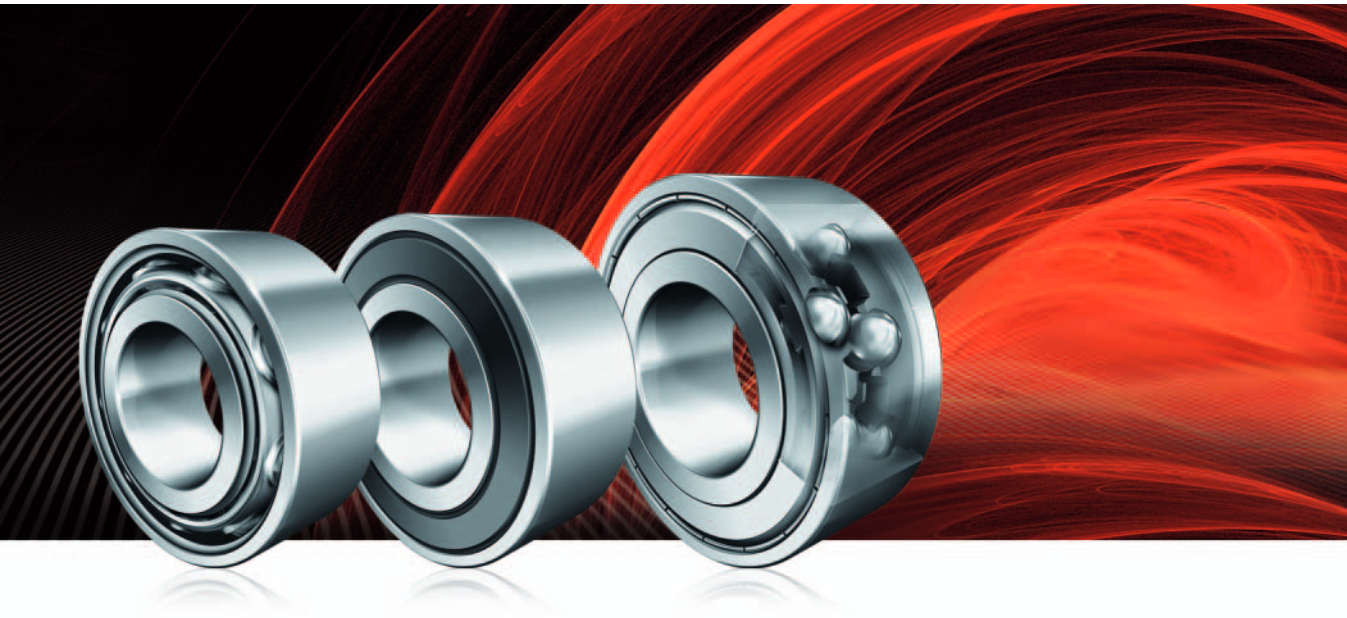
FAG



# Double Row Angular Contact Ball Bearings

X-life quality

SCHAEFFLER

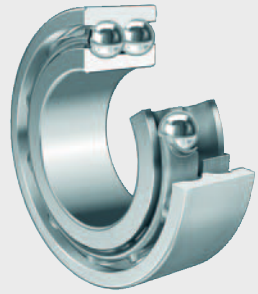
# Double row angular contact ball bearings


| | | Page |
|---|---|---|
| **Product overview** | Double row angular contact ball bearings | 2 |
| **Features** | X-life | 3 |
| | Radial and axial load carrying capacity | 4 |
| | Without filling slot | 4 |
| | Sealing | 4 |
| | Lubrication | 4 |
| | Operating temperature | 5 |
| | Cages | 5 |
| | Suffixes | 6 |
| **Design and safety guidelines** | Equivalent dynamic bearing load | 7 |
| | Equivalent static bearing load | 7 |
| | Minimum radial load | 7 |
| | Speeds | 7 |
| | Design of bearing arrangements | 8 |
| **Accuracy** | Axial internal clearance | 10 |
| **Dimension tables** | Angular contact ball bearings, double row, open or sealed | 12 |

**Double row**

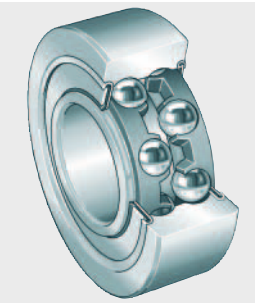
32..-BD, 33..-BD

32..-BD, 33..-BD

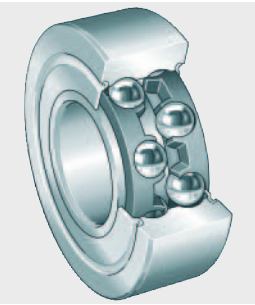



**Lip seals or gap seals**

32..-BD-2HRS, 33..-BD-2HRS




32..-BD-2Z, 33..-BD-2Z



# Double row angular contact ball bearings

## Features

Double row angular contact ball bearings are units with solid inner and outer rings and ball and cage assemblies with polyamide or sheet steel cages. Their construction is similar to a pair of single row angular contact ball bearings in an O arrangement but they are narrower to a certain extent.

The bearings are available in open and sealed designs. Due to the manufacturing processes used, open bearings can have turned recesses in the outer ring for seals or shields. Sealed bearings are maintenance-free and therefore allow particularly economical bearing arrangements.

Due to the raceway geometry and the two rows of balls, the bearing can support forces in both radial and axial directions. They are therefore particularly suitable for use in pumps and agricultural machinery. Furthermore, double row angular contact ball bearings are used in applications including conveying equipment, packaging equipment, elevators and compressors.

The angular adjustment facility of angular contact ball bearings is very limited. The adjustment angle should not exceed 2′.

**X-life** Bearings of X-life quality have improved running accuracy and optimised surfaces. This gives a significant increase in the fatigue limit load of the bearings. In terms of the expanded adjusted rating life, values up to 50% are achieved. In certain applications, this means that a smaller bearing arrangement can be designed.

**Lower noise levels** Due to the higher ball quality, improved raceway surfaces and the more precise dimensional and running tolerances to tolerance class P6, the internal friction in the bearings as well as the noise level of the application during operation is reduced.

**Reduced friction** Lower friction leads to reduced heat generation and thus a longer grease operating life. As a result, higher speeds or an extended operating life of the bearing can be achieved. In addition, this increases the energy efficiency of the application.

**Improved sealing** The innovative seal HRS is in axial contact with the inner ring in an undercut. It thus offers the optimum combination of maximum sealing effectiveness and minimal friction.

**Higher cost-effectiveness** Overall, these measures lead to greater economic benefit for the user. Double row angular contact ball bearings of X-life quality offer a longer operating life, especially in use under axial load conditions. The maintenance intervals in the specific applications can thus be extended. Due to the reduced friction, savings on energy consumption and operating costs can be achieved.

## Radial and axial load carrying capacity

Double row angular contact ball bearings can support axial loads in both directions and high radial loads. They are particularly suitable for bearing arrangements where rigid axial guidance is required.

The axial load carrying capacity is dependent on the contact angle; i. e. the larger the angle ($\alpha$ = 30°), the higher the axial load to which the bearing can be subjected.

## Without filling slot

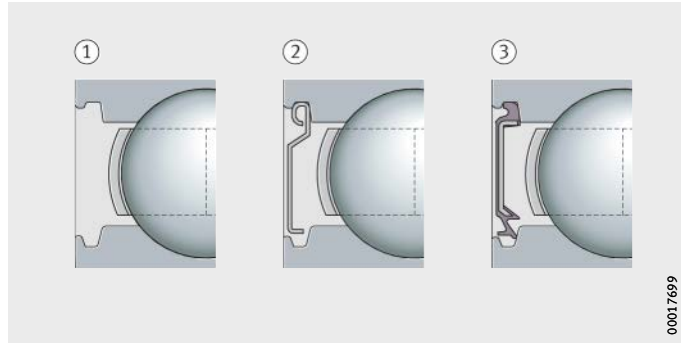
Bearings of series 32..-BD and 33..-BD are self-retaining and do not have filling slots in the end faces of the bearing rings. The contact angle is $\alpha$ = 30°. Their axial load carrying capacity is the same in both directions. These bearings are highly versatile.

## Sealing

Series 32..-BD and 33..-BD with the suffixes 2HRS are sealed by lip seals on both sides. Contact seals are suitable for giving protection against dust, contamination and damp atmospheres. The new design of lip geometry, with axial contact and a dust deflector, has lower friction and thus generates less heat. This allows higher speeds.

