Angular contact ball bearings

Contents

Angular contact ball bearings

Four different designs

SKF high-precision angular contact ball bearings (→ **fig** 1) are available in three dimension series: bearing series 719, 70 and 72 with a contact angle of 15° (designation suffix CD or CX and CE) or 25° (designation suffix ACD or ACX and ACE) (→ **fig** 3). Bearings with the greater contact angle are recommended for applications where high axial stiffness and high axial load carrying capacity are required.

The CX and ACX suffixes identify the small bearing sizes belonging to the CD and ACD design and stand for revised internal geometry.

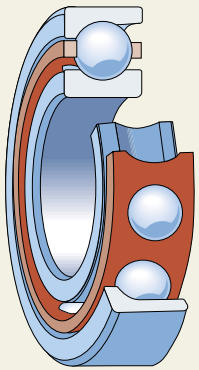
The CE and ACE design bearings have a larger number of small diameter balls compared with the standard CD or CX and ACD or ACX designs.

Summing up, SKF high-precision angular contact ball bearings are available in four different designs and three dimension series (→ **fig** 2).

Clearly the space requirements are different and arrangements can be more or less radially compact. Each bearing series has characteristic features that makes it suitable for particular applications.

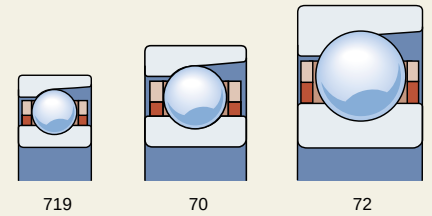
Single row high-precision angular contact ball bearing

Fig 1



For higher speeds, or where little radial space is available, bearings of series 719 or 70 should be chosen. For heavy loads at relatively moderate speeds, bearings of series 72 are more appropriate. Where stiffness requirements are paramount, bearings of series 719 incorporate a large number of balls and have the advantage that large spindle diameters can be used. Both these factors contribute to high stiffness of the spindle system: spindle rigidity increases with increasing spindle diameter and bearing stiffness is more strongly influenced by the number than by the size of the balls. In fact, the rigidity of these light series bearings is greater than that, of comparable bearings from the heavier series.

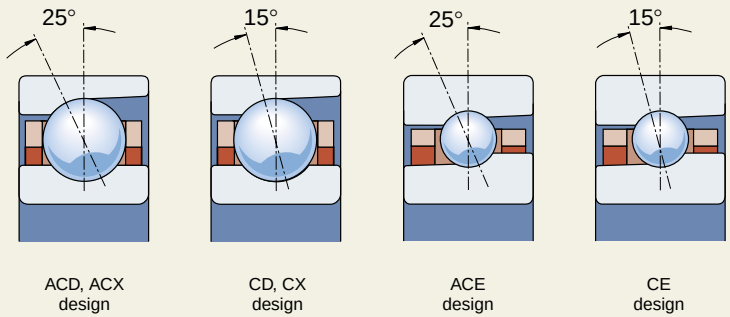
Fig 2



A cross section of the three dimension series

Different designs of SKF high-precision angular contact ball bearings series 70

Fig 3



Standard high-precision angular contact ball bearings

SKF standard high-precision angular contact ball bearings are non-separable, having one reduced height flange on the outer ring, in order to allow the introduction of a large number of balls, using a one-piece cage and an optimised internal design. Thanks to this, they represent the best solution in terms of load carrying capacity, rigidity and speed.

The bearings are manufactured according to 719, 70 and 72 series, with a choice of two different contact angles: 15 degrees (CX and CD) or 25 degrees (ACX and ACD).

The basic design is the same for CX (ACX) and CD (ACD) series. The CX and ACX series covering the small bearing sizes have recently been reviewed, offering improved dynamic and static load ratings, which have been increased by approx. 15 % and 30 % respectively. An enhanced level of radial and axial rigidity has also been obtained without compromising the speed ratings.

The range of standard high-precision angular contact ball bearings covers bore diameters from 8 to 240 mm. Dimensions and technical data can be found in the relevant product tables.

High-speed high-precision angular contact ball bearings

In addition to the standard series, SKF offers a series of high-speed bearings to meet the highest demands in respect of speed capability and running accuracy.

These bearings belong to the series 70 CE (ACE) and 719 CE (ACE) and are characterised by following features:

- smaller balls
- a contact angle of 15° (CE suffixes) or 25° (ACE suffix)
- both outer and inner ring shoulders of reduced height for better lubrication conditions
- an outer ring centred cage
- optimised internal design for enhanced speed capability
- an extremely high running accuracy.

The CE and ACE design bearings have a larger number of small diameter balls compared with the standard CD, CX, ACD and ACX designs. Centrifugal forces from contact between the balls and the outer ring raceway are therefore further reduced, as is also the contact pressure. Because of the smaller balls of the CE and ACE designs, they occupy less of the bearing cross-section. The rings are therefore correspondingly thicker. This means that any form errors of shaft or housing bore have less influence on the roundness of the bearing rings. As a result the running accuracy is enhanced.

The range of very high-speed bearings covers bore diameters from 20 to 120 mm. Technical data and dimensions can be found in the tables. Details concerning technical data and availability of other sizes will be supplied on request.

Hybrid high-precision angular contact ball bearings

If the performance required is close to the limits for all-steel bearings, or if higher rigidity or longer life are needed, an alternative may be to select SKF hybrid bearings. These bearings have steel rings and ceramic balls. The advantages offered by ceramic material versus steel are shown in chapter 1: “Principles of bearing selection and application”, section “material for high-precision bearings”.

Hybrid high-precision angular contact ball bearings offer the following advantages versus all-steel bearings:

- lasting up to four to six times longer
- achieving up to 20 % higher speed
- lower temperature rise in the system
- obtaining higher rigidity
- fewer problems with lubrication and vibration.
- less sensible to speed accelerations and decelerations.

Hybrid high-precision angular contact ball bearings are offered in the same execution as all-steel high-precision angular contact ball bearings, series 719, 70 and 72 with either 15 (CD and CX) or 25 (ACD and ACX) degrees contact angle. Hybrid high-precision angular contact ball bearings are identified by the suffix HC in the designation, e.g. 7014 CDGA/HCP4A.

Hybrid high-speed high-precision angular contact ball bearings

These bearings have smaller ceramic balls, inner and outer ring shoulders of reduced height, outer ring centred cage, optimised internal design, and are suitable for even more demanding applications than those covered by hybrid precision angular contact ball bearings. With proper lubrication conditions and with moderate loading rotational speeds can go up to 3 million $n \times d_m$. By using specially designed hybrid bearings, the spindle speed can be further increased.

The SKF range comprises two series of hybrid high-speed high-precision angular contact ball bearings of series 719 (CE and ACE) and 70 (CE and ACE). The bearings are identified by the suffix HC in the designations, e.g. 7014 CEGA/HCP4A.

Universally matchable bearings

Universally matchable angular contact ball bearings are adjusted during manufacture so that they may be mounted immediately adjacent to each other in a back-to-back, face-to-face or tandem arrangement, as desired. When arranged back-to-back or face-to-face the bearings will have a light, medium or heavy preload depending on the requirements. Basic features such as accuracy, preload class, speed capability etc. of universally matchable angular contact ball bearings are the same as those of the pre-matched sets.

Universally matchable bearings may be useful in reducing stock holding and improving availability. Several specific matched sets may be obtained by stocking the correct universal bearings.

Universal bearings can be supplied in two basic executions: single universal bearings for mounting in any combination, or duplex sets with matched bore and outside diameters.

