2400		6324-ZZ	12.800

Further sizes are available on request.

Deep groove ball bearings stainless steel

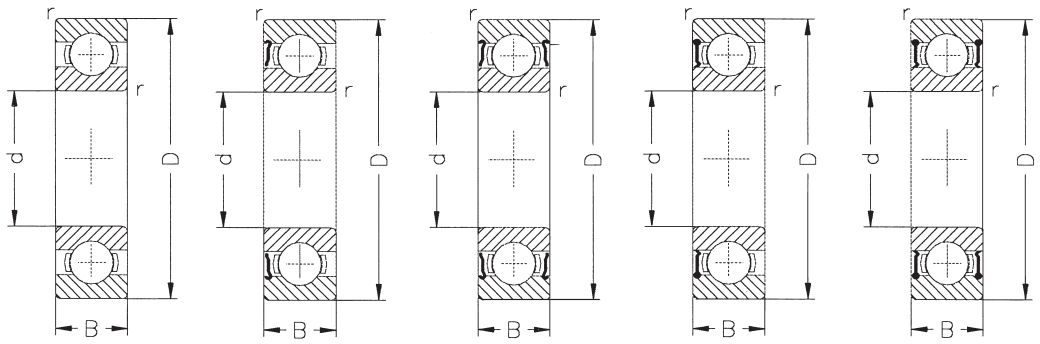


open Z* ZZ* RS* 2RS

Dimensions				Load ratings		Limiting speed		Bearing No.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
10	26	8	0.3	**3.20**	**1.80**	25000	30000	SS 6000	0.020
10	26	8	0.3	**3.20**	**1.80**	25000		SS 6000-Z	0.020
10	26	8	0.3	**3.20**	**1.80**	25000		SS 6000-ZZ	0.020
10	26	8	0.3	**3.20**	**1.80**	15000		SS 6000-RS	0.020
10	26	8	0.3	**3.20**	**1.80**	15000		SS 6000-2RS	0.020
10	30	9	0.6	**3.50**	**2.10**	23000	36435	SS 6200	0.032
10	30	9	0.6	**3.50**	**2.10**	23000		SS 6200-Z	0.032
10	30	9	0.6	**3.50**	**2.10**	23000		SS 6200-ZZ	0.032
10	30	9	0.6	**3.50**	**2.10**	15000		SS 6200-RS	0.032
10	30	9	0.6	**3.50**	**2.10**	15000		SS 6200-2RS	0.032
12	28	8	0.3	**3.50**	**2.10**	23000	28800	SS 6001	0.022
12	28	8	0.3	**3.50**	**2.10**	23000		SS 6001-Z	0.022
12	28	8	0.3	**3.50**	**2.10**	23000		SS 6001-ZZ	0.022
12	28	8	0.3	**3.50**	**2.10**	15000		SS 6001-RS	0.022
12	28	8	0.3	**3.50**	**2.10**	15000		SS 6001-2RS	0.022
12	32	10	0.6	**4.80**	**2.80**	21600	27000	SS 6201	0.040
12	32	10	0.6	**4.80**	**2.80**	21600		SS 6201-Z	0.040
12	32	10	0.6	**4.80**	**2.80**	21600		SS 6201-ZZ	0.040
12	32	10	0.6	**4.80**	**2.80**	14400		SS 6201-RS	0.040
12	32	10	0.6	**4.80**	**2.80**	14400		SS 6201-2RS	0.040
15	32	9	0.3	**3.82**	**2.40**	21600	27000	SS 6002	0.032
15	32	9	0.3	**3.82**	**2.40**	21600		SS 6002-Z	0.032
15	32	9	0.3	**3.82**	**2.40**	21600		SS 6002-ZZ	0.032
15	32	9	0.3	**3.82**	**2.40**	13500		SS 6002-RS	0.032
15	32	9	0.3	**3.82**	**2.40**	13500		SS 6002-2RS	0.032
15	35	11	0.6	**5.36**	**3.30**	18000	23400	SS 6202	0.048
15	35	11	0.6	**5.36**	**3.30**	18000		SS 6202-Z	0.048
15	35	11	0.6	**5.36**	**3.30**	18000		SS 6202-ZZ	0.048
15	35	11	0.6	**5.36**	**3.30**	12600		SS 6202-RS	0.048
15	35	11	0.6	**5.36**	**3.30**	12600		SS 6202-2RS	0.048
17	35	10	0.3	**4.12**	**2.70**	19800	25200	SS 6003	0.042
17	35	10	0.3	**4.12**	**2.70**	19800		SS 6003-Z	0.042
17	35	10	0.3	**4.12**	**2.70**	19800		SS 6003-ZZ	0.042
17	35	10	0.3	**4.12**	**2.70**	11700		SS 6003-RS	0.042
17	35	10	0.3	**4.12**	**2.70**	11700		SS 6003-2RS	0.042
17	40	12	0.6	**6.60**	**4.22**	16200	19800	SS 6203	0.069
17	40	12	0.6	**6.60**	**4.22**	16200		SS 6203-Z	0.069
17	40	12	0.6	**6.60**	**4.22**	16200		SS 6203-ZZ	0.069
17	40	12	0.6	**6.60**	**4.22**	10800		SS 6203-RS	0.069
17	40	12	0.6	**6.60**	**4.22**	10800		SS 6203-2RS	0.069
20	42	12	0.6	**6.50**	**4.25**	15300	18000	SS 6004	0.072
20	42	12	0.6	**6.50**	**4.25**	15300		SS 6004-Z	0.072
20	42	12	0.6	**6.50**	**4.25**	15300		SS 6004-ZZ	0.072
20	42	12	0.6	**6.50**	**4.25**	9900		SS 6004-RS	0.072
20	42	12	0.6	**6.50**	**4.25**	9900		SS 6004-2RS	0.072

*) on request

Deep groove ball bearings stainless steel



Dimensions				Load ratings		Limiting speed		Bearing No.	Weight
d mm	D mm	B mm	r min. mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
20	47	14	1.0	**8.90**	**5.78**	13500	16200	SS 6204	0.117
20	47	14	1.0	**8.90**	**5.78**	13500		SS 6204-Z	0.117
20	47	14	1.0	**8.90**	**5.78**	13500		SS 6204-ZZ	0.117
20	47	14	1.0	**8.90**	**5.78**	9000		SS 6204-RS	0.117
20	47	14	1.0	**8.90**	**5.78**	9000		SS 6204-2RS	0.117
25	47	12	0.6	**6.90**	**4.80**	13500	16200	SS 6005	0.086
25	47	12	0.6	**6.90**	**4.80**	13500		SS 6005-Z	0.086
25	47	12	0.6	**6.90**	**4.80**	13500		SS 6005-ZZ	0.086
25	47	12	0.6	**6.90**	**4.80**	8550		SS 6005-RS	0.086
25	47	12	0.6	**6.90**	**4.80**	8550		SS 6005-2RS	0.086
25	52	15	1.0	**9.68**	**6.64**	12600	15300	SS 6205	0.142
25	52	15	1.0	**9.68**	**6.64**	12600		SS 6205-Z	0.142
25	52	15	1.0	**9.68**	**6.64**	12600		SS 6205-ZZ	0.142
25	52	15	1.0	**9.68**	**6.64**	8100		SS 6205-RS	0.142
25	52	15	1.0	**9.68**	**6.64**	8100		SS 6205-2RS	0.142
30	55	13	1.0	**9.04**	**6.72**	11700	14400	SS 6006	0.128
30	55	13	1.0	**9.04**	**6.72**	11700		SS 6006-Z	0.128
30	55	13	1.0	**9.04**	**6.72**	11700		SS 6006-ZZ	0.128
30	55	13	1.0	**9.04**	**6.72**	9900		SS 6006-RS	0.128
30	55	13	1.0	**9.04**	**6.72**	9900		SS 6006-2RS	0.128
30	62	16	1.0	**13.44**	**9.52**	9900	12600	SS 6206	0.215
30	62	16	1.0	**13.44**	**9.52**	9900		SS 6206-Z	0.215
30	62	16	1.0	**13.44**	**9.52**	9900		SS 6206-ZZ	0.215
30	62	16	1.0	**13.44**	**9.52**	7500		SS 6206-RS	0.215
30	62	16	1.0	**13.44**	**9.52**	7500		SS 6206-2RS	0.215
35	62	14	1.0	**10.88**	**8.32**	9900	12600	SS 6007	0.167
35	62	14	1.0	**10.88**	**8.32**	9900		SS 6007-Z	0.167
35	62	14	1.0	**10.88**	**8.32**	9900		SS 6007-ZZ	0.167
35	62	14	1.0	**10.88**	**8.32**	6300		SS 6007-RS	0.167
35	62	14	1.0	**10.88**	**8.32**	6300		SS 6007-2RS	0.167
35	72	17	1.0	**17.76**	**12.96**	8550	10800	SS 6207	0.315
35	72	17	1.0	**17.76**	**12.96**	8550		SS 6207-Z	0.315
35	72	17	1.0	**17.76**	**12.96**	8550		SS 6207-ZZ	0.315
35	72	17	1.0	**17.76**	**12.96**	5670		SS 6207-RS	0.315
35	72	17	1.0	**17.76**	**12.96**	5670		SS 6207-2RS	0.315

*) on request
Further sizes are available on request.