Series with the suffix 2Z have gap seals of a labyrinth design on both sides. The undercuts and the sealing shield geometry are matched to each other.

Both sealing systems 2Z and 2HRS offer reliable protection against the egress of grease from the bearing and the ingress of contamination into the bearing.




① Open bearing
② Gap seals on both sides (2Z)
③ Lip seals on both sides (2HRS)

*Figure 1*
Available designs

## Lubrication

Sealed bearings are greased with a high quality grease and are lubricated for life. Open bearings are preserved using oil.
In addition to the standard grease, special greases are also available by agreement for particular operating conditions.

## Operating temperature

Open bearings are suitable, depending on their outside diameter, for different operating temperature ranges. Bearings are available by agreement for temperatures up to +200 °C. For standard bearings, see table.

### Operating temperature ranges

| Outside diameter<br>mm | Operating temperature<br>°C |
|---|---|
| ≦ 90 | –30 to +120 |
| > 90 | –30 to +150 |

Bearings with cages made from glass fibre reinforced polyamide are suitable for operating temperatures up to +120 °C, restricted by the cage material.

Bearings with the suffix 2HRS are suitable up to +110 °C, restricted by the lubricant and seal material.

## Cages

Bearings without a cage suffix have standard cages made from sheet steel.

The new sheet steel cages are of an optimised design and are suitable for temperatures up to +200 °C. They are therefore more rigid and thus more robust and generate less operating noise. The grease is distributed better and the bearing operating life is extended. Upon customer request, steel cages can be made more resistant to chemical fluids by means of coatings and special heat treatments.

Angular contact ball bearings with cages made from glass fibre reinforced polyamide have the suffix TVH.

The revised polyamide cages were optimised on the basis of objectives similar to those for the steel cages: higher rigidity, better grease distribution, reduced energy consumption and thus lower generation of heat and noise. This allows higher speeds as well as a longer grease and bearing operating life.

Available standard designs, see table.

### Cage and bore code

| Series | Polyamide cage[1)] | Sheet steel cage[1)] |
|---|---|---|
| | Bore code | |
| 32..-BD | 02 to 13 | 02 to 13 |
| 33..-BD | 02 to 11 | 04 to 11 |

[1)] Other cage designs are available by agreement. In such cages, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for bearings with standard cages.

Check the chemical resistance of the polyamide to synthetic greases and lubricants with EP additives.

Aged oil and additives in the oil can impair the operating life of plastic cages at high temperatures.

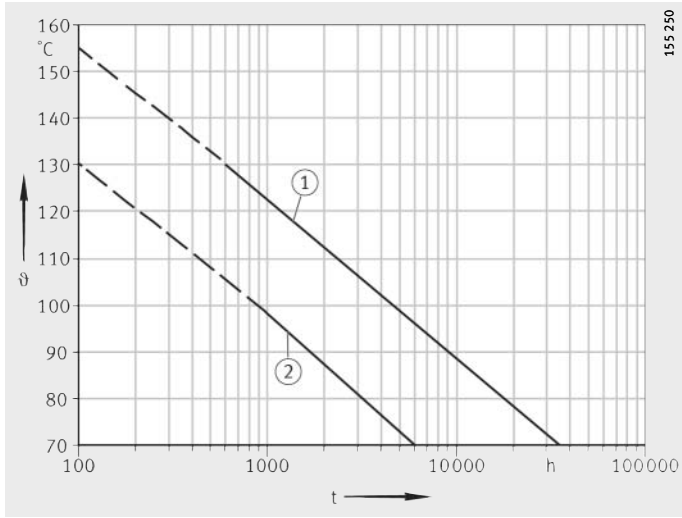
The oil change intervals must be observed.

### Oil changes

At temperatures in the bearing of less than +50 °C and with only slight contamination, an oil change once per year is generally sufficient.

Guide values for oil change intervals are given in *Figure 2*.

The precise oil change intervals should be agreed in consultation with the oil manufacturer.




ϑ = oil sump temperature
t = oil change interval

① Synthetic gearbox oils
② Mineral gearbox oils
Source: FVA Project No. 171

*Figure 2*
Oil change intervals

## Suffixes

Suffixes for available designs: see table.

### Available designs

| Suffix | Description | Design |
|---|---|---|
| BD | Modified internal construction, contact angle $\alpha$ = 30°, without filling slot | Standard |
| TVH | Solid polyamide snap cage, ball-guided | |
| 2HRS | Lip seals on both sides | |
| 2Z | Gap seals on both sides | |
| C2 | Axial internal clearance C2 | Special design, available by agreement |
| C3 | Axial internal clearance C3 | |
| C4 | Axial internal clearance C4 | |
| RROC | Corrotect® coating | |
| S0 | Dimensional stabilisation | |
| S1 | Dimensional stabilisation | |

## Design and safety guidelines

### Equivalent dynamic bearing load

The equivalent dynamic bearing load P is valid for bearings that are subjected to radial and axial dynamic loads. It gives the same rating life as the combined bearing load occurring in practice.

For bearings under dynamic loading, the following applies:

**Contact angle 30°**

| Load ratio | Equivalent dynamic bearing load |
|---|---|
| $\frac{F_a}{F_r} \leq 0,8$ | $P = F_r + 0,78 \cdot F_a$ |
| $\frac{F_a}{F_r} > 0,8$ | $P = 0,63 \cdot F_r + 1,24 \cdot F_a$ |

$F_a$ N
Axial dynamic bearing load
$F_r$ N
Radial dynamic bearing load
P N
Equivalent dynamic bearing load for combined load.

### Equivalent static bearing load

The equivalent static bearing load for combined loads $P_0$ is valid for bearings that are subjected to radial and axial static loads.

It induces the same load at the centre point of the most heavily loaded contact point between the rolling element and raceway as the combined bearing load occurring in practice.

**Contact 30°** For bearings under static loading, the following applies:

$$P_0 = F_{0r} + 0,66 \cdot F_{0a}$$

$P_0$ N
Equivalent static bearing load for combined load
$F_{0a}$ N
Axial static bearing load
$F_{0r}$ N
Radial static bearing load.

### Minimum radial load

In order to ensure slippage-free operation, the bearings must be subjected to a minimum radial load. This applies particularly in the case of high speeds and high accelerations. In continuous operation, a minimum radial load of the order of $P/C_r > 0,01$ is necessary for ball bearings with cage.

### Speeds

The reference speed $n_B$ can be exceeded up to the limiting speed $n_G$ if permitted by the operating conditions. If the reference speed in the tables is higher than the limiting speed, the higher value cannot be used.

In bearings with lip seals 2HRS, the speed is limited by the permissible sliding speed of the sealing lips, so only the limiting speed is given in the dimension tables.

The limiting speed $n_G$ given in the dimension tables must not be exceeded.

## Design of bearing arrangements

In order to make comprehensive use of the performance capacity of the bearings, the adjacent construction must be of an appropriate design.

### Shaft and housing tolerances

The recommended shaft tolerances for radial bearings with a cylindrical bore must be observed, see table.

The recommended housing tolerances for radial bearings must be observed, see table, page 9.

### Shaft tolerances for radial bearings with cylindrical bore

| Conditions of rotation | Bearing type | Shaft diameter mm | Displacement capability, load | Tolerance zone |
|---|---|---|---|---|
| Point load on inner ring | Ball bearings, roller bearings | All sizes | Inner ring easily displaced | g6 (g5) |
| | | | Inner ring not easily displaced | h6 (j6) |
| | | | Angular contact ball bearings and tapered roller bearings with adjusted inner ring | |
| Circumferential load on inner ring or indeterminate load direction | Ball bearings | up to 50 | Normal loads[2] | j6 (j5) |
| | | 50 to 100 | Low loads[3] | j6 (j5) |
| | | | Normal and high loads[4] | k6 (k5) |
| | | 100 to 200 | Low loads[2] | k6 (m6) |
| | | | Normal and high loads[5] | m6 (m5) |
| | | over 200 | Low loads | m6 (m5) |
| | | | Normal and high loads | n6 (n5) |

1) For easier fitting.

2) $C/P > 10$.

3) $C/P > 12$.

4) $C/P < 12$.

5) $C/P < 10$.