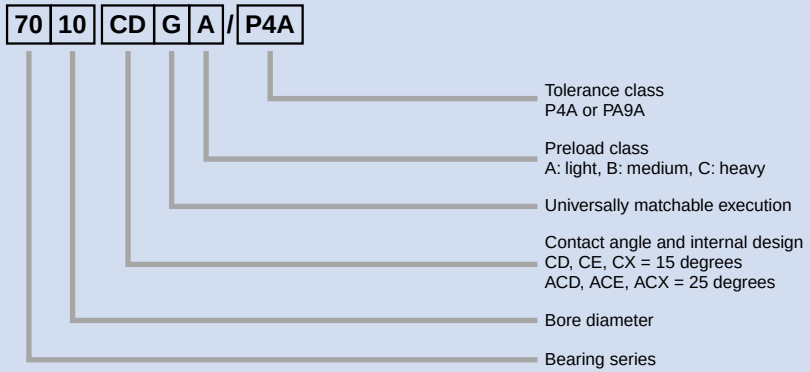
The designations for single universal bearings are explained in **Table 1**.

Customers need to order the same number of single universal bearings as the number of bearings in a set, e.g. to replace a set 7014 CD/P4ATBTA, three bearings 7014 CDGA/P4A are required.

Alternatively, duplex sets of universally matchable bearings can be chosen. Duplex universal bearings can either be used as sets, or each bearing used to form other groups of bearings, with the only limitation being the contact angle and the preload class. Universal bearings with light preload must not be paired against bearings with a different contact angle or preload class. For such special cases, please consult the SKF application engineering service.

Designation of single universal high-precision angular contact ball bearings

Table 1



See Table 17 for more details

Table 2 shows some possible combinations and the corresponding number of matched sets, single bearings or duplex sets to be ordered.

Marking of universally matchable bearings

The bearing rings have several markings for identification purposes. Each bearing is marked with the complete designation on the outer ring face. To facilitate the selection of the actual bore and outside diameters in order to obtain the desired fits after mounting, the actual deviation of the inner bore diameter and outside diameter from nominal, are marked on the inner ring/outer ring respectively. An asterisk marks the position of the greatest out-of-round on the inner and outer ring side-faces. This is where the greatest wall thickness between the base of the raceway and the bore or the outside diameter surface can be found.

A “chevron V” is marked on the outer ring outside diameter indicating the contact angle direction. This allows the users to check that universally matchable bearings, once fitted on the shaft, are correctly positioned according to the desired combination, i.e. back-to-back, face-to-face, etc. (➔ **fig 8 page 121**).

Matched bearing sets

SKF high-precision angular contact ball bearings are also supplied as complete sets of two, three or four bearings. They are matched during manufacturing so that when the bearings are mounted immediately next to each other, the predetermined value of the preload will be obtained, or the load will be evenly distributed. The bore and outside diameters do not differ by more than one third of the permissible diameter tolerance. There is even less difference between the diameters of matched bearings manufactured to tolerance class PA9A.

The most popular set arrangements are shown in **figs 4, 5, 6 and 7 pages 118 – 119.**

The load lines of bearings arranged back-to-back diverge towards the bearing axis. Axial load can be accommodated in both directions, although only by one bearing (or bearings in tandem) at a time. The back-to-back arrangement is relatively stiff and can also take up tilting moments.

Table 2

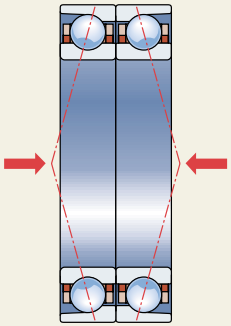
Original matched set	Qty	Single universal bearing	Qty	Duplex universal bearing sets	Qty
7010 CD/P4ATBTA	2	**7010 CDGA/P4A**	6	**7010 CD/P4ADGA**	3
7010 CD/P4AQBCA	2	**7010 CDGA/P4A**	8	**7010 CD/P4ADGA**	4
7010 CD/P4ADT	5	**7010 CDGA/P4A**	10	**7010 CD/P4ADGA**	5
7010 CD/P4ADBA	15	**7010 CDGA/P4A**	30	**7010 CD/P4ADGA**	15
7010 CD/P4ADFA	4	**7010 CDGA/P4A**	8	**7010 CD/P4ADGA**	4

The load lines of bearings arranged face-to-face converge towards the bearing axis. Axial loads can be accommodated in both directions, although again only by one bearing (or bearings in tandem) at a time. The arrangement is not so stiff as the back-to-back arrangement and is less suitable for tilting moments.

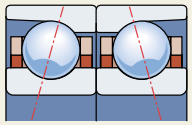
In a tandem arrangement the load lines of the bearings are parallel. Radial and axial loads are equally distributed over the bearings but axial loads can only be carried in one direction. A set of bearings in tandem is therefore generally adjusted against another bearing that can take the axial loads acting in the opposite direction.

Combinations of tandem and back-to-back, or tandem and face-to-face are normally used when the design makes it impossible to adjust a further bearing, or bearing set against the tandem set.

Fig 4

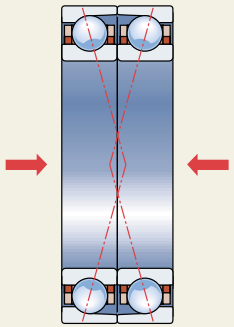


Back-to-back arrangement
for axial load in both directions

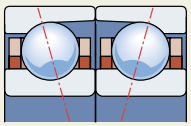


Back-to-back arrangement
Designation suffix DB

Fig 5

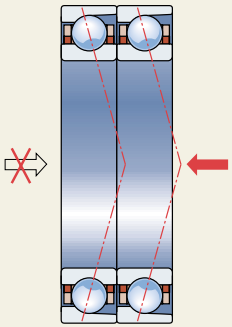


Face-to-face arrangement
for axial load in both directions

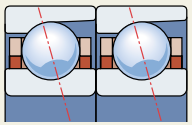


Face-to-face arrangement
Designation suffix DF

Fig 6

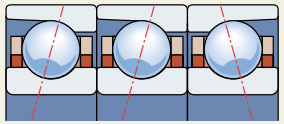


Tandem arrangement
for axial load in one direction

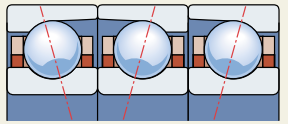


Tandem arrangement
Designation suffix DT

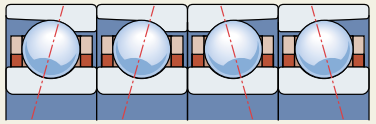
Fig 7



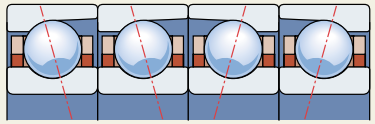
Combination of tandem and
back-to-back arrangement
Designation suffix TBT



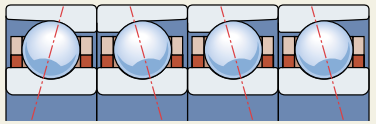
Combination of tandem and
face-to-face arrangement
Designation suffix TFT



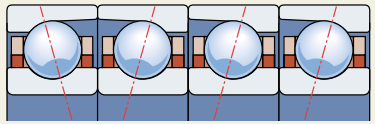
Combination of tandem and back-to-back
arrangement
Designation suffix QBC



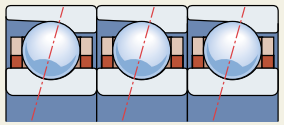
Combination of tandem and face-to-face
arrangement
Designation suffix QFC



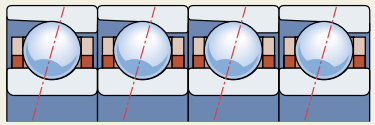
Combination of tandem and back-to-back
arrangement
Designation suffix QBT



Combination of tandem and face-to-face
arrangement
Designation suffix QFT



Tandem arrangement
Designation suffix TT



Tandem arrangement
Designation suffix QT

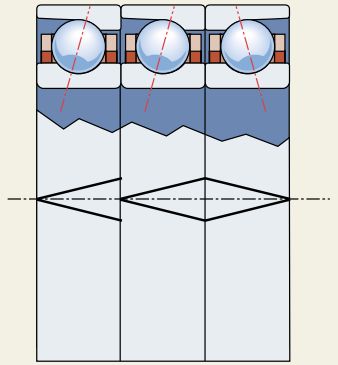
Marking of bearing sets

Bearing sets not only have the markings of single bearings; but also have additional markings for identification purposes and to indicate how the bearings of a matched set should be correctly mounted.