Materialien

Inner ring: made of stainless steel material, hardened
Outer ring: made of stainless steel material, hardened
Roller body: made of stainless steel material, hardened
Cover washers: made of stainless steel material
Sealing washers: synthetic material

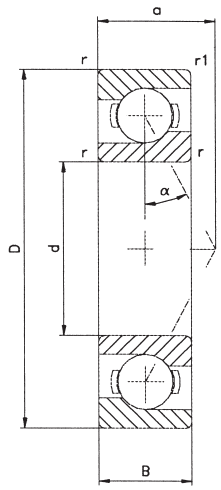
Angular ball bearings, single-row (DIN 628 T1)

Pressure angle alpha = 40°

B.TVP = Solid window-type cage of glass fibre intensified polyamide

B.TVP.UA = Solid window-type cage of glass fibre intensified polyamide, universal version for pairwise mounting, with thrust clearance (for pairwise mounting note lower limiting speed)

B.TVP.UO = Solid window-type cage of glass fibre intensified polyamide, unsiversal version for pairwise mounting, without clearance (for pairwise mounting note lower limiting speed)



Dimensions						Load ratings		Limiting speed		Bearing No.	Weight
d mm	D mm	B mm	r mm	r_1 mm	a mm	**dynamic C** **kN**	**static C_0** **kN**	grease min^{-1}	oil min^{-1}		kg
17	40	12	0.6	0.6	18.0	**10.00**	**5.50**	15000	20000	7203- B.TVP	0.067
17	40	12	0.6	0.6	18.0	**10.00**	**5.50**	15000	20000	7203- B.TVP.U0	0.067
17	47	14	1.0	0.6	20.0	**16.00**	**8.30**	13000	18000	7303- B.TVP	0.113
20	47	14	1.0	0.6	21.0	**13.40**	**7.65**	13000	18000	7204- B.TVP	0.107
20	47	14	1.0	0.6	21.0	**13.40**	**7.65**	13000	18000	7204- B.TVP.U0	0.107
20	47	14	1.0	0.6	21.0	**13.40**	**7.65**	13000	18000	7204- B.TVP.UA	0.107
20	52	15	1.1	0.6	23.0	**19.00**	**10.40**	12000	17000	7304- B.TVP	0.146
20	52	15	1.1	0.6	23.0	**19.00**	**10.40**	12000	17000	7304- B.TVP.U0	0.146
20	52	15	1.1	0.6	23.0	**19.00**	**10.40**	12000	17000	7304- B.TVP.UA	0.146
25	52	15	1.0	0.6	24.0	**14.60**	**9.30**	11000	16000	7205- B.TVP	0.131
25	52	15	1.0	0.6	24.0	**14.60**	**9.30**	11000	16000	7205- B.TVP.U0	0.131
25	52	15	1.0	0.6	24.0	**14.60**	**9.30**	11000	16000	7205- B.TVP.UA	0.131
25	62	17	1.1	0.6	27.0	**26.00**	**15.00**	9500	14000	7305- B.TVP	0.229
25	62	17	1.1	0.6	27.0	**26.00**	**15.00**	9500	14000	7305- B.TVP.U0	0.229
25	62	17	1.1	0.6	27.0	**26.00**	**15.00**	9500	14000	7305- B.TVP.UA	0.229
30	62	16	1.0	0.6	27.0	**20.40**	**13.40**	9000	13000	7206- B.TVP	0.201
30	62	16	1.0	0.6	27.0	**20.40**	**13.40**	9000	13000	7206- B.TVP.U0	0.201
30	62	16	1.0	0.6	27.0	**20.40**	**13.40**	9000	13000	7206- B.TVP.UA	0.201
30	72	19	1.1	0.6	31.0	**32.50**	**20.00**	8000	11000	7306- B.TVP	0.349
30	72	19	1.1	0.6	31.0	**32.50**	**20.00**	8000	11000	7306- B.TVP.U0	0.349
30	72	19	1.1	0.6	31.0	**32.50**	**20.00**	8000	11000	7306- B.TVP.UA	0.349
35	72	17	1.1	0.6	31.0	**27.00**	**18.30**	8000	11000	7207- B.TVP	0.287
35	72	17	1.1	0.6	31.0	**27.00**	**18.30**	8000	11000	7207- B.TVP.U0	0.287
35	72	17	1.1	0.6	31.0	**27.00**	**18.30**	8000	11000	7207- B.TVP.UA	0.287
35	80	21	1.5	1.0	35.0	**39.00**	**25.00**	7000	9500	7307- B.TVP	0.456
35	80	21	1.5	1.0	35.0	**39.00**	**25.00**	7000	9500	7307- B.TVP.U0	0.456
35	80	21	1.5	1.0	35.0	**39.00**	**25.00**	7000	9500	7307- B.TVP.UA	0.456
40	80	18	1.1	0.6	34.0	**32.00**	**23,20**	7000	9500	7208- B.TVP	0.373
40	80	18	1.1	0.6	34.0	**32.00**	**23,20**	7000	9500	7208- B.TVP.U0	0.373
40	80	18	1.1	0.6	34.0	**32.00**	**23,20**	7000	9500	7208- B.TVP.UA	0.373
40	90	23	1.5	1.0	39.0	**50.00**	**32.50**	6300	8500	7308- B.TVP	0.626
40	90	23	1.5	1.0	39.0	**50.00**	**32.50**	6300	8500	7308- B.TVP.U0	0.626
40	90	23	1.5	1.0	39.0	**50.00**	**32.50**	6300	8500	7308- B.TVP.UA	0.626
45	85	19	1.1	0.6	37.0	**36.00**	**26.50**	6300	8500	7209- B.TVP	0.414
45	85	19	1.1	0.6	37.0	**36.00**	**26.50**	6300	8500	7209- B.TVP.U0	0.414
45	85	19	1.1	0.6	37.0	**36.00**	**26.50**	6300	8500	7209- B.TVP.UA	0.414
45	100	25	1.5	1.0	43.0	**60.00**	**40.00**	5600	7500	7309- B.TVP	0.835
45	100	25	1.5	1.0	43.0	**60.00**	**40.00**	5600	7500	7309- B.TVP.U0	0.835
45	100	25	1.5	1.0	43.0	**60.00**	**40.00**	5600	7500	7309- B.TVP.UA	0.835

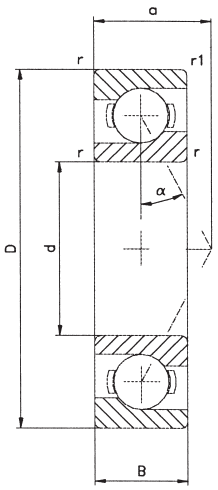
Angular ball bearings, single-row

Pressure angle alpha = 40°

B.TVP = Solid window-type cage of glass fibre intensified polyamide

B.TVP.UA = Solid window-type cage of glass fibre intensified polyamide, universal version for pairwise mounting, with thrust clearance (for pairwise mounting note lower limiting speed)

B.TVP.UO = Solid window-type cage of glass fibre intensified polyamide, unsiversal version for pairwise mounting, without clearance (for pairwise mounting note lower limiting speed)