## Housing tolerances for radial bearings

| Conditions of rotation | Displacement capability, load | Operating conditions | Tolerance zone |
|---|---|---|---|
| Point load on outer ring | Outer ring easily displaced, housing unsplit | The tolerance grade is determined by the running accuracy required | H7 (H6)[1] |
| | Outer ring easily displaced, housing split | | H8 (H7) |
| | Outer ring not easily displaced, housing unsplit | High running accuracy required | H6 (J6) |
| | Outer ring not easily displaced, angular contact ball bearings and tapered roller bearings with adjusted outer ring, housing split | Normal running accuracy | H7 (J7) |
| | Outer ring easily displaced | Heat input via shaft | G7[2] |
| Circumferential load on outer ring or indeterminate load direction | Low loads, outer ring cannot be displaced | With high requirements for running accuracy K6, M6, N6 and P6 | K7 (K6) |
| | Normal loads, shocks, outer ring cannot be displaced | | M7 (M6) |
| | High loads, shocks ($C/P < 6$), outer ring cannot be displaced | | N7 (N6) |
| | High loads, severe shocks, thin-walled housing, outer ring cannot be displaced | | P7 (P6) |

1) G7 for housings made from GG, if bearing outside diameter $D > 250$ mm and temperature difference between outer ring and housing $> 10$ K.

2) F7 for housings made from GG, if bearing outside diameter $D > 250$ mm and temperature difference between outer ring and housing $> 10$ K.

## Mounting dimensions

The dimension tables give the maximum dimension of the radius $r_a$ and the diameters of the abutment shoulders $D_a$ and $d_a$.

## Accuracy

The main dimensions of the bearings conform to DIN 628-3.

The dimensional and geometrical tolerances of the bearings correspond to tolerance class P6 to DIN 620-2.

## Axial internal clearance

Double row angular contact ball bearings of the basic design have the normal axial internal clearance (CN), see table. Bearings are available by agreement with a larger (C3, C4) or smaller (C2) axial internal clearance.

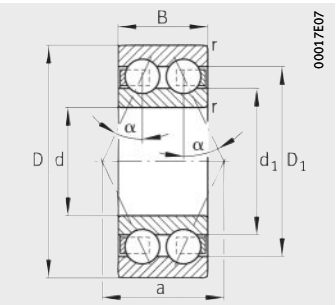
**Axial internal clearance to DIN 628-3 for bearings with unsplit inner ring**

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

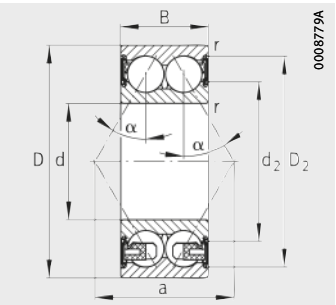
# Angular contact ball bearings

Double row
Open or sealed

X-life



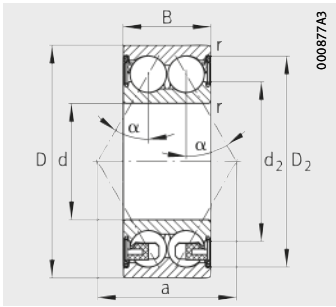

32..-BD, 33..-BD
$\alpha = 30°$



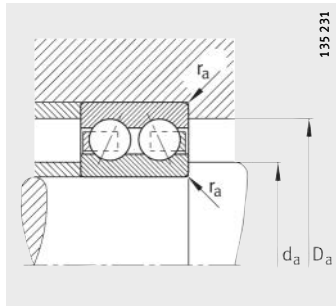

32..-BD-2HRS, 33..-BD-2HRS
$\alpha = 30°$

**Dimension table** · Dimensions in mm

| Designation | | | Mass | Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Series 32 | Series 33 | X-life | m ≈ kg | d | D | B | r min. | $D_1$ ≈ | $D_2$ ≈ |
| **3202-BD** | – | **XL** | 0,065 | **15** | 35 | 15,9 | 0,6 | 29,4 | – |
| **3202-BD-TVH** | – | **XL** | 0,066 | **15** | 35 | 15,9 | 0,6 | 29,4 | – |
| **3202-BD-2HRS** | – | **XL** | 0,068 | **15** | 35 | 15,9 | 0,6 | – | 31,1 |
| **3202-BD-2HRS-TVH** | – | **XL** | 0,065 | **15** | 35 | 15,9 | 0,6 | – | 31,1 |
| **3202-BD-2Z** | – | **XL** | 0,068 | **15** | 35 | 15,9 | 0,6 | – | 31,1 |
| **3202-BD-2Z-TVH** | – | **XL** | 0,065 | **15** | 35 | 15,9 | 0,6 | – | 31,1 |
| – | **3302-BD-TVH** | **XL** | 0,124 | **15** | 42 | 19 | 1 | 35,7 | – |
| – | **3302-BD-2HRS-TVH** | **XL** | 0,122 | **15** | 42 | 19 | 1 | – | 37,9 |
| – | **3302-BD-2Z-TVH** | **XL** | 0,122 | **15** | 42 | 19 | 1 | – | 37,9 |
| **3203-BD** | – | **XL** | 0,094 | **17** | 40 | 17,5 | 0,6 | 33,9 | – |
| **3203-BD-TVH** | – | **XL** | 0,095 | **17** | 40 | 17,5 | 0,6 | 33,9 | – |
| **3203-BD-2HRS** | – | **XL** | 0,098 | **17** | 40 | 17,5 | 0,6 | – | 36,1 |
| **3203-BD-2HRS-TVH** | – | **XL** | 0,093 | **17** | 40 | 17,5 | 0,6 | – | 36,1 |
| **3203-BD-2Z** | – | **XL** | 0,098 | **17** | 40 | 17,5 | 0,6 | – | 36,1 |
| **3203-BD-2Z-TVH** | – | **XL** | 0,094 | **17** | 40 | 17,5 | 0,6 | – | 36,1 |
| – | **3303-BD-TVH** | **XL** | 0,177 | **17** | 47 | 22,2 | 1 | 39 | – |
| – | **3303-BD-2HRS-TVH** | **XL** | 0,176 | **17** | 47 | 22,2 | 1 | – | 41,1 |
| – | **3303-BD-2Z-TVH** | **XL** | 0,176 | **17** | 47 | 22,2 | 1 | – | 41,1 |
| **3204-BD** | – | **XL** | 0,153 | **20** | 47 | 20,6 | 1 | 40,1 | – |
| **3204-BD-TVH** | – | **XL** | 0,154 | **20** | 47 | 20,6 | 1 | 40,1 | – |
| **3204-BD-2HRS** | – | **XL** | 0,157 | **20** | 47 | 20,6 | 1 | – | 42,2 |
| **3204-BD-2HRS-TVH** | – | **XL** | 0,149 | **20** | 47 | 20,6 | 1 | – | 42,2 |
| **3204-BD-2Z** | – | **XL** | 0,157 | **20** | 47 | 20,6 | 1 | – | 42,2 |
| **3204-BD-2Z-TVH** | – | **XL** | 0,153 | **20** | 47 | 20,6 | 1 | – | 42,2 |
| – | **3304-BD** | **XL** | 0,217 | **20** | 52 | 22,2 | 1,1 | 44 | – |
| – | **3304-BD-TVH** | **XL** | 0,215 | **20** | 52 | 22,2 | 1,1 | 44 | – |
| – | **3304-BD-2HRS** | **XL** | 0,223 | **20** | 52 | 22,2 | 1,1 | – | 46,1 |
| – | **3304-BD-2HRS-TVH** | **XL** | 0,217 | **20** | 52 | 22,2 | 1,1 | – | 46,1 |
| – | **3304-BD-2Z** | **XL** | 0,222 | **20** | 52 | 22,2 | 1,1 | – | 46,1 |
| – | **3304-BD-2Z-TVH** | **XL** | 0,214 | **20** | 52 | 22,2 | 1,1 | – | 46,1 |