A ‘V’-shaped marking is to be found on the outside diameter of the bearings. The bearings need to be mounted in the order shown by this marking to obtain the correct preload. It also indicates how the set should be mounted compared with the axial load. The point of the ‘V’ gives the direction in which the axial load should act on the inner ring(s). Where axial loads act in both directions, the ‘V’ point gives the direction of the greater axial load.

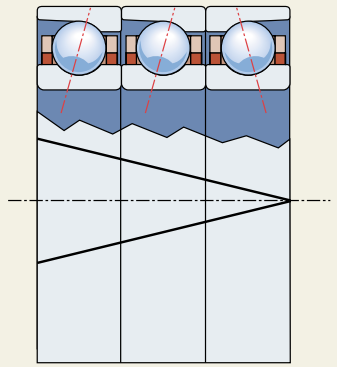
Each bearing of a matched set is marked with the complete designation of the bearing set. The same serial number is shown on the face of the outer ring (➔ **figs** 9 **and** 10).

Fig 8



“V” – shaped marking on outside diameter of universally matchable bearings for paired mounting
Example of a set of three universally matchable bearings combined in TBT arrangement

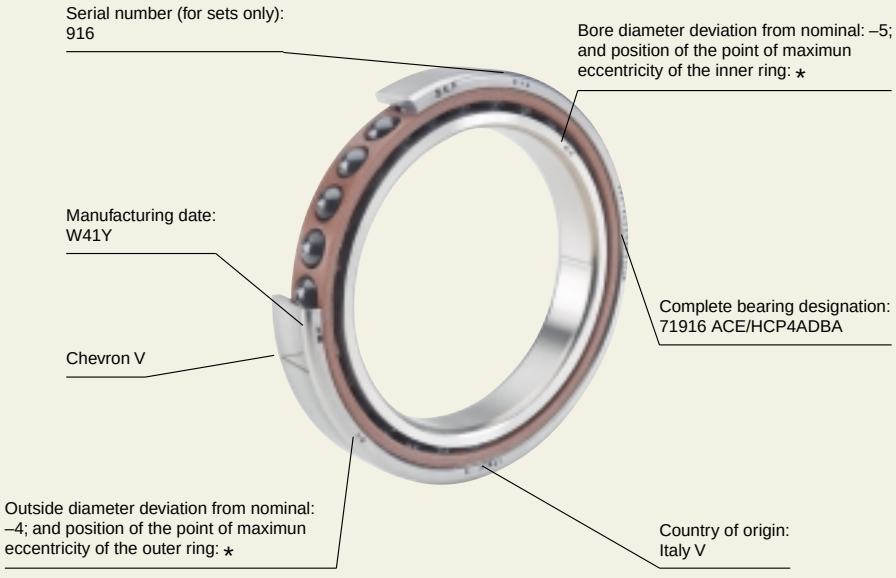
Fig 9



“V” – shaped marking on outside diameter of high precision angular contact ball bearing sets

Marking of bearing sets

Fig 10



General bearing data

Dimensions

SKF high-precision angular contact ball bearings conform to ISO 15:1998, Diameter Series 9, 0 and 2.

Tolerances

SKF high-precision angular contact ball bearings are manufactured to tolerance class P4A specifications as standard. On request, bearings can be made according to class PA9A or other specifications.

The values for P4A and PA9A tolerance classes are given in **Tables 3 and 4**. Hybrid bearings are made to the same tolerances as the corresponding all-steel bearings.

Preload

To meet varying customer needs in terms of speed, heat generation and rigidity, SKF offers standard high-precision angular contact ball bearings (identified by suffixes CX, CD, ACX and ACD), universally matchable and matched back-to-back or face-to-face in groups of two or more bearings per set, with three different preload classes as standard:
Class A: light preload
Class B: medium preload
Class C: heavy preload

Hybrid high-precision angular contact ball bearings (identified by the suffix HC) are normally supplied either with preload class A or B since the heavy preload is not recommended for high-speed operations. For the same reason preload classes A and B are usually applied to the high-speed high-precision angular contact ball bearings (identified by suffixes CE and ACE), fitted either with steel or ceramic balls.

Tables 5 page 124, 6 page 125 and 7 page 126 show preload values for bearing pairs arranged either back-to-back or face-to-face prior to mounting.

Class P4A tolerances for radial bearings

Table 3

Inner ring

d over	d incl.	Δ_{dmp} high	Δ_{dmp} low	Δ_{ds} high	Δ_{ds} low	V_{dp} max	V_{dmp} max	Δ_{Bs} high	Δ_{Bs} low	Δ_{B1s} high	Δ_{B1s} low	V_{Bs} max	K_{ia} max	S_d max	S_{ia} max
mm		µm		µm		µm	µm	µm		µm		µm	µm	µm	µm
2,5	**10**	0	–4	0	–4	1,3	1	0	–40	0	–250	1,3	1,3	1,3	1,3
10	**18**	0	–4	0	–4	1,3	1	0	–80	0	–250	1,3	1,3	1,3	1,3
18	**30**	0	–5	0	–5	1,3	1	0	–120	0	–250	1,3	2,5	1,3	2,5
30	**50**	0	–6	0	–6	1,3	1	0	–120	0	–250	1,3	2,5	1,3	2,5
50	**80**	0	–7	0	–7	2	1,3	0	–150	0	–250	1,3	2,5	1,3	2,5
80	**120**	0	–8	0	–8	2,5	1,5	0	–200	0	–250	2,5	2,5	2,5	2,5
120	**150**	0	–10	0	–10	6	3	0	–250	0	–380	4	4	4	4
150	**180**	0	–10	0	–10	6	3	0	–250	0	–380	4	6	5	6
180	**250**	0	–12	0	–12	7	4	0	–300	0	–500	5	7	6	7

Outer ring

D over	D incl.	Δ_{Dmp} high	Δ_{Dmp} low	Δ_{Ds} high	Δ_{Ds} low	V_{Dp} max	V_{Dmp} max	Δ_{Cs}, Δ_{C1s}	V_{Cs} max	K_{ea} max	S_D max	S_{ea} max
mm		µm		µm		µm	µm		µm	µm	µm	µm
18	**30**	0	–5	0	–5	2	1,3	Values are	1,3	2,5	1,3	2,5
30	**50**	0	–6	0	–6	2	1,3	identical to	1,3	2,5	1,3	2,5
50	**80**	0	–7	0	–7	2	1,3	those for inner ring	1,3	3,8	1,3	3,8
80	**120**	0	–8	0	–8	2,5	1,3	of same	2,5	5	2,5	5
120	**150**	0	–9	0	–9	2,5	1,5	bearing	2,5	5	2,5	5
150	**180**	0	–10	0	–10	6	3		4	6	4	6
180	**250**	0	–11	0	–11	6	4		5	8	5	8
250	**315**	0	–13	0	–13	8	5		5	9	6	8
315	**400**	0	–15	0	–15	9	6		7	10	8	10