Dimensions						Load ratings		Limiting speed		Bearing No.	Weight
d	D	B	r	r_1	a	dynamic C	static C_0	grease	oil		
mm	mm	mm	mm	mm	mm	kN	kN	min^{-1}	min^{-1}		kg
50	90	20	1.1	0.6	39.0	**37.50**	**28.50**	6000	8000	7210- B.TVP	0.466
50	90	20	1.1	0.6	39.0	**37.50**	**28.50**	6000	8000	7210- B.TVP.U0	0.466
50	90	20	1.1	0.6	39.0	**37.50**	**28.50**	6000	8000	7210- B.TVP.UA	0.466
50	110	27	2.0	1.0	47.0	**69.50**	**47.50**	5300	7000	7310- B.TVP	1.080
50	110	27	2.0	1.0	47.0	**69.50**	**47.50**	5300	7000	7310- B.TVP.U0	1.080
50	110	27	2.0	1.0	47.0	**69.50**	**47.50**	5300	7000	7310- B.TVP.UA	1.080
55	100	21	1.5	1.0	43.0	**46.50**	**36.00**	5300	7000	7211- B.TVP	0.633
55	100	21	1.5	1.0	43.0	**46.50**	**36.00**	5300	7000	7211- B.TVP.U0	0.633
55	100	21	1.5	1.0	43.0	**46.50**	**36.00**	5300	7000	7211- B.TVP.UA	0.633
55	120	29	2.0	1.0	51.0	**78.00**	**56.00**	4800	6300	7311- B.TVP	1.141
55	120	29	2.0	1.0	51.0	**78.00**	**56.00**	4800	6300	7311- B.TVP.U0	1.141
55	120	29	2.0	1.0	51.0	**78.00**	**56.00**	4800	6300	7311- B.TVP.UA	1.141
60	110	22	1.5	1.0	47.0	**56.00**	**44.00**	4800	6300	7212- B.TVP	0.798
60	110	22	1.5	1.0	47.0	**56.00**	**44.00**	4800	6300	7212- B.TVP.U0	0.798
60	110	22	1.5	1.0	47.0	**56.00**	**44.00**	4800	6300	7212- B.TVP.UA	0.798
60	130	31	2.1	1.1	55.0	**90.00**	**65.50**	4300	5600	7312- B.TVP	1.181
60	130	31	2.1	1.1	55.0	**90.00**	**65.50**	4300	5600	7312- B.TVP.U0	1.181
60	130	31	2.1	1.1	55.0	**90.00**	**65.50**	4300	5600	7312- B.TVP.UA	1.181
65	120	23	1.5	1.0	50.5	**64.00**	**53.00**	4500	6000	7213- B.TVP	1.030
65	120	23	1.5	1.0	50.5	**64.00**	**53.00**	4500	6000	7213- B.TVP.U0	1.030
65	120	23	1.5	1.0	50.5	**64.00**	**53.00**	4500	6000	7213- B.TVP.UA	1.030
65	140	33	2.1	1.1	60.0	**102.00**	**75.00**	4000	5300	7313- B.TVP	2.160
65	140	33	2.1	1.1	60.0	**102.00**	**75.00**	4000	5300	7313- B.TVP.U0	2.160
65	140	33	2.1	1.1	60.0	**102.00**	**75.00**	4000	5300	7313- B.TVP.UA	2.160
70	125	24	1.5	1.0	53.0	**69.50**	**58.50**	4300	5600	7214- B.TVP	1.140
70	125	24	1.5	1.0	53.0	**69.50**	**58.50**	4300	5600	7214- B.TVP.U0	1.140
70	125	24	1.5	1.0	53.0	**69.50**	**58.50**	4300	5600	7214- B.TVP.UA	1.140
70	150	35	2.1	1.1	64.0	**114.00**	**86.50**	3800	5000	7314- B.TVP	2.650
70	150	35	2.1	1.1	64.0	**114.00**	**86.50**	3800	5000	7314- B.TVP.U0	2.650
70	150	35	2.1	1.1	64.0	**114.00**	**86.50**	3800	5000	7314- B.TVP.UA	2.650

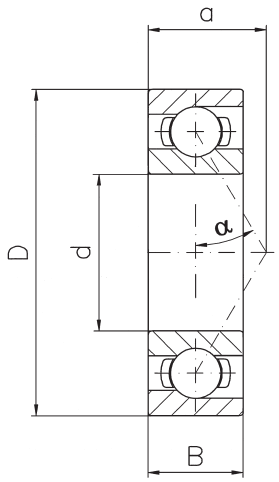
Further sizes are available on request.

Spindle bearings, single-row

C. = Pressure angle alpha = 15°

E. = Pressure angle alpha = 25°

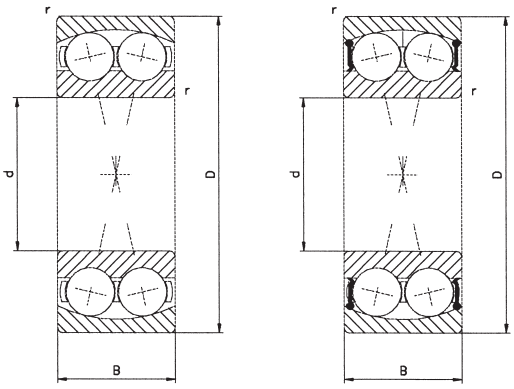
TPA.P4.UL = Solid window-type cage of textile laminated phenolic, tolerance class P4, universal version for pairwise mounting



Dimensions				Load ratings		Limiting speed		Bearing No.	Weight
d	D	B	a	dynamic C	static C_0	grease	oil		
mm	mm	mm	mm	kN	kN	min^{-1}	min^{-1}		kg
17	35	10	8	**8.65**	**4.90**	43000	63000	B7003-C.TPA.P4.UL	0.040
17	35	10	11	**8.30**	**4.75**	38000	56000	B7003-E.TPA.P4.UL	0.040
17	40	12	10	**10.80**	**5.85**	38000	56000	B7203-C.TPA.P4.UL	0.060
17	40	12	13	**10.40**	**5.60**	36000	53000	B7203-E.TPA.P4.UL	0.060
20	42	12	10	**10.00**	**6.00**	30000	40000	B7004-C.TPA.P4.UL	0.690
20	42	12	13	**9.50**	**5.70**	26000	36000	B7004-E.TPA.P4.UL	0.690
20	47	14	12	**12.90**	**7.50**	28000	38000	B7204- C.TPA.P4.UL	0.690
20	47	14	15	**12.50**	**7.20**	24000	34000	B7204- E.TPA.P4.UL	0.108
25	47	12	11	**11.00**	**7.20**	26000	36000	B7005- C.TPA.P4.UL	0.108
25	47	12	14	**10.60**	**6.95**	24000	34000	B7005- E.TPA.P4.UL	0.084
25	52	15	13	**14.60**	**9.30**	24000	34000	B7205- C.TPA.P4.UL	0.084
25	52	15	17	**13.70**	**8.80**	22000	32000	B7205- E.TPA.P4.UL	0.133
30	55	13	16	**14.30**	**10.00**	22000	32000	B7006- C.TPA.P4.UL	0.133
30	55	13	14	**13.40**	**9.50**	20000	30000	B7006- E.TPA.P4.UL	0.117
30	62	16	14	**20.80**	**13.70**	20000	30000	B7206- C.TPA.P4.UL	0.204
30	62	16	19	**20.00**	**13.20**	18000	26000	B7206- E.TPA.P4.UL	0.204
35	62	14	14	**16.30**	**12.20**	19000	28000	B7007- C.TPA.P4.UL	0.157
35	62	14	18	**15.60**	**11.40**	17000	24000	B7007- E.TPA.P4.UL	0.157
35	72	17	16	**25.50**	**18.00**	18000	26000	B7207- C.TPA.P4.UL	0.296
35	72	17	21	**24.50**	**17.00**	16000	26000	B7207- E.TPA.P4.UL	0.296
40	68	15	15	**17.30**	**14.00**	18000	26000	B7008- C.TPA.P4.UL	0.196
40	68	15	20	**16.60**	**13.20**	15000	20000	B7008- E.TPA.P4.UL	0.196
40	80	18	17	**34.50**	**23.20**	16000	22000	B7208- C.TPA.P4.UL	0.364
40	80	18	23	**32.50**	**22.40**	14000	19000	B7208- E.TPA.P4.UL	0.364
45	75	16	16	**23.20**	**18.30**	16000	22000	B7009- C.TPA.P4.UL	0.236
45	75	16	22	**22.00**	**17.30**	14000	19000	B7009- E.TPA.P4.UL	0.236
45	85	19	18	**40.50**	**29.00**	15000	20000	B7209- C.TPA.P4.UL	0.408
45	85	19	25	**39.00**	**27.50**	13000	18000	B7209- E.TPA.P4.UL	0.408
50	80	16	17	**24.50**	**20.80**	15000	20000	B7010- C.TPA.P4.UL	0.262
50	80	16	23	**23.20**	**20.00**	13000	18000	B7010- E.TPA.P4.UL	0.262
50	90	20	19	**45.00**	**32.50**	14000	19000	B7210- C.TPA.P4.UL	0.459
50	90	20	26	**42.50**	**31.50**	12000	17000	B7210- E.TPA.P4.UL	0.459
55	90	18	19	**34.00**	**28.50**	13000	18000	B7011- C.TPA.P4.UL	0.383
55	90	18	26	**32.50**	**27.00**	11000	16000	B7011- E.TPA.P4.UL	0.383
55	100	21	21	**53.00**	**40.00**	12000	17000	B7211- C.TPA.P4.UL	0.608
55	100	21	29	**50.00**	**38.00**	11000	16000	B7211- E.TPA.P4.UL	0.608
60	95	18	19	**35.50**	**30.50**	12000	17000	B7012- C.TPA.P4.UL	0.410
60	95	18	27	**33.50**	**29.00**	11000	16000	B7012- E.TPA.P4.UL	0.410
60	110	22	23	**64.00**	**49.00**	11000	16000	B7212- C.TPA.P4.UL	0.782
60	110	22	31	**61.00**	**47.50**	9500	14000	B7212- E.TPA.P4.UL	0.782