32..-BD-2Z, 33..-BD-2Z
$\alpha = 30°$



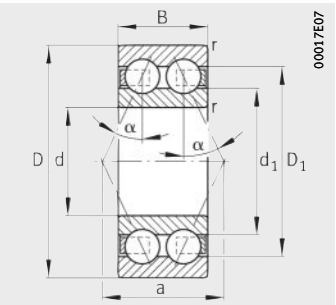

Mounting dimensions

| | | | Mounting dimensions | | | Basic load ratings | | Fatigue limit load | Limiting speed | Reference speed |
|---|---|---|---|---|---|---|---|---|---|---|
| $d_1$ | $d_2$ | a | $d_a$ | $D_a$ | $r_a$ | dyn. $C_r$ | stat. $C_{0r}$ | $C_{ur}$ | $n_G$ | $n_B$ |
| ≈ | ≈ | ≈ | min. | max. | max. | N | N | N | $min^{-1}$ | $min^{-1}$ |
| 22,2 | – | 20,7 | 19,2 | 30,8 | 0,6 | 12 600 | 7 400 | 500 | 22 300 | 18 500 |
| 22,2 | – | 20,7 | 19,2 | 30,8 | 0,6 | 12 600 | 7 400 | 500 | 22 300 | 18 500 |
| – | 21 | 20,7 | 19,2 | 30,8 | 0,6 | 12 600 | 7 400 | 500 | 16 700 | – |
| – | 21 | 20,7 | 19,2 | 30,8 | 0,6 | 12 600 | 7 400 | 500 | 16 700 | – |
| – | 21 | 20,7 | 19,2 | 30,8 | 0,6 | 12 600 | 7 400 | 500 | 16 700 | 18 500 |
| – | 21 | 20,7 | 19,2 | 30,8 | 0,6 | 12 600 | 7 400 | 500 | 16 700 | 18 500 |
| 27,2 | – | 24,8 | 20,6 | 36,4 | 1 | 17 000 | 10 400 | 700 | 18 400 | 13 200 |
| – | 25,8 | 24,8 | 20,6 | 36,4 | 1 | 17 000 | 10 400 | 700 | 13 800 | – |
| – | 25,8 | 24,8 | 20,6 | 36,4 | 1 | 17 000 | 10 400 | 700 | 13 800 | 13 200 |
| 25,8 | – | 23,5 | 21,2 | 35,8 | 0,6 | 15 500 | 9 500 | 640 | 19 400 | 16 600 |
| 25,8 | – | 23,5 | 21,2 | 35,8 | 0,6 | 15 500 | 9 500 | 640 | 19 400 | 16 600 |
| – | 24,4 | 23,5 | 21,2 | 35,8 | 0,6 | 15 500 | 9 500 | 640 | 14 600 | – |
| – | 24,4 | 23,5 | 21,2 | 35,8 | 0,6 | 15 500 | 9 500 | 640 | 14 600 | – |
| – | 24,4 | 23,5 | 21,2 | 35,8 | 0,6 | 15 500 | 9 500 | 640 | 14 600 | 16 600 |
| – | 24,4 | 23,5 | 21,2 | 35,8 | 0,6 | 15 500 | 9 500 | 640 | 14 600 | 16 600 |
| 28,5 | – | 27,5 | 22,6 | 41,4 | 1 | 22 500 | 13 100 | 880 | 16 600 | 12 600 |
| – | 27,1 | 27,5 | 22,6 | 41,4 | 1 | 22 500 | 13 100 | 880 | 12 400 | – |
| – | 27,1 | 27,5 | 22,6 | 41,4 | 1 | 22 500 | 13 100 | 880 | 12 400 | 12 600 |
| 30,8 | – | 27,9 | 25,6 | 41,4 | 1 | 20 600 | 12 900 | 870 | 16 100 | 15 000 |
| 30,8 | – | 27,9 | 25,6 | 41,4 | 1 | 20 600 | 12 900 | 870 | 16 100 | 15 000 |
| – | 29,2 | 27,9 | 25,6 | 41,4 | 1 | 20 600 | 12 900 | 870 | 12 100 | – |
| – | 29,2 | 27,9 | 25,6 | 41,4 | 1 | 20 600 | 12 900 | 870 | 12 100 | – |
| – | 29,2 | 27,9 | 25,6 | 41,4 | 1 | 20 600 | 12 900 | 870 | 12 100 | 15 000 |
| – | 29,2 | 27,9 | 25,6 | 41,4 | 1 | 20 600 | 12 900 | 870 | 12 100 | 15 000 |
| 33,5 | – | 30,4 | 27 | 45 | 1 | 24 600 | 15 900 | 1 070 | 14 700 | 10 900 |
| 33,5 | – | 30,4 | 27 | 45 | 1 | 24 600 | 15 900 | 1 070 | 14 700 | 10 900 |
| – | 31,9 | 30,4 | 27 | 45 | 1 | 24 600 | 15 900 | 1 070 | 11 000 | – |
| – | 31,9 | 30,4 | 27 | 45 | 1 | 24 600 | 15 900 | 1 070 | 11 000 | – |
| – | 31,9 | 30,4 | 27 | 45 | 1 | 24 600 | 15 900 | 1 070 | 11 000 | 10 900 |
| – | 31,9 | 30,4 | 27 | 45 | 1 | 24 600 | 15 900 | 1 070 | 11 000 | 10 900 |

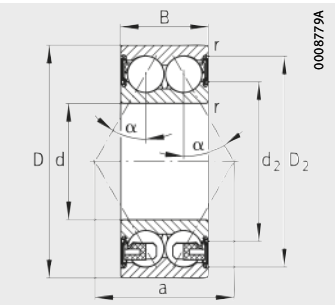
# Angular contact ball bearings

Double row
Open or sealed

X-life



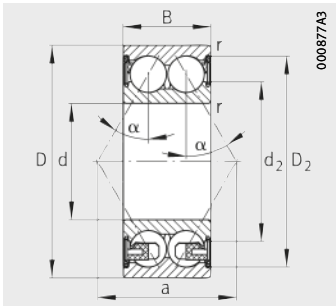

32..-BD, 33..-BD
$\alpha = 30°$



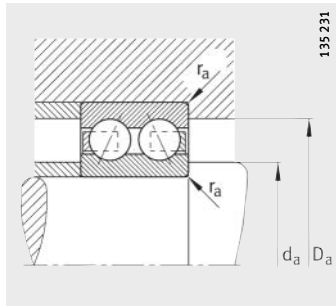

32..-BD-2HRS, 33..-BD-2HRS
$\alpha = 30°$

**Dimension table** (continued) · Dimensions in mm

| Designation | | | Mass | Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Series 32 | Series 33 | X-life | m ≈ kg | d | D | B | r min. | $D_1$ ≈ | $D_2$ ≈ |
| **3205-BD** | – | **XL** | 0,175 | **25** | 52 | 20,6 | 1 | 45,1 | – |
| **3205-BD-TVH** | – | **XL** | 0,174 | **25** | 52 | 20,6 | 1 | 45,1 | – |
| **3205-BD-2HRS** | – | **XL** | 0,18 | **25** | 52 | 20,6 | 1 | – | 47,6 |
| **3205-BD-2HRS-TVH** | – | **XL** | 0,176 | **25** | 52 | 20,6 | 1 | – | 47,6 |
| **3205-BD-2Z** | – | **XL** | 0,18 | **25** | 52 | 20,6 | 1 | – | 47,6 |
| **3205-BD-2Z-TVH** | – | **XL** | 0,175 | **25** | 52 | 20,6 | 1 | – | 47,6 |
| – | **3305-BD** | **XL** | 0,355 | **25** | 62 | 25,4 | 1,1 | 51,5 | – |
| – | **3305-BD-TVH** | **XL** | 0,352 | **25** | 62 | 25,4 | 1,1 | 51,5 | – |
| – | **3305-BD-2HRS** | **XL** | 0,36 | **25** | 62 | 25,4 | 1,1 | – | 53,7 |
| – | **3305-BD-2HRS-TVH** | **XL** | 0,352 | **25** | 62 | 25,4 | 1,1 | – | 53,7 |
| – | **3305-BD-2Z** | **XL** | 0,361 | **25** | 62 | 25,4 | 1,1 | – | 53,7 |
| – | **3305-BD-2Z-TVH** | **XL** | 0,348 | **25** | 62 | 25,4 | 1,1 | – | 53,7 |
| **3206-BD** | – | **XL** | 0,292 | **30** | 62 | 23,8 | 1 | 53,3 | – |
| **3206-BD-TVH** | – | **XL** | 0,288 | **30** | 62 | 23,8 | 1 | 53,3 | – |
| **3206-BD-2HRS** | – | **XL** | 0,3 | **30** | 62 | 23,8 | 1 | – | 55,8 |
| **3206-BD-2HRS-TVH** | – | **XL** | 0,29 | **30** | 62 | 23,8 | 1 | – | 55,8 |
| **3206-BD-2Z** | – | **XL** | 0,3 | **30** | 62 | 23,8 | 1 | – | 55,8 |
| **3206-BD-2Z-TVH** | – | **XL** | 0,283 | **30** | 62 | 23,8 | 1 | – | 55,8 |
| – | **3306-BD** | **XL** | 0,56 | **30** | 72 | 30,2 | 1,1 | 60,5 | – |
| – | **3306-BD-TVH** | **XL** | 0,543 | **30** | 72 | 30,2 | 1,1 | 60,5 | – |
| – | **3306-BD-2HRS** | **XL** | 0,56 | **30** | 72 | 30,2 | 1,1 | – | 63,5 |
| – | **3306-BD-2HRS-TVH** | **XL** | 0,549 | **30** | 72 | 30,2 | 1,1 | – | 63,5 |
| – | **3306-BD-2Z** | **XL** | 0,559 | **30** | 72 | 30,2 | 1,1 | – | 63,5 |
| – | **3306-BD-2Z-TVH** | **XL** | 0,54 | **30** | 72 | 30,2 | 1,1 | – | 63,5 |