Class PA9A tolerances for radial bearings

Table 4

Inner ring

d over	d incl.	Δ_{ds} high	Δ_{ds} low	V_{dp} max	V_{dmp} max	Δ_{Bs} high	Δ_{Bs} low	Δ_{B1s} high	Δ_{B1s} low	V_{Bs} max	K_{ia} max	S_d max	S_{ia} max
mm		µm		µm	µm	µm		µm		µm	µm	µm	µm
2,5	**10**	0	–2,5	1,3	1	0	–25	0	–250	1,3	1,3	1,3	1,3
10	**18**	0	–2,5	1,3	1	0	–80	0	–250	1,3	1,3	1,3	1,3
18	**30**	0	–2,5	1,3	1	0	–120	0	–250	1,3	2,5	1,3	2,5
30	**50**	0	–2,5	1,3	1	0	–120	0	–250	1,3	2,5	1,3	2,5
50	**80**	0	–3,8	2	1,3	0	–150	0	–250	1,3	2,5	1,3	2,5
80	**120**	0	–5	2,5	1,5	0	–200	0	–380	2,5	2,5	2,5	2,5
120	**150**	0	–6,5	3	2	0	–250	0	–380	2,5	2,5	2,5	2,5
150	**180**	0	–6,5	3	2	0	–300	0	–500	3,8	5	3,8	5
180	**250**	0	–7,5	4	2,5	0	–350	0	–500	3,8	5	3,8	5

Outer ring

D over	D incl.	Δ_{Ds} high	Δ_{Ds} low	V_{Dp} max	V_{Dmp} max	Δ_{Cs}, Δ_{C1s}	V_{Cs} max	K_{ea} max	S_D max	S_{ea} max
mm		µm		µm	µm	µm	µm	µm	µm	µm
18	**30**	0	–3,8	2	1,3	Values are	1,3	2,5	1,3	2,5
30	**50**	0	–3,8	2	1,3	identical to	1,3	2,5	1,3	2,5
50	**80**	0	–3,8	2	1,3	those for inner ring	1,3	3,8	1,3	3,8
80	**120**	0	–5	2,5	1,3	of same	2,5	5	2,5	5
120	**150**	0	–5	2,5	1,5	bearing	2,5	5	2,5	5
150	**180**	0	–6,5	3	2	(Δ_{Bs}, Δ_{B1s})	2,5	5	2,5	5
180	**250**	0	–7,5	4	2,5		3,8	6,5	3,8	6,5
250	**315**	0	–7,5	4	3,5		3,8	6,5	3,8	6,5
315	**400**	0	–10	5	5		6,5	7,5	6,5	7,5

Table 5

Bearing		Axial preload									
		Series 719 ACD 719 ACD/HC 719 ACX and 719 ACX/HC			Series 719 CD 719 CD/HC 719 CX and 719 CX/HC			Series 719 ACE and 719 ACE/HC		Series 719 CE and 719 CE/HC	
		Class			Class			Class		Class	
Bore diameter	Size	A	B	C[1]	A	B	C[1]	A	B	A	B
mm		N									
10	**00**	15	30	60	10	20	40	–	–	–	–
12	**01**	15	30	60	10	20	40	–	–	–	–
15	**02**	25	50	100	15	30	60	–	–	–	–
17	**03**	25	50	100	15	30	60	–	–	–	–
20	**04**	35	70	140	25	50	100	35	105	20	60
25	**05**	40	80	160	25	50	100	40	120	25	75
30	**06**	40	80	160	25	50	100	40	120	25	75
35	**07**	60	120	240	35	70	140	55	165	35	105
40	**08**	70	140	280	45	90	180	75	225	45	135
45	**09**	80	160	320	50	100	200	80	240	50	150
50	**10**	80	160	320	50	100	200	80	240	50	150
55	**11**	120	240	480	70	140	280	120	360	75	225
60	**12**	120	240	480	70	140	280	120	360	75	225
65	**13**	120	240	480	80	160	320	130	390	80	240
70	**14**	200	400	800	130	260	520	170	510	105	315
75	**15**	210	420	840	130	260	520	180	540	110	330
80	**16**	220	440	880	140	280	560	180	540	110	330
85	**17**	270	540	1 080	170	340	680	230	690	140	420
90	**18**	280	560	1 120	180	360	720	230	690	140	420
95	**19**	290	580	1 160	190	380	760	245	735	150	450
100	**20**	360	720	1 440	230	460	920	295	885	180	540
105	**21**	360	720	1 440	230	460	920	300	900	185	555
110	**22**	370	740	1 480	230	460	920	310	930	190	570
120	**24**	450	900	1 800	290	580	1 160	385	1 155	235	705
130	**26**	540	1 080	2 160	350	700	1 400	–	–	–	–
140	**28**	560	1 120	2 240	360	720	1 440	–	–	–	–
150	**30**	740	1 480	960	470	940	1 880	–	–	–	–
160	**32**	800	1 600	3 200	490	980	1 960	–	–	–	–
170	**34**	800	1 600	3 200	500	1 000	2 000	–	–	–	–
180	**36**	1 000	2 000	4 000	630	1 260	2 520	–	–	–	–
190	**38**	1 000	2 000	4 000	640	1 280	2 560	–	–	–	–
200	**40**	1 250	2 500	5 000	800	1 600	3 200	–	–	–	–
220	**44**	1 300	2 600	5 200	850	1 700	3 400	–	–	–	–

[1] All-steel bearings only

Series 719
Preload in bearings for universal pairing and bearing sets arranged back-to-back or face-to-face

Series 70
Preload in bearings for universal pairing and bearing sets arranged back-to-back or face-to-face

➤

Table 6

Bearing		Axial preload									
		Series 70 ACD 70 ACD/HC 70 ACX and 70 ACX/HC			Series 70 CD 70 CD/HC 70 CX and 70 CX/HC			Series 70 ACE and 70 ACE/HC		Series 70 CE and 70 CE/HC	
		Class			Class						
Bore diameter	Size	A	B	C[1]	A	B	C[1]	A	B	A	B
mm		N									
8	**8**	20	40	80	10	20	40	–	–	–	–
9	**9**	20	40	80	10	20	40	–	–	–	–
10	**00**	25	50	100	15	30	60	–	–	–	–
12	**01**	25	50	100	15	30	60	–	–	–	–
15	**02**	30	60	120	20	40	80	–	–	–	–
17	**03**	40	80	160	25	50	100	–	–	–	–
20	**04**	50	100	200	35	70	140	55	165	35	105
25	**05**	60	120	240	35	70	140	55	165	35	105
30	**06**	90	180	360	50	100	200	80	240	50	150
35	**07**	90	180	360	60	120	240	80	240	50	150
40	**08**	100	200	400	60	120	240	90	270	55	165
45	**09**	170	340	680	110	220	440	105	315	65	195
50	**10**	180	360	720	110	220	440	115	345	70	210
55	**11**	230	460	920	150	300	600	120	360	75	225
60	**12**	240	480	960	150	300	600	130	390	80	240
65	**13**	240	480	960	160	320	640	130	390	80	240
70	**14**	300	600	1 200	200	400	800	180	540	110	330
75	**15**	310	620	1 240	200	400	800	180	540	110	330
80	**16**	390	780	1 560	240	480	960	230	690	140	420
85	**17**	400	800	1 600	250	500	1 000	230	690	140	420
90	**18**	460	920	1 840	300	600	1 200	295	885	180	540
95	**19**	480	960	1 920	310	620	1 240	295	885	180	540
100	**20**	500	1 000	2 000	310	620	1 240	300	900	185	555
105	**21**	560	1 180	2 360	360	720	1 440	–	–	–	–
110	**22**	650	1 300	2 600	420	840	1 680	–	–	–	–
120	**24**	690	1 380	2 760	430	860	1 720	–	–	–	–
130	**26**	900	1 800	3 600	560	1 120	2 240	–	–	–	–
140	**28**	900	1 800	3 600	570	1 140	2 280	–	–	–	–
150	**30**	1 000	2 000	4 000	650	1 300	2 600	–	–	–	–
160	**32**	1 150	2 300	4 600	730	1 460	2 920	–	–	–	–
170	**34**	1 250	2 500	5 000	800	1 600	3 200	–	–	–	–
180	**36**	1 450	2 900	5 800	900	1 800	3 600	–	–	–	–
190	**38**	1 450	2 900	5 800	950	1 900	3 800	–	–	–	–
200	**40**	1 750	3 500	7 000	1 100	2 200	4 400	–	–	–	–
220	**44**	2 000	4 000	8 000	1 250	2 500	5 000	–	–	–	–
240	**48**	2 050	4 100	8 200	1 300	2 600	5 200	–	–	–	–