Further sizes are available on request.

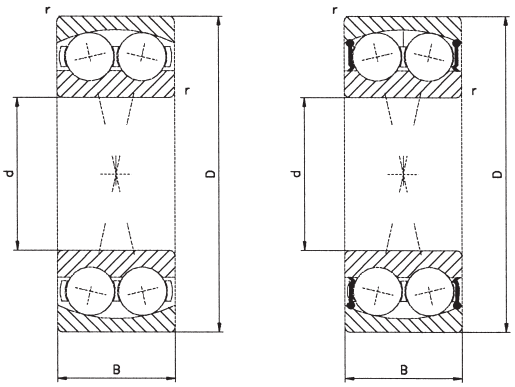
Self aligning ball bearings (DIN 630)



open 2RS

Dimensions				Load ratings · Faktor						Limiting speed		Bearing No.	Weight
d	D	B	r min.	dynamic C	$\frac{F_a}{F_r} \le e$	$\frac{F_a}{F_r} > e$		static C_0		grease	oil		
mm	mm	mm	mm	kN	e	y_1	y_2	kN	y_0	min^{-1}	min^{-1}		kg
10	30	9	0.6	**5.50**	**0.32**	**2.0**	**3.00**	**1.20**	**2.1**	24000	30000	1200	0.034
10	30	14	0.6	**8.30**	**0.58**	**1.1**	**1.70**	**1.73**	**1.1**	22000	28000	2200	0.045
10	30	14	0.6	**5.50**	**0.32**	**2.0**	**3.00**	**1.20**	**2.1**	18000		2200-2RS	0.045
10	35	11	0.6	**7.20**	**0.34**	**1.8**	**2.90**	**1.60**	**1.9**	20000	26000	1300	0.062
12	32	10	0.6	**5.60**	**0.37**	**1.7**	**2.60**	**1.27**	**1.8**	24000	30000	1201	0.041
12	32	14	0.6	**9.00**	**0.53**	**1.2**	**1.85**	**1.96**	**1.3**	20000	26000	2201	0.050
12	32	14	0.6	**5.60**	**0.37**	**1.7**	**2.60**	**1.27**	**1.8**	17000		2201-2RS	0.057
12	37	12	1.0	**9.36**	**0.35**	**1.8**	**2.80**	**2.16**	**1.9**	18000	22000	1301	0.073
15	35	11	0.6	**7.41**	**0.34**	**1.9**	**2.90**	**1.76**	**2.0**	20000	26000	1202	0.049
15	35	14	0.6	**9.15**	**0.46**	**1.4**	**2.10**	**2.08**	**1.5**	19000	24000	2202	0.057
15	35	14	0.6	**7.50**	**0.34**	**1.9**	**2.90**	**1.76**	**2.0**	15000		2202-2RS	0.060
15	42	13	1.0	**9.50**	**0.35**	**1.8**	**2.80**	**2.28**	**1.9**	17000	20000	1302	0.100
17	40	12	0.6	**8.00**	**0.33**	**1.9**	**3.00**	**2.04**	**2.0**	18000	22000	1203	0.074
17	40	16	0.6	**11.40**	**0.46**	**1.4**	**2.10**	**2.75**	**1.4**	16000	19000	2203	0.086
17	40	16	0.6	**8.00**	**0.33**	**1.9**	**3.00**	**2.04**	**2.0**	14000		2203-2RS	0.096
17	47	14	1.0	**12.50**	**0.32**	**1.9**	**3.00**	**3.20**	**2.0**	15000	18000	1303	0.136
20	47	14	1.0	**10.00**	**0.28**	**2.2**	**3.50**	**2.65**	**2.3**	15000	18000	1204	0.117
20	47	18	1.0	**14.30**	**0.44**	**1.5**	**2.20**	**3.55**	**1.5**	14000	17000	2204	0.136
20	47	18	1.0	**10.00**	**0.28**	**2.2**	**3.50**	**2.65**	**2.3**	11000		2204-2RS	0.148
20	52	15	1.1	**12.50**	**0.29**	**2.2**	**3.30**	**3.35**	**2.3**	13000	16000	1304	0.172
25	52	15	1.0	**12.20**	**0.27**	**2.4**	**3.70**	**3.35**	**2.5**	13000	16000	1205	0.137
25	52	18	1.0	**17.00**	**0.35**	**1.8**	**2.80**	**4.40**	**1.9**	12000	15000	2205	0.159
25	52	18	1.0	**12.20**	**0.27**	**2.4**	**3.70**	**3.35**	**2.5**	9500		2205-2RS	0.162
25	62	17	1.1	**18.00**	**0.28**	**2.3**	**3.50**	**5.00**	**2.4**	11000	14000	1305	0.275
30	62	16	1.0	**15.60**	**0.25**	**2.5**	**3.90**	**4.65**	**2.7**	11000	14000	1206	0.220
30	62	20	1.0	**25.50**	**0.30**	**2.1**	**3.30**	**6.95**	**2.2**	9500	12000	2206	0.259
30	62	20	1.0	**15.60**	**0.25**	**2.5**	**3.90**	**4.65**	**2.7**	8000		2206-2RS	0.268
30	72	19	1.1	**21.20**	**0.26**	**2.4**	**3.70**	**6.30**	**2.5**	9000	11000	1306	0.408
35	72	17	1.1	**16.00**	**0.22**	**2.8**	**4.30**	**5.20**	**2.9**	9500	12000	1207	0.329
35	72	23	1.1	**32.00**	**0.30**	**2.1**	**3.30**	**9.00**	**2.2**	8000	9500	2207	0.404
35	72	23	1.1	**16.00**	**0.22**	**2.8**	**4.30**	**5.20**	**2.9**	7000		2207-2RS	0.434
35	80	21	1.5	**25.00**	**0.26**	**2.5**	**3.80**	**8.00**	**2.6**	8000	9500	1307	0.535
40	80	18	1.1	**19.30**	**0.22**	**2.9**	**4.50**	**6.55**	**3.0**	8500	10000	1208	0.417
40	80	23	1.1	**31.50**	**0.26**	**2.4**	**3.80**	**9.50**	**2.5**	7500	9000	2208	0.488
40	80	23	1.1	**19.30**	**0.22**	**2.9**	**4.50**	**6.55**	**3.0**	6300		2208-2RS	0.515
40	90	23	1.5	**29.00**	**0.25**	**2.5**	**3.90**	**9.65**	**2.6**	7000	8500	1308	0.742
45	85	19	1.1	**22.00**	**0.21**	**3.0**	**4.70**	**7.35**	**3.2**	7500	9000	1209	0.463
45	85	23	1.1	**28.00**	**0.26**	**2.4**	**3.80**	**9.00**	**2.5**	7000	8500	2209	0.527
45	85	23	1.1	**22.00**	**0.21**	**3.0**	**4.70**	**7.35**	**3.2**	5600		2209-2RS	0.543
45	100	25	1.5	**38.00**	**0.25**	**2.5**	**3.90**	**12.90**	**2.6**	6300	7500	1309	0.994