32..-BD-2Z, 33..-BD-2Z
$\alpha = 30°$



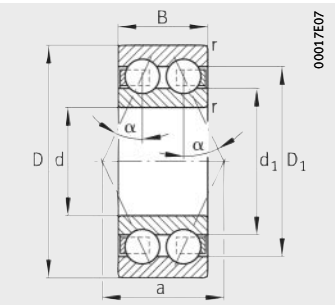

Mounting dimensions

| | | | Mounting dimensions | | | Basic load ratings | | Fatigue limit load | Limiting speed | Reference speed |
|---|---|---|---|---|---|---|---|---|---|---|
| $d_1$ | $d_2$ | a | $d_a$ | $D_a$ | $r_a$ | dyn. $C_r$ | stat. $C_{0r}$ | $C_{ur}$ | $n_G$ | $n_B$ |
| ≈ | ≈ | ≈ | min. | max. | max. | N | N | N | $min^{-1}$ | $min^{-1}$ |
| 35,8 | – | 30,8 | 30,6 | 46,4 | 1 | 22 000 | 15 200 | 1 020 | 14 300 | 12 700 |
| 35,8 | – | 30,8 | 30,6 | 46,4 | 1 | 22 000 | 15 200 | 1 020 | 14 300 | 12 700 |
| – | 34,2 | 30,8 | 30,6 | 46,4 | 1 | 22 000 | 15 200 | 1 020 | 10 700 | – |
| – | 34,2 | 30,8 | 30,6 | 46,4 | 1 | 22 000 | 15 200 | 1 020 | 10 700 | – |
| – | 34,2 | 30,8 | 30,6 | 46,4 | 1 | 22 000 | 15 200 | 1 020 | 10 700 | 12 700 |
| – | 34,2 | 30,8 | 30,6 | 46,4 | 1 | 22 000 | 15 200 | 1 020 | 10 700 | 12 700 |
| 39,5 | – | 35,4 | 32 | 55 | 1 | 31 500 | 21 000 | 1 410 | 12 400 | 9 400 |
| 39,5 | – | 35,4 | 32 | 55 | 1 | 31 500 | 21 000 | 1 410 | 12 400 | 9 400 |
| – | 37,6 | 35,4 | 32 | 55 | 1 | 31 500 | 21 000 | 1 410 | 9 300 | – |
| – | 37,6 | 35,4 | 32 | 55 | 1 | 31 500 | 21 000 | 1 410 | 9 300 | – |
| – | 37,6 | 35,4 | 32 | 55 | 1 | 31 500 | 21 000 | 1 410 | 9 300 | 9 400 |
| – | 37,6 | 35,4 | 32 | 55 | 1 | 31 500 | 21 000 | 1 410 | 9 300 | 9 400 |
| 42,2 | – | 36,4 | 35,6 | 56,4 | 1 | 31 000 | 22 200 | 1 490 | 11 900 | 11 100 |
| 42,2 | – | 36,4 | 35,6 | 56,4 | 1 | 31 000 | 22 200 | 1 490 | 11 900 | 11 100 |
| – | 40,3 | 36,4 | 35,6 | 56,4 | 1 | 31 000 | 22 200 | 1 490 | 9 000 | – |
| – | 40,3 | 36,4 | 35,6 | 56,4 | 1 | 31 000 | 22 200 | 1 990 | 9 000 | – |
| – | 40,3 | 36,4 | 35,6 | 56,4 | 1 | 31 000 | 22 200 | 1 990 | 9 000 | 11 100 |
| – | 40,3 | 36,4 | 35,6 | 56,4 | 1 | 31 000 | 22 200 | 1 490 | 9 000 | 11 100 |
| 46,3 | – | 41,9 | 37 | 65 | 1 | 43 000 | 29 500 | 1 990 | 10 400 | 8 500 |
| 46,3 | – | 41,9 | 37 | 65 | 1 | 43 000 | 29 500 | 1 990 | 10 400 | 8 500 |
| – | 44,4 | 41,9 | 37 | 65 | 1 | 43 000 | 29 500 | 1 990 | 7 800 | – |
| – | 44,4 | 41,9 | 37 | 65 | 1 | 43 000 | 29 500 | 1 990 | 7 800 | – |
| – | 44,4 | 41,9 | 37 | 65 | 1 | 43 000 | 29 500 | 1 990 | 7 800 | 8 500 |
| – | 44,4 | 41,9 | 37 | 65 | 1 | 43 000 | 29 500 | 1 990 | 7 800 | 8 500 |