[1] All-steel bearings only

Sets of three or more bearings have a higher preload than sets of two bearings. The relevant preload value can be calculated by multiplying the preload values of pairs reported in the tables by the following factors:
1,35 for TBT and TFT sets
1,60 for QBT and QFT sets
2,00 for QBC and QFC sets.

To calculate preload for sets of bearings involving more than four bearings, or for sets incorporating bearings of different designs, size and contact angle, please contact SKF application engineering service.

Series 72
Preload in bearings for universal pairing and bearing sets arranged back-to-back or face-to-face

Table 7

Bearing		Axial preload					
		Series 72 ACD 72 ACD/HC 72 ACX and 72 ACX/HC			Series 72 CD 72 CD/HC 72 CX and 72 CX/HC		
Bore diameter	Size	Class A	B	C[1)]	Class A	B	C[1)]
mm	–	N					
10	**00**	35	70	140	20	40	80
12	**01**	35	70	140	20	40	80
15	**02**	45	90	180	30	60	120
17	**03**	60	120	240	35	70	140
20	**04**	70	140	280	45	90	180
25	**05**	80	160	320	50	100	200
30	**06**	150	300	600	90	180	360
35	**07**	190	380	760	120	240	480
40	**08**	240	480	960	150	300	600
45	**09**	260	520	1 040	160	320	640
50	**10**	260	520	1 040	170	340	680
55	**11**	330	660	1 320	210	420	840
60	**12**	400	800	1 600	250	500	1 000
65	**13**	450	900	1 800	290	580	1 160
70	**14**	480	960	1 920	300	600	1 200
75	**15**	500	1 000	2 000	310	620	1 240
80	**16**	580	1 160	2 320	370	740	1 480
85	**17**	600	1 200	2 400	370	740	1 480
90	**18**	750	1 500	3 000	480	960	1 920
95	**19**	850	1 700	3 400	520	1 040	2 080
100	**20**	950	1 900	3 800	590	1 180	2 360
105	**21**	1 000	2 000	4 000	650	1 300	2 600
110	**22**	1 050	2 100	4 200	670	1 340	2 680
120	**24**	1 200	2 400	4 800	750	1 500	3 000

[1)] All-steel bearings only

Factors affecting the preload

Preload on bearing systems is influenced by several factors under static and dynamic conditions.

The actual preload value on the bearings fitted in a system differs from the pre-determined preload value in the manufacturing process, depending on:
- the actual fits between the bearing inner rings and the shaft, and between the bearing outer rings and the housing
- the system speed for constant position arrangements.

Other effects may influence the actual preload of angular contact ball bearings systems while operating such as:
- temperature differences in operation between the bearing inner ring and outer rings and the rolling elements
- the shaft and housing materials (i.e. different materials may show varying thermal expansion coefficients, resulting in a differential deformation of the mating part while the system is operating).
- geometric errors (e.g. imposed misalignment, cylindricity and conicity errors, coaxiality errors between front and rear housing).

In case of applications where the above points may be important please contact the SKF application engineering service for advice.

Influence of the fit on the preload
When a bearing is mounted with an interference fit on the shaft, the inner ring will expand, increasing the raceway diameter. Conversely, an interference fit in the housing will compress the outer ring, reducing the raceway diameter.

One of these conditions alone or both together, will reduce the space for the rolling elements and thus increase the preload of the bearing set.

The preload change thus depends on the real fit between bearings and mating parts. When mating parts are made to tolerances according to the recommendations given in **Tables 1 and 2 pages 42 – 43** (e.g. js4 for shafts and JS5 for housings for bearings of P4A precision class) the preload increase can then be calculated from the following equation with reasonable accuracy.

$$G_m = f\, f_1\, f_2\, f_{HC}\, G_{A,\,B,\,C}$$

where
G_m = preload of the mounted bearing sets, N
$G_{A,\,B,\,C}$ = preload of bearing sets prior to mounting, see **Tables 5, 6 and 7 pages 124 – 126**
f = bearing factor, see **Diagram 1 page 129**
f_1 = correction factor depending on contact angle, see **Table 8 page 128**
f_2 = correction factor depending on preload class, see **Table 8**
f_{HC} = correction factor for hybrid bearings where applicable, see **Table 8**

Example
What will be the preload of the bearing pair 71924 CD/P4ADBC when mounted?

From **Table** 5 **page 124**, the value of G_C is 1 160 N. The value of the bearing factor f = 2,2 according to **Diagram** 1. The correction factors obtained from **Table** 8 are $f_1 = 1$ and $f_2 = 1{,}24$. Therefore,

$$G_m = f\, f_1\, f_2\, G_C$$

$$G_m = 2{,}2 \times 1 \times 1{,}24 \times 1\,160\ \text{N} = 3\,165\ \text{N}$$

In other cases the fits may have to be significantly higher, for instance in very high-speed spindles, to avoid the bearing inner ring from loosening its contact with the shaft as a result of the centrifugal force. The effect of fits must then be calculated in more detail. For special cases such as these, please consult the SKF application engineering service.

The relationship between bearing fits, shafts, housing proportions and preload increases can be studied according to **Diagram** 1.