Self aligning ball bearings



open 2RS

Dimensions				Load ratings · Faktor						Limiting speed		Bearing No.	Weight
d	D	B	r min.	dynamic C	$\frac{F_a}{F_r} \le e$	$\frac{F_a}{F_r} > e$		static C_0		grease	oil		
mm	mm	mm	mm	kN	e	y_1	y_2	kN	y_0	min^{-1}	min^{-1}		kg
50	90	20	1.1	**22.80**	**0.20**	**3.2**	**4.90**	**8.15**	**3.3**	7000	8500	1210	0.531
50	90	23	1.1	**28.00**	**0.24**	**2.6**	**4.10**	**9.50**	**2.7**	6700	8000	2210	0.567
50	90	23	1.1	**22.80**	**0.20**	**3.2**	**4.90**	**8.15**	**3.3**	5300		2210-2RS	0.595
50	110	27	2.0	**41.50**	**0.24**	**2.6**	**4.00**	**14.30**	**2.7**	5600	6700	1310	1.290
55	100	21	1.5	**27.00**	**0.19**	**3.3**	**5.10**	**10.00**	**3.5**	6300	7500	1211	0.693
55	100	25	1.5	**39.00**	**0.22**	**2.9**	**4.50**	**12.70**	**3.1**	5600	6700	2211	0.763
55	100	25	1.5	**27.00**	**0.19**	**3.3**	**5.10**	**10.00**	**3.5**	4800		2211-2RS	0.796
55	120	29	2.0	**51.00**	**0.24**	**2.7**	**4.10**	**18.00**	**2.8**	5000	6000	1311	1.640
60	110	22	1.5	**30.00**	**0.18**	**3.5**	**5.40**	**11.60**	**3.6**	5600	6700	1212	0.900
60	110	28	1.5	**47.50**	**0.23**	**2.7**	**4.20**	**16.60**	**2.8**	5300	6300	2212	1.080
60	110	28	1.5	**30.00**	**0.18**	**3.5**	**5.40**	**11.60**	**3.6**	4300		2212-2RS	1.110
60	130	31	2.1	**57.00**	**0.23**	**2.8**	**4.30**	**20.80**	**2.9**	4500	5300	1312	2.030

Further sizes are available on request.

Angle adjustments

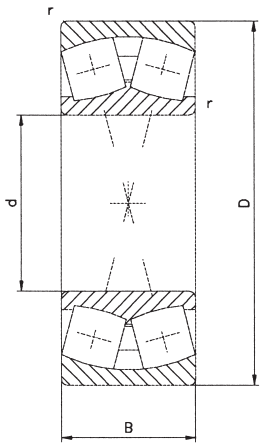
Self aligning ball bearings can be swiveled about 4° from the center position. Sealed self-aligning ball bearings up to a maximum of 1.5°.

Self aligning roller bearings (DIN 635 T2)

E = strengthened interior construction

A = steel retainer

B33 = lubrication groove and bore in outering



Dimensions				Load ratings · Factor						Limiting speed		Bearing No.	Weight
d	D	B	r min.	dynamic C	$\frac{F_a}{F_r} \le e$	$\frac{F_a}{F_r} > e$		static C_0		grease	oil		
mm	mm	mm	mm	kN	e	y_1	y_2	kN	y_0	min^{-1}	min^{-1}		kg
25	52	18	1.0	**43**	**0.34**	**2.0**	**2.9**	**43**	**1.9**	9100	11700	22205-EAB33	0.165
30	62	20	1.0	**57**	**0.31**	**2.2**	**3.2**	**61**	**2.1**	7600	9800	22206-EAB33	0.261
35	72	23	1.1	**76**	**0.31**	**2.2**	**3.2**	**85**	**2.1**	6500	8400	22207-EAB33	0.406
40	80	23	1.1	**88**	**0.28**	**2.4**	**3.6**	**95**	**2.3**	5800	7500	22208-EAB33	0.489
40	90	33	1.5	**130**	**0.36**	**1.9**	**2.8**	**147**	**1.8**	4300	5700	22308-EAB33	0.978
45	85	23	1.1	**92**	**0.26**	**2.6**	**3.9**	**108**	**2.6**	5400	6900	22209-EAB33	0.539
45	100	36	1.5	**160**	**0.36**	**1.9**	**2.8**	**183**	**1.9**	3800	4800	22309-EAB33	1.300
50	90	23	1.1	**99**	**0.24**	**2.8**	**4.2**	**116**	**2.8**	5000	6400	22210-EAB33	0.579
50	110	40	2.0	**193**	**0.36**	**1.9**	**2.8**	**224**	**1.8**	3400	4300	22310-EAB33	1.750
55	100	25	1.5	**118**	**0.23**	**2.9**	**4.4**	**142**	**2.9**	4500	5600	22211-EAB33	0.802
55	120	43	2.0	**228**	**0.36**	**1.9**	**2.8**	**265**	**1.8**	3200	4000	22311-EAB33	2.220
60	110	28	1.5	**143**	**0.24**	**2.8**	**4.2**	**170**	**2.8**	4000	5000	22212-EAB33	1.060
60	130	46	2.1	**265**	**0.35**	**1.9**	**2.8**	**310**	**1.9**	2800	3600	22312-EAB33	2.790
65	120	31	1.5	**173**	**0.24**	**2.8**	**4.2**	**212**	**2.8**	3600	4500	22213-EAB33	1.440
65	140	48	2.1	**285**	**0.34**	**2.0**	**3.0**	**310**	**2.0**	2600	3400	22313-EAB33	3.400
70	125	31	1.5	**181**	**0.23**	**2.9**	**4.4**	**231**	**2.9**	3600	4500	22214-EAB33	1.520
70	150	51	2.1	**325**	**0.34**	**2.0**	**3.0**	**390**	**2.0**	2400	3200	22314-EAB33	4.060
75	130	31	1.5	**187**	**0.22**	**3.1**	**4.6**	**245**	**3.0**	3400	4300	22215-EAB33	1.610
75	160	55	2.1	**380**	**0.34**	**2.0**	**3.0**	**455**	**1.9**	2200	3000	22315-EAB33	4.990

Further sizes are available on request.

Angle adjustments approx. 1°.

McGill self aligning roller bearing, single-row

McGill SPHERE-ROL bearings are dimensionally interchangeable with ordinary 2-row spherical roller bearings.
The main dimensions are according to ISO/R 15 and DIN 635 respectively DIN 616.
Misalignment up to ± 3° is accommodated by the unsealed versions and up to ± 2° by the sealed versions.