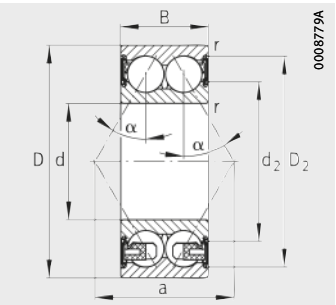
# Angular contact ball bearings

Double row
Open or sealed

X-life



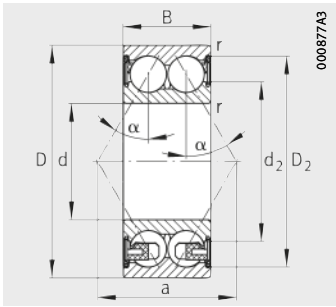

32..-BD, 33..-BD
$\alpha = 30°$



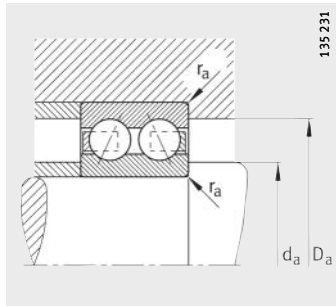

32..-BD-2HRS, 33..-BD-2HRS
$\alpha = 30°$

**Dimension table** (continued) · Dimensions in mm

| Designation | | | Mass | Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Series 32 | Series 33 | X-life | m ≈ kg | d | D | B | r min. | $D_1$ ≈ | $D_2$ ≈ |
| **3207-BD** | – | **XL** | 0,44 | **35** | 72 | 27 | 1,1 | 62,4 | – |
| **3207-BD-TVH** | – | **XL** | 0,436 | **35** | 72 | 27 | 1,1 | 62,4 | – |
| **3207-BD-2HRS** | – | **XL** | 0,45 | **35** | 72 | 27 | 1,1 | – | 65,4 |
| **3207-BD-2HRS-TVH** | – | **XL** | 0,44 | **35** | 72 | 27 | 1,1 | – | 65,4 |
| **3207-BD-2Z** | – | **XL** | 0,45 | **35** | 72 | 27 | 1,1 | – | 65,4 |
| **3207-BD-2Z-TVH** | – | **XL** | 0,432 | **35** | 72 | 27 | 1,1 | – | 65,4 |
| – | **3307-BD** | **XL** | 0,73 | **35** | 80 | 34,9 | 1,5 | 68,9 | – |
| – | **3307-BD-TVH** | **XL** | 0,706 | **35** | 80 | 34,9 | 1,5 | 68,9 | – |
| – | **3307-BD-2HRS** | **XL** | 0,74 | **35** | 80 | 34,9 | 1,5 | – | 71,9 |
| – | **3307-BD-2HRS-TVH** | **XL** | 0,717 | **35** | 80 | 34,9 | 1,5 | – | 71,9 |
| – | **3307-BD-2Z** | **XL** | 0,736 | **35** | 80 | 34,9 | 1,5 | – | 71,9 |
| – | **3307-BD-2Z-TVH** | **XL** | 0,702 | **35** | 80 | 34,9 | 1,5 | – | 71,9 |
| **3208-BD** | – | **XL** | 0,59 | **40** | 80 | 30,2 | 1,1 | 69,6 | – |
| **3208-BD-TVH** | – | **XL** | 0,591 | **40** | 80 | 30,2 | 1,1 | 69,6 | – |
| **3208-BD-2HRS** | – | **XL** | 0,6 | **40** | 80 | 30,2 | 1,1 | – | 72,6 |
| **3208-BD-2HRS-TVH** | – | **XL** | 0,597 | **40** | 80 | 30,2 | 1,1 | – | 72,6 |
| **3208-BD-2Z** | – | **XL** | 0,605 | **40** | 80 | 30,2 | 1,1 | – | 72,6 |
| **3208-BD-2Z-TVH** | – | **XL** | 0,58 | **40** | 80 | 30,2 | 1,1 | – | 72,6 |
| – | **3308-BD** | **XL** | 0,99 | **40** | 90 | 36,5 | 1,5 | 77 | – |
| – | **3308-BD-TVH** | **XL** | 0,969 | **40** | 90 | 36,5 | 1,5 | 77 | – |
| – | **3308-BD-2HRS** | **XL** | 1,01 | **40** | 90 | 36,5 | 1,5 | – | 79,9 |
| – | **3308-BD-2HRS-TVH** | **XL** | 0,985 | **40** | 90 | 36,5 | 1,5 | – | 79,9 |
| – | **3308-BD-2Z** | **XL** | 1,008 | **40** | 90 | 36,5 | 1,5 | – | 79,9 |
| – | **3308-BD-2Z-TVH** | **XL** | 0,967 | **40** | 90 | 36,5 | 1,5 | – | 79,9 |




32..-BD-2Z, 33..-BD-2Z
$\alpha = 30°$



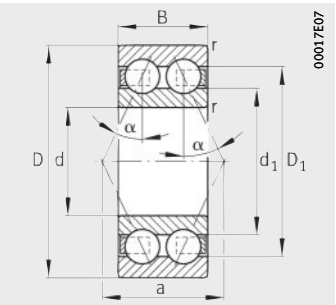

Mounting dimensions

| | | | Mounting dimensions | | | Basic load ratings | | Fatigue limit load | Limiting speed | Reference speed |
|---|---|---|---|---|---|---|---|---|---|---|
| $d_1$ | $d_2$ | a | $d_a$ | $D_a$ | $r_a$ | dyn. $C_r$ | stat. $C_{0r}$ | $C_{ur}$ | $n_G$ | $n_B$ |
| ≈ | ≈ | ≈ | min. | max. | max. | N | N | N | $min^{-1}$ | $min^{-1}$ |
| 49,1 | – | 42,5 | 42 | 65 | 1 | 41 000 | 30 000 | 2 030 | 10 100 | 9 900 |
| 49,1 | – | 42,5 | 42 | 65 | 1 | 41 000 | 30 000 | 2 030 | 10 100 | 9 900 |
| – | 46,9 | 42,5 | 42 | 65 | 1 | 41 000 | 30 000 | 2 030 | 7 500 | – |
| – | 46,9 | 42,5 | 42 | 65 | 1 | 41 000 | 30 000 | 2 030 | 7 600 | – |
| – | 46,9 | 42,5 | 42 | 65 | 1 | 41 000 | 30 000 | 2 030 | 7 500 | 9 800 |
| – | 46,9 | 42,5 | 42 | 65 | 1 | 41 000 | 30 000 | 2 030 | 7 600 | 9 900 |
| 51,8 | – | 48 | 44 | 71 | 1,5 | 55 000 | 36 500 | 2 460 | 9 000 | 8 100 |
| 51,8 | – | 48 | 44 | 71 | 1,5 | 55 000 | 36 500 | 2 460 | 9 000 | 8 100 |
| – | 49,6 | 48 | 44 | 71 | 1,5 | 55 000 | 36 500 | 2 460 | 6 800 | – |
| – | 49,6 | 48 | 44 | 71 | 1,5 | 55 000 | 36 500 | 2 460 | 6 800 | – |
| – | 49,6 | 48 | 44 | 71 | 1,5 | 55 000 | 36 500 | 2 460 | 6 800 | 8 100 |
| – | 49,6 | 48 | 44 | 71 | 1,5 | 55 000 | 36 500 | 2 460 | 6 800 | 8 100 |
| 54,9 | – | 47,4 | 47 | 73 | 1 | 51 000 | 38 000 | 2 550 | 8 900 | 9 100 |
| 54,9 | – | 47,4 | 47 | 73 | 1 | 51 000 | 38 000 | 2 550 | 8 900 | 9 100 |
| – | 52,8 | 47,4 | 47 | 73 | 1 | 51 000 | 38 000 | 2 550 | 6 700 | – |
| – | 52,8 | 47,4 | 47 | 73 | 1 | 51 000 | 38 000 | 2 550 | 6 700 | – |
| – | 52,8 | 47,4 | 47 | 73 | 1 | 51 000 | 38 000 | 2 550 | 6 700 | 9 100 |
| – | 52,8 | 47,4 | 47 | 73 | 1 | 51 000 | 38 000 | 2 550 | 6 700 | 9 100 |
| 59 | – | 53,1 | 49 | 81 | 1,5 | 67 000 | 48 500 | 3 250 | 8 000 | 7 000 |
| 59 | – | 53,1 | 49 | 81 | 1,5 | 67 000 | 48 500 | 3 250 | 8 000 | 7 000 |
| – | 56,8 | 53,1 | 49 | 81 | 1,5 | 67 000 | 48 500 | 3 250 | 6 000 | – |
| – | 56,8 | 53,1 | 49 | 81 | 1,5 | 67 000 | 48 500 | 3 250 | 6 000 | – |
| – | 56,8 | 53,1 | 49 | 81 | 1,5 | 67 000 | 48 500 | 3 250 | 6 000 | 7 000 |
| – | 56,8 | 53,1 | 49 | 81 | 1,5 | 67 000 | 48 500 | 3 250 | 6 000 | 7 000 |