List of correction factors for preload calculation

Table 8

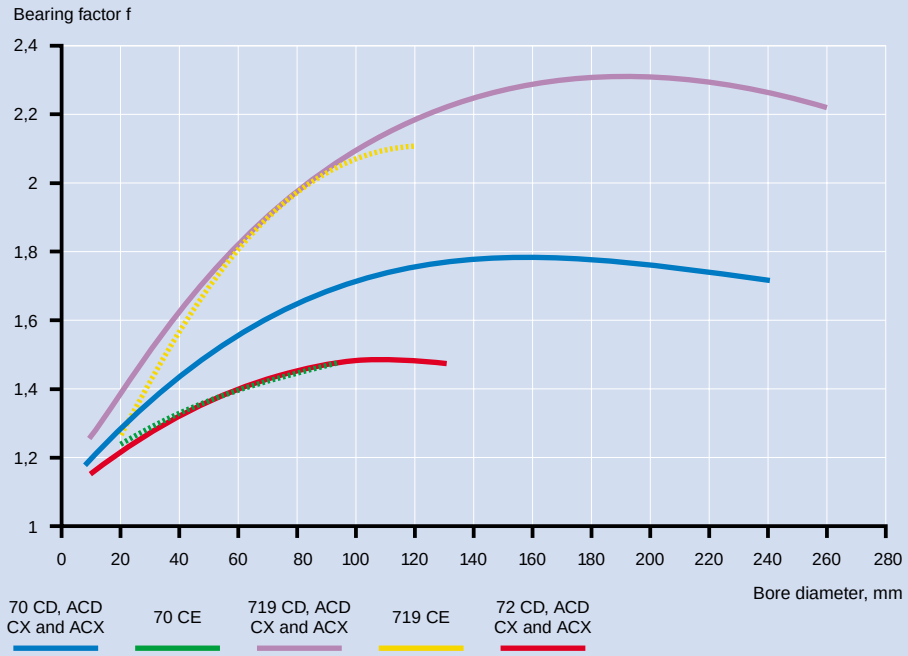
Bearing series	f_{HC} [1]	f_1 [2]	f_2 [3] Preload A	f_2 [3] Preload B	f_2 [3] Preload C
719 CD and CX	1	1	1	1,12	1,24
719 ACD and ACX	1	0,92	1	1,1	1,21
719 CE	1	1	1	1,14	–
719 ACE	1	0,92	1	1,14	–
719 CD/HC and CX/HC	1,08	1	1	1,12	–
719 ACD/HC and ACX/HC	1,08	0,92	1	1,12	–
719 CE/HC	1,06	1	1	1,14	–
719 ACE/HC	1,05	0,92	1	1,14	–
70 CD and CX	1	1	1	1,1	1,2
70 ACD and ACX	1	0,92	1	1,09	1,18
70 CE	1	1	1	1,08	–
70 ACE	1	0,96	1	1,08	–
70 CD/HC and CX/HC	1,07	1	1	1,1	–
70 ACD/HC and ACX/HC	1,06	0,92	1	1,09	–
70 CE/HC	1,02	1	1	1,09	–
70 ACE/HC	1,03	0,96	1	1,07	–
72 CD and CX	1	1	1	1,04	1,1
72 ACD and ACX	1	0,95	1	1,05	1,1
72 CD/HC and CX/HC	1,04	1	1	1,04	–
72 ACD/HC and ACX/HC	1,02	0,95	1	1,04	–

[1] f_{HC} = correction factor for ceramic balls
[2] f_1 = correction factor for contact angle
[3] f_2 = correction factor dependent on preload

Influence of speed on preload
A drastic increase in preload may also occur when approaching very high-speeds. The increase is mostly due to the centrifugal load affecting the position of the rolling elements. Thus, adoption of ceramic balls allows much higher rotational speeds, while maintaining low heat generation and

Bearing factor f

Diagram 1



adequate stiffness. In **Diagram** 2 the preload variation versus speed for different executions of basic bearing type 7014 is shown. For applications where speed is in excess of 1 – 1,2 million n d_m and constant position preload is necessary, please consult the SKF Application Engineering Service for more details.

For high-speed applications like internal grinding spindles and high-frequency milling spindles, the preload is often given through a set of elastic calibrated springs (→ **fig** 11), or alternatively hydraulic preload is used.

Table 9 gives guideline values for the spring force to be applied on bearings in constant load arrangements. The values refer to single bearings with 15 degrees contact angle (suffixes CX, CD and CE), both all-steel and hybrid, of the most popular sizes used with spring preload systems. If bearings are paired in tandem, the value in the table needs to be multiplied by the number of single bearings in the set.

The above values are calculated to minimise the difference in contact angle between outer and inner raceway contacts, and to retain a certain axial rigidity of the bearing at high speed. However, it should be noted that additional preload is detrimental to performance because of heat generation.

Preload increase factor for different bearing designs
Reference base type 7014

Diagram 2

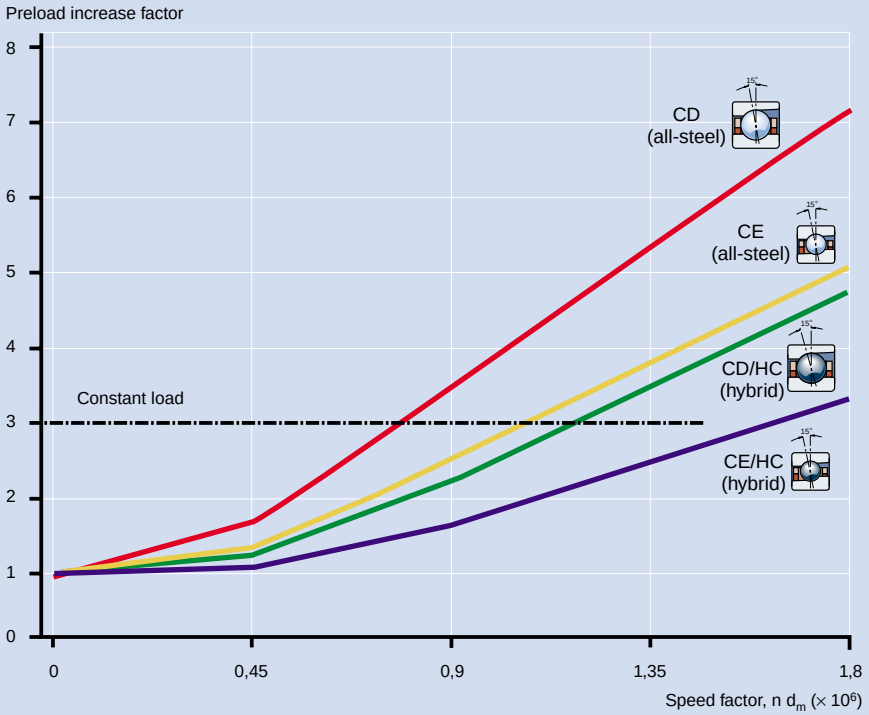
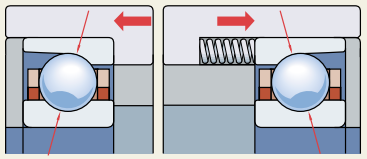


Fig 11



For applications where extremely high speed is required preloading should be done through calibrated springs acting against a bearing ring

Table 9

Guideline values for the spring force in constant load bearing arrangements

Bearing size	Speed factor (n d_m × 10^6) 2,25 Preload	2,0	1,75	1,5	1,25
	N				
7000	150	150	150	125	100
7001	150	150	150	125	100
7002	160	160	160	125	100
7003	175	175	150	125	100
7004	250	250	200	150	150
7005	280	280	250	200	175
7006	350	350	300	200	175
7007	400	400	350	300	200
7008	400	400	350	300	200
7009	750	750	650	500	400
7010	750	750	650	500	400
7011	1 000	1 000	900	800	600
7012	1 000	1 000	900	800	600

Preload for customised needs

Most often, intermediate rings (spacers) are inserted between the bearings of a set (→ **fig 12 page 135**). When a special preload may be required to achieve the best performance, it is possible to change preload by face grinding the inner or outer spacer. It is not advisable to modify the bearings in any way.

Tables 10 and 11 show which spacer(s) should be ground to increase or decrease the preload. **Tables 12 and 13, page 134** show the necessary width reduction to be achieved by face grinding.