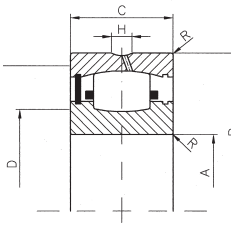
Radial clearance for ”SB” Bearings with straight bores

Basic bore diameter mm		Radial clearance in µm							
		C_2		Normal		C_3		C_4	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
14	24	10	20	20	36	36	46	46	61
24	30	15	25	25	41	41	56	56	71
30	40	15	30	30	46	46	61	61	81
40	50	20	36	36	56	56	76	76	99
50	65	25	43	43	66	66	91	91	119
65	80	30	51	51	81	81	112	112	145
80	100	36	63	63	99	99	135	135	180
100	120	43	79	79	122	122	163	163	211
120	140	51	97	97	145	145	191	191	241
140	160	61	109	109	165	165	221	221	279
160	180	66	119	119	180	180	241	241	310
180	200	71	130	130	201	201	262	262	338
200	225	81	140	140	221	221	290	290	378
225	250	91	150	150	241	241	320	320	419
250	280	99	170	170	262	262	351	351	457

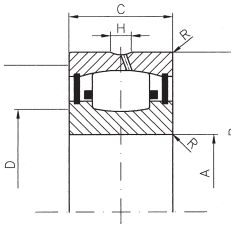
Radial clearance for ”SB” Bearings with tapered (”K” type) bore

Basic bore diameter mm		Radial clearance in µm							
		C_2		Normal		C_3		C_4	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
14	24	15	25	25	36	36	46	46	61
24	30	20	30	30	43	43	56	56	76
30	40	20	36	36	51	51	66	66	86
40	50	30	46	46	61	61	81	81	104
50	65	36	56	56	76	76	99	99	124
65	80	46	71	71	94	94	124	124	155
80	100	51	81	81	112	112	145	145	191
100	120	64	99	99	135	135	175	175	226
120	140	76	119	119	160	160	206	206	259
140	160	86	130	130	180	180	231	231	300
160	180	94	140	140	201	201	259	259	340
180	200	104	160	160	224	224	290	290	371
200	225	119	180	180	251	251	320	320	411
225	250	135	201	201	269	269	356	356	452
250	280	150	221	221	300	300	396	396	495

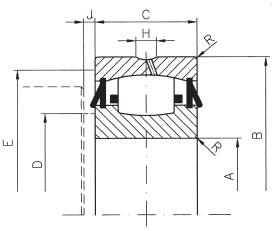
Self aligning roller bearings McGill



cylindrical bore



sealed



LAMBDA SEALS

Bearing No.	Bore		Outside diameter		Width			Shoulder dimensions				Limiting speed	Load ratings		Weight
	A	Toleran. *	B	Tolerance *	C	Toleran. *	r **	D	E	H	J min	oil ***	dynamic C	static C_0	
	mm	µm	mm	µm	mm	µm	mm	mm	mm	mm	mm	U/min	kN	kN	kg
SB 22204-W33-SS	20	-10	47	-13	18	-127	1.0	25.4	41.3	3.2	2.4	11000	**32.21**	**25.80**	0.150
SB 22205-W33-SS	25	-10	52	-13	18	-127	1.0	31.0	46.0	4.0	2.4	10000	**39.01**	**32.47**	0.180
SB 22206-W33-SS	30	-10	62	-13	20	-127	1.0	36.5	55.6	4.0	2.4	8100	**53.98**	**47.60**	0.290
SB 22207-W33-SS	35	-13	72	-13	23	-127	1.0	41.3	61.9	4.4	2.4	6800	**73.48**	**64.94**	0.430
SB 22208-W33-SS	40	-13	80	-13	23	-127	1.0	47.6	69.9	4.4	2.4	6000	**79.38**	**72.06**	0.540
SB 22209-W33-SS	45	-13	85	-15	23	-127	1.0	52.4	74.6	4.4	2.4	5600	**84.37**	**78.73**	0.590
SB 22210-W33-SS	50	-13	90	-15	23	-127	1.0	57.2	85.7	4.4	2.4	5250	**88.00**	**85.85**	0.640
SB 22211-W33-SS	55	-15	100	-15	25	-152	1.5	63.5	88.9	4.4	2.4	4650	**111.13**	**102.31**	0.860
SB 22212-W33-SS	60	-15	110	-15	28	-152	1.5	69.9	98.4	4.4	2.4	4200	**141.07**	**137.45**	1.018
SB 22213-W33-SS	65	-15	120	-15	31	-152	1.5	74.6	106.4	4.8	3.2	3800	**163.30**	**173.48**	1.540
SB 22215-W33-SS	75	-15	130	-20	31	-152	1.5	84.1	117.5	4.8	3.2	3500	**180.99**	**184.16**	1.770
SB 22216-W33-SS	80	-15	140	-20	33	-152	2.0	90.5	125.4	5.6	3.2	3250	**197.77**	**216.18**	2.090
SB 22217-W33-SS	85	-20	150	-20	36	-203	2.0	95.3	134.9	5.6	3.2	3000	**224.53**	**262.89**	2.680
SB 22218-W33-SS	90	-20	160	-25	40	-203	2.0	100.0	144.5	5.6	3.2	2800	**278.06**	**308.26**	3.040
SB 22219-W33-SS	95	-20	170	-25	43	-203	2.0	106.4	154.0	8.3	3.2	2650	**312.98**	**377.65**	4.170
SB 22220-W33-SS	100	-20	180	-25	46	-203	2.0	112.7	161.9	8.3	3.2	2500	**350.63**	**411.91**	5.040
SB 22222-W33-SS	110	-20	200	-31	53	-203	2.0	123.8	181.0	8.3	3.2	2200	**458.14**	**551.60**	7.210
SB 22224-W33-SS	120	-20	215	-31	58	-203	2.0	134.9	195.3	11.1	4.8	2050	**548.86**	**653.89**	8.980
SB 22226-W33-SS	130	-25	230	-31	64	-254	2.5	149.2	211.1	11.1	4.8	1900	**607.82**	**742.85**	11.300
SB 22228-W33-SS	140	-25	250	-31	68	-254	2.5	158.8	230.2	11.1	4.8	1750	**743.90**	**889.64**	14.200
SB 22230-W33-SS	150	-25	270	-36	73	-254	2.5	169.9	246.1	13.9	4.8	1600	**775.66**	**938.57**	17.900

*) Tolerances from 0 up to shown figure.
**) r = maximum fillet radius for shaft and housing.
***) Refers to oil lubrication and moderate load. For grease lubrication, use 1/2 of the values shown.

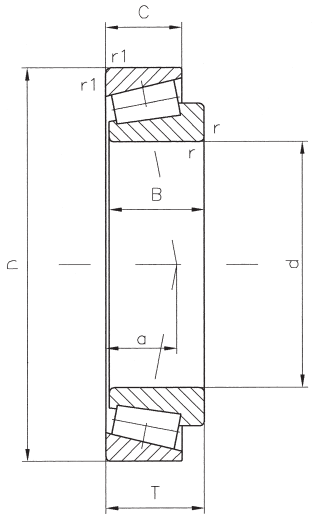
Consult factory for availability.

1. Add suffix **„K“** to indicate tapered bore bearing.
2. All sizes supplied with outer ring relubrication feature (-W33) unless otherwise specified. Consult factory for availability of non-W33.
3. Add suffix „-W22“ for selected OD.
4. Add suffix **„S“** to bearing number for single seal and **„SS“** for double seals. For tapered bore bearings using single seal, add suffix **„S“** to indicate seal on small bore side and **„SL“** to indicate seal on large bore side. For high temp. seals, use **„TS“, „TSS“**, and high temp. grease.
5. For LAMBDA seals, add suffix „YS“ to bearing number for single seal and „YSS“ for double seals. For tapered bore bearings, single LAMBDA sealed, add suffix „YS“ to indicate seal on small bore side and „YSL“ to indicate seal on large bore side.

CAUTION: Sizes SB 22202 through SB 22211 and SB 22214 and SB 22215, standard AFBMA locknuts and lockwashers will not clear LAMBDA seal I.D. unless 1/16" thick spacer is used between face of bearing and washer (or locknut).