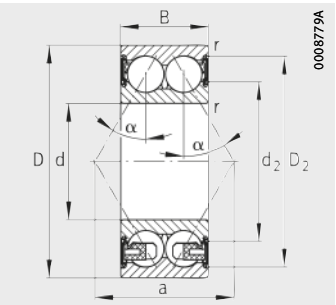
# Angular contact ball bearings

Double row
Open or sealed

X-life



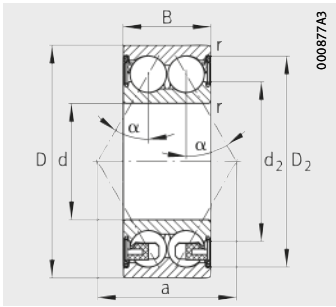

32..-BD, 33..-BD
$\alpha = 30°$



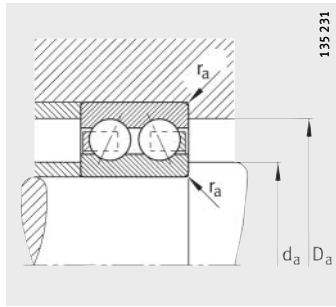

32..-BD-2HRS, 33..-BD-2HRS
$\alpha = 30°$

**Dimension table** (continued) · Dimensions in mm

| Designation | | | Mass | Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Series 32 | Series 33 | X-life | m ≈ kg | d | D | B | r min. | $D_1$ ≈ | $D_2$ ≈ |
| **3209-BD** | – | **XL** | 0,622 | **45** | 85 | 30,2 | 1,1 | 75,1 | – |
| **3209-BD-TVH** | – | **XL** | 0,622 | **45** | 85 | 30,2 | 1,1 | 75,1 | – |
| **3209-BD-2HRS** | – | **XL** | 0,644 | **45** | 85 | 30,2 | 1,1 | – | 78,1 |
| **3209-BD-2HRS-TVH** | – | **XL** | 0,626 | **45** | 85 | 30,2 | 1,1 | – | 78,1 |
| **3209-BD-2Z** | – | **XL** | 0,64 | **45** | 85 | 30,2 | 1,1 | – | 78,1 |
| **3209-BD-2Z-TVH** | – | **XL** | 0,618 | **45** | 85 | 30,2 | 1,1 | – | 78,1 |
| – | **3309-BD** | **XL** | 1,35 | **45** | 100 | 39,7 | 1,5 | 84,4 | – |
| – | **3309-BD-TVH** | **XL** | 1,335 | **45** | 100 | 39,7 | 1,5 | 84,4 | – |
| – | **3309-BD-2HRS** | **XL** | 1,36 | **45** | 100 | 39,7 | 1,5 | – | 87,3 |
| – | **3309-BD-2HRS-TVH** | **XL** | 1,314 | **45** | 100 | 39,7 | 1,5 | – | 87,3 |
| – | **3309-BD-2Z** | **XL** | 1,361 | **45** | 100 | 39,7 | 1,5 | – | 87,3 |
| – | **3309-BD-2Z-TVH** | **XL** | 1,315 | **45** | 100 | 39,7 | 1,5 | – | 87,3 |
| **3210-BD** | – | **XL** | 0,7 | **50** | 90 | 30,2 | 1,1 | 80,1 | – |
| **3210-BD-TVH** | – | **XL** | 0,672 | **50** | 90 | 30,2 | 1,1 | 80,1 | – |
| **3210-BD-2HRS** | – | **XL** | 0,7 | **50** | 90 | 30,2 | 1,1 | – | 82,9 |
| **3210-BD-2HRS-TVH** | – | **XL** | 0,668 | **50** | 90 | 30,2 | 1,1 | – | 82,9 |
| **3210-BD-2Z** | – | **XL** | 0,695 | **50** | 90 | 30,2 | 1,1 | – | 82,9 |
| **3210-BD-2Z-TVH** | – | **XL** | 0,667 | **50** | 90 | 30,2 | 1,1 | – | 82,9 |
| – | **3310-BD** | **XL** | 1,82 | **50** | 110 | 44,4 | 2 | 93,3 | – |
| – | **3310-BD-TVH** | **XL** | 1,749 | **50** | 110 | 44,4 | 2 | 93,3 | – |
| – | **3310-BD-2HRS** | **XL** | 1,82 | **50** | 110 | 44,4 | 2 | – | 96,8 |
| – | **3310-BD-2HRS-TVH** | **XL** | 1,748 | **50** | 110 | 44,4 | 2 | – | 96,8 |
| – | **3310-BD-2Z** | **XL** | 1,814 | **50** | 110 | 44,4 | 2 | – | 96,8 |
| – | **3310-BD-2Z-TVH** | **XL** | 1,75 | **50** | 110 | 44,4 | 2 | – | 96,8 |




32..-BD-2Z, 33..-BD-2Z
$\alpha = 30°$



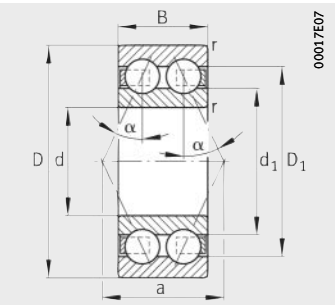

Mounting dimensions

| | | | Mounting dimensions | | | Basic load ratings | | Fatigue limit load | Limiting speed | Reference speed |
|---|---|---|---|---|---|---|---|---|---|---|
| $d_1$ | $d_2$ | a | $d_a$ | $D_a$ | $r_a$ | dyn. $C_r$ | stat. $C_{0r}$ | $C_{ur}$ | $n_G$ | $n_B$ |
| ≈ | ≈ | ≈ | min. | max. | max. | N | N | N | $min^{-1}$ | $min^{-1}$ |
| 59,9 | – | 50,3 | 52 | 78 | 1 | 50 000 | 39 000 | 2 650 | 8 300 | 8 400 |
| 59,9 | – | 50,3 | 52 | 78 | 1 | 50 000 | 39 000 | 2 650 | 8 300 | 8 400 |
| – | 57,7 | 50,3 | 52 | 78 | 1 | 50 000 | 39 000 | 2 650 | 6 300 | – |
| – | 57,7 | 50,3 | 52 | 78 | 1 | 50 000 | 39 000 | 2 650 | 6 300 | – |
| – | 57,7 | 50,3 | 52 | 78 | 1 | 50 000 | 39 000 | 2 650 | 6 300 | 8 400 |
| – | 57,7 | 50,3 | 52 | 78 | 1 | 50 000 | 39 000 | 2 650 | 6 300 | 8 400 |
| 65,5 | – | 57,8 | 54 | 91 | 1,5 | 72 000 | 54 000 | 3 600 | 7 300 | 6 500 |
| 65,5 | – | 57,8 | 54 | 91 | 1,5 | 72 000 | 54 000 | 3 600 | 7 300 | 6 500 |
| – | 65,5 | 57,8 | 54 | 91 | 1,5 | 72 000 | 54 000 | 3 600 | 5 500 | – |
| – | 65,5 | 57,8 | 54 | 91 | 1,5 | 72 000 | 54 000 | 3 600 | 5 500 | – |
| – | 65,5 | 57,8 | 54 | 91 | 1,5 | 72 000 | 54 000 | 3 600 | 5 500 | 6 500 |
| – | 65,5 | 57,8 | 54 | 91 | 1,5 | 72 000 | 54 000 | 3 600 | 5 500 | 6 500 |
| 64,9 | – | 53,2 | 57 | 83 | 1 | 53 000 | 44 000 | 3 000 | 7 800 | 7 600 |
| 64,9 | – | 53,2 | 57 | 83 | 1 | 53 000 | 44 000 | 3 000 | 7 800 | 7 600 |
| – | 62,8 | 53,2 | 57 | 83 | 1 | 53 000 | 44 000 | 3 000 | 5 900 | – |
| – | 62,8 | 53,2 | 57 | 83 | 1 | 53 000 | 44 000 | 3 000 | 5 900 | – |
| – | 62,8 | 53,2 | 57 | 83 | 1 | 53 000 | 44 000 | 3 000 | 5 900 | 7 600 |
| – | 62,8 | 53,2 | 57 | 83 | 1 | 53 000 | 44 000 | 3 000 | 5 900 | 7 600 |
| 71,5 | – | 64,2 | 61 | 99 | 2 | 93 000 | 70 000 | 4 700 | 6 500 | 6 100 |
| 71,5 | – | 64,2 | 61 | 99 | 2 | 93 000 | 70 000 | 4 700 | 6 500 | 6 100 |
| – | 69 | 64,2 | 61 | 99 | 2 | 93 000 | 70 000 | 4 700 | 4 900 | – |
| – | 69 | 64,2 | 61 | 99 | 2 | 93 000 | 70 000 | 4 700 | 4 900 | – |
| – | 69 | 64,2 | 61 | 99 | 2 | 93 000 | 70 000 | 4 700 | 4 900 | 6 100 |
| – | 69 | 64,2 | 61 | 99 | 2 | 93 000 | 70 000 | 4 700 | 4 900 | 6 100 |