Spacers are not only used to customise the preload but to improve the system rigidity, and sometimes to bring the oil pipes as close as possible to the raceways. In

Table 10

Spacer(s) to be ground to increase preload

Bearing arrangement	The part to be face ground	Amount to be ground off to increase preload from		
		A up to B	B up to C	A up to C
Back-to-back	Inner spacer	a	b	a + b
Face-to-face	Outer spacer	a	b	a + b

Table 11

Spacer(s) to be ground to decrease preload

Bearing arrangement	The part to be face ground	Amount to be ground off to decrease preload from		
		B down to A	C down to B	C down to A
Back-to-back	Outer spacer	a	b	a + b
Face-to-face	Inner spacer	a	b	a + b

Spacer width reduction for changing preloads in matched sets, CD, CX and CE designs

Table 12

Bearing size		Spacer adjustment							
		Series 719 CD 719 CD/HC 719 CX and 719 CX/HC		Series 70 CD 70 CD/HC 70 CX and 70 CX/HC		Series 72 CD 72 CD/HC 72 CX and 72 CX/HC		Series 719 CE and 719 CE/HC	Series 70 CE and 70 CE/HC
Bore diameter	Size	a	b	a	b	a	b	a	a
mm	–	µm							
8	**8**	–	–	4	6	–	–	–	–
9	**9**	–	–	4	6	–	–	–	–
10	**00**	4	6	5	7	6	9	–	–
12	**01**	4	6	5	7	6	9	–	–
15	**02**	5	7	5	8	7	11	–	–
17	**03**	5	7	6	9	8	11	–	–
20	**04**	5	8	7	10	8	12	10	14
25	**05**	5	8	7	10	8	12	11	13
30	**06**	5	8	8	13	11	15	11	16
35	**07**	6	10	8	13	12	17	13	15
40	**08**	7	11	8	13	13	21	14	15
45	**09**	7	11	12	17	14	21	15	16
50	**10**	7	12	12	17	14	21	15	17
55	**11**	10	15	14	19	16	24	21	15
60	**12**	10	15	14	19	18	26	21	16
65	**13**	10	18	14	20	20	29	22	16
70	**14**	13	19	15	23	20	29	25	19
75	**15**	13	19	15	23	20	29	25	19
80	**16**	13	20	17	25	20	32	26	22
85	**17**	15	22	17	25	20	32	29	22
90	**18**	15	23	18	29	25	36	29	26
95	**19**	16	23	19	29	25	39	30	26
100	**20**	17	26	19	29	27	41	33	26
105	**21**	17	26	21	32	28	42	34	
110	**22**	17	26	23	34	28	42	35	–
120	**24**	19	29	23	35	30	46	38	–
130	**26**	21	31	26	39	–	–	–	–
140	**28**	21	33	26	39	–	–	–	–
150	**30**	25	38	27	43	–	–	–	–
160	**32**	26	39	29	45	–	–	–	–
170	**34**	26	40	29	45	–	–	–	–
180	**36**	28	44	30	47	–	–	–	–
190	**38**	29	44	31	49	–	–	–	–
200	**40**	31	49	34	54	–	–	–	–
220	**44**	33	51	37	56	–	–	–	–
240	**48**			38	59	–	–	–	–

Spacer width reduction for changing preloads in matched sets, ACD, ACX and ACE designs

Table 13

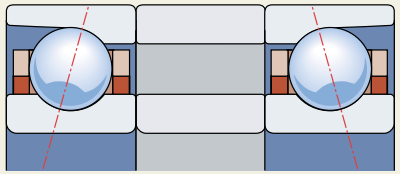
Bearing size		Spacer adjustment Series 719 ACD 719 ACD/HC 719 ACX and 719 ACX/HC		Series 70 ACD 70 ACD/HC 70 ACX and 70 ACX/HC		Series 72 ACD 72 ACD/HC 72 ACX and 72 ACX/HC		Series 719 ACE and 719 ACE/HC	Series 70 ACE and 70 ACE/HC
Bore diameter	Size	a	b	a	b	a	b	a	a
mm	–	µm							
8	**8**	–	–	3	4	–	–	–	–
9	**9**	–	–	3	4	–	–	–	–
10	**00**	2	4	3	5	3	6	–	–
12	**01**	2	4	3	5	3	6	–	–
15	**02**	3	5	3	5	5	7	–	–
17	**03**	3	5	4	6	5	8	–	–
20	**04**	4	5	4	7	5	8	7	9
25	**05**	4	5	5	7	5	8	7	8
30	**06**	4	5	6	9	7	11	7	10
35	**07**	5	6	6	9	9	12	8	9
40	**08**	5	7	6	9	10	14	9	9
45	**09**	5	7	7	12	10	14	9	10
50	**10**	5	7	8	12	10	14	9	10
55	**11**	6	10	8	14	11	17	13	10
60	**12**	6	10	8	14	12	18	13	10
65	**13**	6	10	8	14	13	20	14	10
70	**14**	8	13	10	15	13	21	15	12
75	**15**	9	13	10	15	13	21	15	12
80	**16**	9	13	12	18	13	22	15	14
85	**17**	10	15	12	18	13	22	17	14
90	**18**	10	16	12	19	16	25	18	16
95	**19**	10	16	12	20	17	27	18	16
100	**20**	11	18	13	21	18	29	20	16
105	**21**	11	18	13	22	18	30	20	
110	**22**	11	18	15	23	18	30	21	–
120	**24**	12	21	15	24	20	32	23	–
130	**26**	14	22	17	27	–	–	–	–
140	**28**	14	23	17	27	–	–	–	–
150	**30**	16	26	18	28	–	–	–	–
160	**32**	17	27	18	30	–	–	–	–
170	**34**	17	27	18	30	–	–	–	–
180	**36**	18	30	19	33	–	–	–	–
190	**38**	18	30	19	33	–	–	–	–
200	**40**	20	33	22	37	–	–	–	–
220	**44**	21	34	24	38	–	–	–	–
240	**48**			24	39	–	–	–	–

other cases, especially in grease-lubricated spindles, it is necessary to have spacers to allow grease to escape from the contact zone to reduce running temperature.

In order to get the best performance from the bearings, spacers should not deform under load, and form errors should not be introduced, as these would affect the preload of the bearing sets. In general, the guidelines given in the form tolerance requirements for shaft and housing can be followed. For spacers in particular, the material should be hard enough to resist damage during handling, preferably the same hardness as bearing rings (i.e. around 60 HRC), but materials with 45 – 50 HRC would be adequate.

The most important point concerns the parallelism of the faces and the width difference between the outer and inner spacer, in the same set of bearings. The parallelism should be kept within 1 – 2 µm. To obtain the lowest possible difference in width of the inner and outer spacer, the two spacers should be face ground together (one placed inside the other).

Fig 12



Example of spacers in between a group of two high-precision angular contact ball bearings matched back-to-back

Cages

High-precision angular contact ball bearings are as standard equipped with outer ring land riding fabric-reinforced phenolic resin cages. The cages are lightweight and designed to minimise centrifugal force, while ensuring an optimum lubricant flow throughout the ball-raceway contact. They are not identified in the bearing designation. New, better performance cages now being introduced are made of PEEK (polyether ether ketone) and are identified in the bearing designation by the suffix “TNH”. Fabric-reinforced phenolic resin ball guided cages and metallic machined cages are also available on request.

Speed ratings

The limiting speeds quoted in the bearing tables are guideline values and are valid provided that the bearings are lightly loaded ($P \leqslant 0{,}06\ C$), that they are lightly preloaded by means of springs, and that the transport of heat away from the bearing position is good.

The values for oil spot lubrication are maximum values and should be reduced for certain other methods of oil lubrication as mentioned in the chapter **Speed** (➔ **page 23**). The values for grease lubrication are also maximum values. Both apply to single bearings.