6. For expansion-type bearing, add suffix „E“ to catalog number immediately after diametral clearance specifications."

Taper roller bearings with cylindrical bore (DIN ISO 355 und DIN 720)

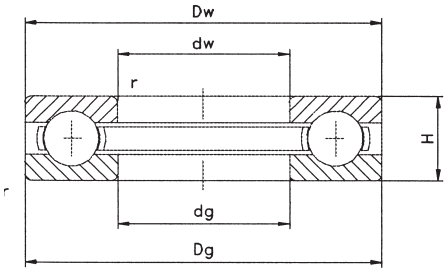


Dimensions							Load ratings					Limiting speed		Bearing No.	Weight
d	D	B	C	T	r,r_1 min.	a approx.	dynamic C	e	y	static C_0	y_0	grease	oil		
mm	mm	mm	mm	mm	mm	mm	kN			kN		min^{-1}	min^{-1}		kg
15	35	11	10	11.75	0.6	10	**12.0**	**0.46**	**1.3**	**12.0**	**0.7**	12000	17000	30202	0.055
15	42	13	11	14.25	1.0	10	**21.6**	**0.29**	**2.1**	**20.4**	**1.2**	10000	15000	30302	0.099
17	40	12	11	13.25	1.0	10	**18.6**	**0.35**	**1.7**	**19.6**	**1.0**	10000	15000	30203	0.081
17	47	14	12	15.25	1.0	10	**26.5**	**0.29**	**2.1**	**25.0**	**1.2**	9000	13000	30303	0.133
20	47	14	12	15.25	1.0	11	**26.5**	**0.35**	**1.7**	**27.5**	**1.0**	8500	12000	30204	0.129
20	52	15	13	16.25	1.5	11	**32.5**	**0.30**	**2.0**	**32.5**	**1.1**	8000	11000	30304	0.175
25	52	15	13	16.25	1.0	13	**30.5**	**0.37**	**1.6**	**34.5**	**0.9**	7500	10000	30205	0.157
25	62	17	15	18.25	1.5	13	**44.0**	**0.30**	**2.0**	**45.0**	**1.1**	6700	9000	30305	0.273
30	62	16	14	17.25	1.0	14	**41.5**	**0.37**	**1.6**	**48.0**	**0.9**	6300	8500	30206	0.240
30	72	19	16	20.75	1.5	15	**56.0**	**0.31**	**1.9**	**61.0**	**1.1**	5600	7500	30306	0.407
35	72	17	15	18.25	1.5	15	**50.0**	**0.37**	**1.6**	**58.5**	**0.9**	5300	7000	30207	0.341
35	80	21	18	22.75	1.5	16	**69.5**	**0.31**	**1.9**	**76.5**	**1.1**	5000	6700	30307	0.541
40	80	18	16	19.75	1.5	17	**58.5**	**0.37**	**1.6**	**67.0**	**0.9**	4800	6300	30208	0.436
40	90	23	20	25.25	1.5	20	**86.5**	**0.35**	**1.7**	**104.0**	**1.0**	4300	5600	30308	0.769
45	85	19	16	20.75	1.5	18	**67.0**	**0.40**	**1.5**	**83.0**	**0.8**	4300	5600	30209	0.499
45	100	25	22	27.25	1.5	21	**104.0**	**0.35**	**1.7**	**125.0**	**1.0**	3800	5000	30309	1.020
50	90	20	17	21.75	1.5	20	**75.0**	**0.42**	**1.4**	**96.5**	**0.8**	4000	5300	30210	0.566
50	110	27	23	29.25	2.0	23	**122.0**	**0.35**	**1.7**	**150.0**	**1.0**	3400	4500	30310	1.300

Further sizes are available on request.

Now also available noise tested version.

Deep groove ball thrust bearing (DIN 711)



Dimensions						Load ratings		Limiting speed		Bearing No.	Weight
d	dg	Dw	Dg	H	r min.	dynamic C	static C_0	grease	oil		
mm	mm	mm	mm	mm	mm	kN	kN	min^{-1}	min^{-1}		kg
10	11	24	24	9	0.3	**10.0**	**14.0**	7000	9500	51100	0.021
10	12	26	26	11	0.6	**12.7**	**17.0**	6000	8000	51200	0.031
12	13	26	26	9	0.3	**10.4**	**15.3**	6700	9000	51101	0.023
12	14	28	28	11	0.6	**13.2**	**19.0**	6000	8000	51201	0.034
15	16	28	28	9	0.3	**9.3**	**14.0**	6300	8500	51102	0.024
15	17	32	32	12	0.6	**16.6**	**25.0**	5000	6700	51202	0.046
17	18	30	30	9	0.3	**9.6**	**15.3**	6300	8500	51103	0.026
17	19	35	35	12	0.6	**17.3**	**27.5**	5000	6700	51203	0.053
20	21	35	35	10	0.3	**12.7**	**20.8**	5300	7000	51104	0.039
20	22	40	40	14	0.6	**22.4**	**37.5**	4300	5600	51204	0.083
25	26	42	42	11	0.6	**15.6**	**29.0**	4800	6300	51105	0.060
25	27	47	47	15	0.6	**28.0**	**50.0**	3800	5000	51205	0.115
30	32	47	47	11	0.6	**16.6**	**33.5**	4300	5600	51106	0.069
30	32	52	52	16	0.6	**22.5**	**47.5**	3600	4800	51206	0.134
35	37	52	52	12	0.6	**17.6**	**37.5**	4000	5300	51107	0.087
35	37	62	62	18	1.0	**35.5**	**67.0**	3000	4000	51207	0.215
40	42	60	60	13	0.6	**23.2**	**50.0**	3400	4500	51108	0.125
40	42	68	68	19	1.0	**46.5**	**98.0**	2800	3800	51208	0.278
45	47	65	65	14	0.6	**24.5**	**57.0**	3400	4500	51109	0.153
45	47	73	73	20	1.0	**39.0**	**80.0**	2600	3600	51209	0.302
50	52	70	70	14	0.6	**25.5**	**63.0**	3200	4300	51110	0.169
50	52	78	78	22	1.0	**50.0**	**106.0**	2400	3400	51210	0.371
55	57	78	78	16	0.6	**31.0**	**78.0**	2800	3800	51111	0.247
55	57	90	90	25	1.0	**61.0**	**134.0**	2200	3200	51211	0.586
60	62	85	85	17	1.0	**36.5**	**93.0**	2600	3600	51112	0.330
60	62	95	95	26	1.0	**62.0**	**140.0**	2000	3000	51212	0.651
65	67	90	90	18	1.0	**37.5**	**98.0**	2400	3400	51113	0.359
65	67	100	100	27	1.0	**64.0**	**150.0**	2000	3000	51213	0.737
70	72	95	95	18	1.0	**37.5**	**104.0**	2400	3400	51114	0.385
70	72	105	105	27	1.0	**65.5**	**160.0**	1900	2800	51214	0.783
75	77	100	100	19	1.0	**44.0**	**137.0**	2200	3200	51115	0.520
75	77	110	110	27	1.0	**67.0**	**170.0**	1900	2800	51215	0.827
80	82	105	105	19	1.0	**45.0**	**140.0**	2200	3200	51116	0.557
80	82	115	115	28	1.0	**75.0**	**190.0**	1800	2600	51216	0.908
85	87	110	110	19	1.0	**45.5**	**150.0**	2200	3200	51117	0.597
85	88	125	125	31	1.0	**98.0**	**250.0**	1600	2200	51217	1.220
90	92	120	120	22	1.0	**60.0**	**190.0**	1900	2800	51118	0.878
90	93	135	135	35	1.1	**120.0**	**300.0**	1500	2000	51218	1.680

Further sizes are available on request.

ASK Steel balls

Tolerances of hardened steel balls (DIN 5401, version 2002, 08)

Grade	Diameter of the ball		Tolerances of a ball in the lot			Tolerance		Sorting range and classification		
	Nominal size D_w		Size tolerance V_{Dws}	Shape tolerance tDw	Roughness R_a	of a lot V_{DwL} [1]	Sorting interval I_G; S_t			
	greater than	up to	max.	max.	max.	max.				
	mm		µm			µm		µm		
G3*)	-	12	0.08	0.08	0.01	0.13	0.5	-5…-0.5	0	+0.5…+5
G5*)	-	12	0.13	0.13	0.014	0.25	1	-5…-1	0	+1…+5
G10*)	-	25	0.25	0.25	0.02	0.5	1	-9…-1	0	+1…+9
G16*)	-	25	0.4	0.4	0.025	0.8	2	-10…-2	0	+2…+10
G20*)	-	38	0.5	0.5	0.032	1	2	-10…-2	0	+2…+10
G28*)	-	50	0.7	0.7	0.05	1.4	2	-12…-2	0	+2…+12
G40*)	-	100	1	1	0.06	2	4	-16…-4	0	+4…+16
G100	-	150	2.5	2.5	0.125	5	10	-40…-10	0	+10…+40
G200	-	150	5	5	0.2	10	15	-60…-15	0	+15…+60
G500	-	25	25	25	-	50	50	-50	0	+50
	25	50	25	25	-	75	75	-75	0	-75
	50	75	25	25	-	100	100	-100	0	+100
	75	100	32	32	-	125	125	-125	0	+125
	100	125	38	38	-	150	150	-150	0	+150
	125	150	44	44	-	175	175	-175	0	+175
G600	all	-	-	-	-	400	-		0	
G700	all	-	-	-	-	2000	-		0	

[1] Tolerance V_{DwA} at G500 to 700 instead of V_{DwL} *) only upon request

Hardness of hardened roller bearing steels in accordance with DIN 17 230

D_w		
greater than	up to	hardness*)
-	12.7	740 up to 900 HV 10**)
12.7	50.8	60 up to 66 HRC
50.8	70	59 up to 65 HRC
70	120	57 up to 63 HRC
120	150	55 up to 61 HRC

*) Surface hardness
These hardness values are attained during heat treatment. The subsequent hardness processing causes cold solidification in the outer marginal zone, leading to certain hardness increases that cannot be calculated for. In the surface region, the upper limit value thus may be slightly exceeded.
For large balls, the core hardness may be slightly less than the values measured in the marginal zones.