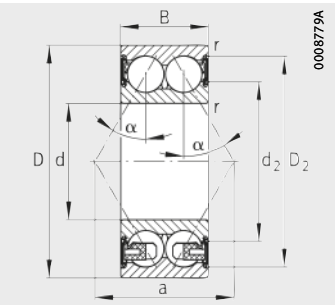
# Angular contact ball bearings

Double row
Open or sealed

X-life



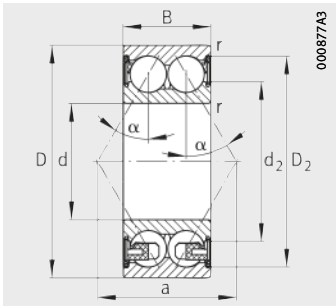

32..-BD, 33..-BD
$\alpha = 30°$



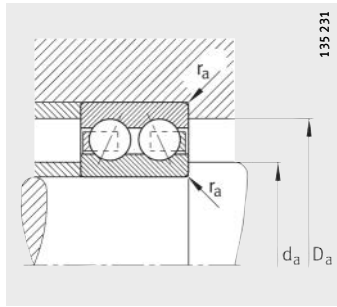

32..-BD-2HRS, 33..-BD-2HRS
$\alpha = 30°$

**Dimension table** (continued) · Dimensions in mm

| Designation | | | Mass | Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Series 32 | Series 33 | X-life | m ≈ kg | d | D | B | r min. | $D_1$ ≈ | $D_2$ ≈ |
| **3211-BD** | – | **XL** | 0,94 | **55** | 100 | 33,3 | 1,5 | 87,8 | – |
| **3211-BD-TVH** | – | **XL** | 0,94 | **55** | 100 | 33,3 | 1,5 | 87,8 | – |
| **3211-BD-2HRS** | – | **XL** | 0,98 | **55** | 100 | 33,3 | 1,5 | – | 90,8 |
| **3211-BD-2HRS-TVH** | – | **XL** | 0,933 | **55** | 100 | 33,3 | 1,5 | – | 90,8 |
| **3211-BD-2Z** | – | **XL** | 0,979 | **55** | 100 | 33,3 | 1,5 | – | 90,8 |
| **3211-BD-2Z-TVH** | – | **XL** | 0,93 | **55** | 100 | 33,3 | 1,5 | – | 90,8 |
| – | **3311-BD** | **XL** | 2,35 | **55** | 120 | 49,2 | 2 | 103,3 | – |
| – | **3311-BD-TVH** | **XL** | 2,28 | **55** | 120 | 49,2 | 2 | 103,3 | – |
| – | **3311-BD-2HRS** | **XL** | 2,35 | **55** | 120 | 49,2 | 2 | – | 106,8 |
| – | **3311-BD-2HRS-TVH** | **XL** | 2,264 | **55** | 120 | 49,2 | 2 | – | 106,8 |
| – | **3311-BD-2Z** | **XL** | 2,34 | **55** | 120 | 49,2 | 2 | – | 106,8 |
| – | **3311-BD-2Z-TVH** | **XL** | 2,265 | **55** | 120 | 49,2 | 2 | – | 106,8 |
| **3212-BD** | – | **XL** | 1,31 | **60** | 110 | 36,5 | 1,5 | 97 | – |
| **3212-BD-TVH** | – | **XL** | 1,25 | **60** | 110 | 36,5 | 1,5 | 97 | – |
| **3212-BD-2HRS** | – | **XL** | 1,31 | **60** | 110 | 36,5 | 1,5 | – | 100,5 |
| **3212-BD-2HRS-TVH** | – | **XL** | 1,25 | **60** | 110 | 36,5 | 1,5 | – | 100,5 |
| **3212-BD-2Z** | – | **XL** | 1,301 | **60** | 110 | 36,5 | 1,5 | – | 100,5 |
| **3212-BD-2Z-TVH** | – | **XL** | 1,24 | **60** | 110 | 36,5 | 1,5 | – | 100,5 |
| **3213-BD** | – | **XL** | 1,67 | **65** | 120 | 38,1 | 1,5 | 106,6 | – |
| **3213-BD-TVH** | – | **XL** | 1,604 | **65** | 120 | 38,1 | 1,5 | 106,6 | – |
| **3213-BD-2HRS** | – | **XL** | 1,67 | **65** | 120 | 38,1 | 1,5 | – | 110,1 |
| **3213-BD-2HRS-TVH** | – | **XL** | 1,6 | **65** | 120 | 38,1 | 1,5 | – | 110,1 |
| **3213-BD-2Z** | – | **XL** | 1,667 | **65** | 120 | 38,1 | 1,5 | – | 110,1 |
| **3213-BD-2Z-TVH** | – | **XL** | 1,602 | **65** | 120 | 38,1 | 1,5 | – | 110,1 |




32..-BD-2Z, 33..-BD-2Z
$\alpha = 30°$




Mounting dimensions

| | | | Mounting dimensions | | | Basic load ratings | | Fatigue limit load | Limiting speed | Reference speed |
|---|---|---|---|---|---|---|---|---|---|---|
| $d_1$ | $d_2$ | a | $d_a$ | $D_a$ | $r_a$ | dyn. $C_r$ | stat. $C_{0r}$ | $C_{ur}$ | $n_G$ | $n_B$ |
| ≈ | ≈ | ≈ | min. | max. | max. | N | N | N | $min^{-1}$ | $min^{-1}$ |
| 71,6 | – | 58,5 | 64 | 91 | 1,5 | 61 000 | 51 000 | 3 450 | 7 100 | 7 200 |
| 71,6 | – | 58,5 | 64 | 91 | 1,5 | 61 000 | 51 000 | 3 450 | 7 100 | 7 200 |
| – | 69,2 | 58,5 | 64 | 91 | 1,5 | 61 000 | 51 000 | 3 450 | 5 300 | – |
| – | 69,2 | 58,5 | 64 | 91 | 1,5 | 61 000 | 51 000 | 3 450 | 5 300 | – |
| – | 69,2 | 58,5 | 64 | 91 | 1,5 | 61 000 | 51 000 | 3 450 | 5 300 | 7 200 |
| – | 69,2 | 58,5 | 64 | 91 | 1,5 | 61 000 | 51 000 | 3 450 | 5 300 | 7 200 |
| 78,8 | – | 71,4 | 66 | 109 | 2 | 116 000 | 88 000 | 6 000 | 5 800 | 5 800 |
| 78,8 | – | 71,4 | 66 | 109 | 2 | 116 000 | 88 000 | 6 000 | 5 800 | 5 800 |
| – | 76,4 | 71,4 | 66 | 109 | 2 | 116 000 | 88 000 | 6 000 | 4 350 | – |
| – | 76,4 | 71,4 | 66 | 109 | 2 | 116 000 | 88 000 | 6 000 | 4 350 | – |
| – | 76,4 | 71,4 | 66 | 109 | 2 | 116 000 | 88 000 | 6 000 | 4 350 | 5 800 |
| – | 76,4 | 71,4 | 66 | 109 | 2 | 116 000 | 88 000 | 6 000 | 4 350 | 5 800 |
| 79 | – | 64,7 | 69 | 101 | 1,5 | 75 000 | 64 000 | 4 300 | 6 300 | 6 700 |
| 79 | – | 64,7 | 69 | 101 | 1,5 | 75 000 | 64 000 | 4 300 | 6 300 | 6 700 |
| – | 76,6 | 64,7 | 69 | 101 | 1,5 | 75 000 | 64 000 | 4 300 | 4 750 | – |
| – | 76,6 | 64,7 | 69 | 101 | 1,5 | 75 000 | 64 000 | 4 300 | 4 750 | – |
| – | 76,6 | 64,7 | 69 | 101 | 1,5 | 75 000 | 64 000 | 4 300 | 4 750 | 6 700 |
| – | 76,6 | 64,7 | 69 | 101 | 1,5 | 75 000 | 64 000 | 4 300 | 4 750 | 6 700 |
| 87,7 | – | 70,7 | 74 | 111 | 1,5 | 86 000 | 77 000 | 5 200 | 5 700 | 6 100 |
| 87,7 | – | 70,7 | 74 | 111 | 1,5 | 86 000 | 77 000 | 5 200 | 5 700 | 6 100 |
| – | 85,3 | 70,7 | 74 | 111 | 1,5 | 86 000 | 77 000 | 5 200 | 4 250 | – |
| – | 85,3 | 70,7 | 74 | 111 | 1,5 | 86 000 | 77 000 | 5 200 | 4 300 | – |
| – | 85,3 | 70,7 | 74 | 111 | 1,5 | 86 000 | 77 000 | 5 200 | 4 250 | 6 100 |
| – | 85,3 | 70,7 | 74 | 111 | 1,5 | 86 000 | 77 000 | 5 200 | 4 300 | 6 100 |

MATNR 036898937-0000 / TPI 213 / 01 / GB-D / 2016111 / Printed in Germany by kraus

**Schaeffler Technologies AG & Co. KG**

Georg-Schäfer-Straße 30
97421 Schweinfurt
Germany
Internet www.fag.com
E-mail faginfo@schaeffler.com

In Germany:
Phone 0180 5003872
Fax 0180 5003873

From other countries:
Phone +49 9721 91-0
Fax +49 9721 91-3435

Every care has been taken to ensure the correctness of the information contained in this publication but no liability can be accepted for any errors or omissions.
We reserve the right to make technical changes.

© Schaeffler Technologies AG & Co. KG
Issued: 2016, November

This publication or parts thereof may not be reproduced without our permission.
TPI 213 GB-D