**) 62 to 67 HRC are also admissible; the Vickers test is, however, binding.

Tolerances of hardened balls made of stainless steel (DIN 5401, version 2002,08)

Diameter of the ball		Tolerances of a ball in the lot		Tolerance		Sorting range and classification						
Nominal size D_w		Size tolerance V_{Dws}	Shape tolerance t_{Dw}	of a lot V_{DwA}	Sorting interval I_G							
greater than	up ro	max.	max.	max.								
mm		µm		µm		µm						
-	25	1	2	4	4	-20	-8	-4	0	+4	+8	+20
25	50	1.5	3	6	6	-24	-12	-6	0	+6	+12	+24
50	75	2	4	8	8	-32	-16	-8	0	+8	+16	+32
75	100	2.5	5	10	10	-40	-20	-10	0	+10	+20	+40
100	125	3	6	12	12	-48	-24	-12	0	+12	+24	+48
125	150	3.5	7	14	14	-56	-28	-14	0	+14	+28	+56

Tolerances of non heat-treatable balls made of stainless steel (DIN 5401 T1, version 2002,08)
Copper-tin alloy
Copper-zinc alloy

Diameter of the ball		Tolerances of a ball in the lot		Tolerance		Sorting range and classification						
Nominal size D_w		Size tolerance V_{Dws}	Shape tolerance t_{Dw}	of a lot V_{DwA}	Sorting interval I_G							
greater than	up to	max.	max.	max.								
mm		µm		µm		µm						
-	25	5	10	20	20	-60	-40	-20	0	+20	+40	+60
25	50	7.5	15	30	30	-90	-60	-30	0	+30	+60	+90
50	75	10	20	40	40	-120	-80	-40	0	+40	+80	+120

Hardness and materials

Class	Material No.	Abbreviation, alloy	Hardness	
Stainless steel			$D_w \leq 12{,}7$ mm	$D_w \leq 12{,}7$ mm
	1.3541	X 45 Cr 13	580 to 700 HV 10	54 to 60 HRC
heat treatable	1.4034	X 46 Cr 13	580 to 700 HV 10	54 to 60 HRC
hardened	1.4037	X 65 Cr 13	640 to 780 HV 10	57 to 63 HRC
in accordance	1.3543	X 102 Cr Mo 17	640 to 780 HV 10	57 to 63 HRC
with DIN 17 230	1.3549	X 89 Cr Mo V 18 l	640 to 780 HV 10	57 to 63 HRC
non heat-treatable	1.4301	X 5 Cr Ni 18 10	135 to 200 HV 10	
in accordance	1.4571	X 6 Cr Ni Mo Ti 17 12 2	135 to 200 HV 10	
wtih DIN 17 440	1.4580	X 6 Cr Ni Mo Nb 17 12 2	135 to 200 HV 10	
Copper-zinc alloy	2.1030	Cu Sn 8	200 to 220 HB	
in accordance				
with DIN 17 662				
Copper-tin alloy	2.0321	Cu Zn 37	180 to 200 HB	
in accordance	2.0360	Cu Zn 40	180 to 200 HB	
with DIN 17 660				

Bore diameter and weights for steel balls made of through-hardened bearing steel

Bore diameter of steel ball D_w mm (Inch)	Weight 1000 piece *(7.85 g/cm²)* kg wppr.
1.588 (1/16 Inch)	0.0165
2	0.0329
2.381 (3/32 Inch)	0.0555
2.5	0.0642
3	0.1110
3.175 (1/8 Inch)	0.1320
3.5	0.1760
3.969 (5/32 Inch)	0.2570
4	0.2630
4.5	0.3750
4.762 (3/16 Inch)	0.4440
5	0.5140
5.5	0.6840
5.556 (7/32 Inch)	0.7050
6	0.8880
6.350 (1/4 Inch)	1.0500
6.5	1.1300
7	1.4100
7.144 (9/32 Inch)	1.5000
7.5	1.7300
7.938 (5/16 Inch)	2.0600
8	2.1100
8.5	2.5200
8.731 (11/32 Inch)	2.7400
9	3.0000
9.525 (3/8 Inch)	3.5500
10	4.1100
10.319 (13/32 Inch)	4.5200
11	5.4700
11.112 (7/16 Inch)	5.6400
11.906 (15/32 Inch)	6.9400
12	7.1000
12.5	8.0300
12.7	8.4200
13	9.0300
13.494 (17/32 Inch)	10.1000
14	11.3000
14.288 (9/16 Inch)	12.0000
15	13.9000
15.081 (19/32 Inch)	14.1000
15.875 (5/8 Inch)	16.4000
16	16.8000
16.669 (21/32 Inch)	19.0000
17	20.2000
17.462 (11/16 Inch)	21.9000
18	24.0000
18.256 (23/32 Inch)	25.0000
19	28.2000
19.05 (3/4 Inch)	28.4000
19.844 (25/32 Inch)	32.1000
20	32.9000
20.638 (13/16 Inch)	36.1000
21	38.1000
22	43.8000
22.225 (7/8 Inch)	45.1000
23.812 (15/16 Inch)	55.5000
24	56.8000
25	64.2000

Bore diameter and weights for steel balls made of hardened stainless steel

Bore diameter of steel ball D_w mm (Inch)	Weight 1000 piece *(7.7 g/cm²)* kg appr.
1.588 (1/16 Inch)	0.0136
2	0.0323
2.381 (3/32 Inch)	0.0544
2.5	0.0630
3	0.1090
3.175 (1/8 Inch)	0.1270
3.5	0.1730
3.969 (5/32 Inch)	0.2520
4	0.2580
4.5	0.3670
4.762 (3/16 Inch)	0.4350
5	0.5040
5.5	0.6710
5.556 (7/32 Inch)	0.6910
6	0.8710
6.350 (1/4 Inch)	1.0300
6.5	1.1070
7	1.3800
7.144 (9/32 Inch)	1.4700
7.5	1.7000
7.938 (5/16 Inch)	2.0200
8	2.0600
8.5	2.4760
8.731 (11/32 Inch)	2.6800
9	2.9400
9.525 (3/8 Inch)	3.4800
10	4.0300
10.319 (13/32 Inch)	4.4300
11	5.3660
11.112 (7/16 Inch)	5.5300
11.906 (15/32 Inch)	6.8040
12	6.9700
12.5	7.8700
12.7	8.2600
13	8.8600
13.494 (17/32 Inch)	9.9060
14	11.1000
14.288 (9/16 Inch)	11.7600
15	13.6000
15.081 (19/32 Inch)	13.8280
15.875 (5/8 Inch)	16.1000
16	16.5000
16.669 (21/32 Inch)	18.6730
17	19.8070
17.462 (11/16 Inch)	21.4700
18	23.5000
18.256 (23/32 Inch)	24.5300
19	27.6500
19.05 (3/4 Inch)	27.9000
19.844 (25/32 Inch)	31.5000
20	32.3000
20.638 (13/16 Inch)	35.4400
21	37.3400
22	42.9000
22.225 (7/8 Inch)	44.2600
23.812 (15/16 Inch)	54.4300
24	55.7340
25	63.0000

Further sizes are available on request.