When single bearings are adjusted against each other to a greater degree, e.g. to increase spindle stiffness, or if matched sets of two, three or four bearings are to be used, the speed rating values given in the tables must be reduced.

Reduction factors to obtain guideline values for the appropriate conditions are given in **Table** 14.

For special preloads please contact SKF.

If the speed rating obtained from the above for matched bearing sets is inadequate, a simple design change, such as the inclusion of intermediate rings between the bearings will allow appreciable increases to be made (➔ **fig** 12 **page 135**). For sets of three bearings, for example, it should then be possible to run at the speed rating for paired bearings. Springs to preload the bearings may be beneficial. This type of preload is generally used for high-speed operation in order to obtain an even preload over the whole operating range of the machine.

Speed reduction factors for preloaded bearing sets of angular contact ball bearings

Table 14

Bearing arrangement	**Bearing design** CD, CD/HC, ACD ACD/HC CX, CX/HC, ACX and ACX/HC Preload			All Special preload	CE, CE/HC, ACE and ACE/HC Preload	
	A	B	C		A	B
Set of 2 bearings paired in tandem	0,90	0,80	0,65		0,90	0,70
Set of 2 bearings paired back-to-back or face-to-face	0,80	0,70	0,55	Call SKF	0,75	0,60
Set of 3 bearings	0,70	0,55	0,35		0,65	0,40
Set of 4 bearings	0,65	0,45	0,25		0,55	0,30

Equivalent dynamic bearing load

For bearings arranged singly or paired in tandem

$P = F_r$ when $F_a/F_r \leqslant e$
$P = XF_r + YF_a$ when $F_a/F_r > e$

Factor values are given in **Table** 15 **page 138**.

When calculating bearing pairs, F_r and F_a represent the forces acting on the bearing pair.

For bearings paired back-to-back or face-to-face

$P = F_r + Y_1F_a$ when $F_a/F_r \leqslant e$
$P = XF_r + Y_2F_a$ when $F_a/F_r > e$

Factor values are given in **Table** 16 **page 138**. When calculating bearing pairs, F_r and F_a represent the forces acting on the bearing pair.

Equivalent static bearing load

For bearings arranged singly or paired in tandem

$P_0 = 0{,}5\ F_r + Y_0F_a$

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

For bearings paired back-to-back or face-to-face

$P_0 = F_r + Y_0F_a$

The value of factor Y_0 depends on the contact angle and can be obtained from **Tables** 15 **and** 16. When calculating bearing pairs, F_r and F_a are the forces acting on the bearing pair.

Vibration from other machinery, traffic or during transportation may cause damage to bearings. In such cases, bearing life is not limited by the material fatigue, but by the permanent deformation produced in the contact between balls and raceways. A ball may be driven into the surface of the rings by the applied load. The same may happen for bearings sustaining heavy shock loads during a fraction of a revolution.

As demands are high for running properties and life, permanent deformation of the bearing parts should be avoided at all times. The maximum load should therefore not exceed the equivalent static load obtained from the equation:

$$P_0 = C_0/s_0$$

where
P_0 = equivalent static bearing load, N
C_0 = basic static load rating, N
s_0 = static safety factor.

For all-steel high-precision angular contact ball bearings, a minimum safety factor s_0 of 3 is recommended. For hybrid bearings, a safety factor s_0 of 3,4 can be used.

Calculation factors for single bearings and bearings paired in tandem

Table 15

$f_0 F_a/C_0$	e	X	Y	Y_0
Contact angle 15 degrees (suffix CD, CX and CE)				
< 0,178	0,38	0,44	1,47	0,46
0,357	0,4	0,44	1,40	0,46
0,714	0,43	0,44	1,30	0,46
1,07	0,46	0,44	1,23	0,46
1,43	0,47	0,44	1,19	0,46
2,14	0,5	0,44	1,12	0,46
3,57	0,55	0,44	1,02	0,46
5,35	0,56	0,44	1,00	0,46
> 7,14	0,56	0,44	1,00	0,46
Contact angle 25 degrees (suffix ACD, ACX and ACE)				
–	0,68	0,41	0,87	0,38

Values of f_0 are given in the bearing tables

Calculation factors for bearings paired back-to-back or face-to-face

Table 16

$2\ f_0 F_a/C_0$	e	X	Y_1	Y_2	Y_0
Contact angle 15 degrees (suffix CD, CX and CE)					
< 0,178	0,38	0,72	1,65	2,39	0,92
0,357	0,4	0,72	1,57	2,28	0,92
0,714	0,43	0,72	1,46	2,11	0,92
1,07	0,46	0,72	1,38	2,00	0,92
1,43	0,47	0,72	1,34	1,93	0,92
2,14	0,5	0,72	1,26	1,82	0,92
3,57	0,55	0,72	1,14	1,66	0,92
5,35	0,56	0,72	1,12	1,63	0,92
> 7,14	0,56	0,72	1,12	1,63	0,92
Contact angle 25 degrees (suffix ACD, ACX and ACE)					
–	0,68	0,67	0,92	1,41	0,76

Values of f_0 are given in the bearing tables

Calculation of equivalent bearing load for preloaded angular contact ball bearings

When calculating the equivalent bearing load for preloaded bearings, it is necessary to take the preload into account. The axial component of the load (F_a) is needed for the equivalent load calculation. It is obtained using the following equations when actual operating conditions are considered (the values obtained will be approximate).

For bearing pairs under radial load and axially secured

$$F_a = G_m$$

For bearing pairs under radial load and preloaded by springs

$$F_a = G_{A,\,B}$$

For bearing pairs under axial load and axially secured

$$F_a = G_m + 0{,}67\ K_a \quad \text{when } K_a \leqslant 3\ G_m$$
$$F_a = K_a \quad \text{when } K_a > 3\ G_m$$

For bearing pairs under axial load and preloaded by springs

$$F_a = G_{A,\,B} + K_a$$

where
F_a = axial component of a bearing load, N
$G_{A,\,B}$ = preload of a bearing pair, N
G_m = preload on a mounted bearing pair, N
K_a = external axial force acting on single bearing, N

Designation systems of single bearings and matched sets

The complete designation of a single bearing identifies the series, bore diameter, contact angle, and design, as well as the suffix indicating the tolerance class e.g. 71914 CD/P4A. The designation of bearing sets also includes suffixes indicating the number of bearings in the set, their arrangement and preload. Additional suffixes may be added to identify bearings incorporating special features, such as greases, special tolerances, etc. Please consult SKF for precise information.

The designation scheme of SKF high-precision angular contact ball bearings is shown in **Table 17 page 140**.

Table 17

719 | 10 | ACE | TNH | / | HC | P4A | Q | BC | A

Bearing series
719 Single row angular contact ball bearing, ISO Dimension Series 19
70 Single row angular contact ball bearing, ISO Dimension Series 10
72 Single row angular contact ball bearing, ISO Dimension Series 02

Bore diameter
8 8 mm bore diameter
9 9 mm bore diameter
00 10 mm bore diameter
01 12 mm bore diameter
02 15 mm bore diameter
03 17 mm bore diameter
04 (×5) 20 mm bore diameter
I
48 (×5) 240 mm bore diameter

Contact angle and internal design
ACD, ACX 25°
CD,CX 15°
ACE 25°
CE 15°

Cage design and material
— Outer ring land riding, fabric reinforced phenolic resin
TNH Rolling element riding, glass fibre reinforced PEEK

Rolling element material
— Steel
HC Silicon nitride (ceramic)

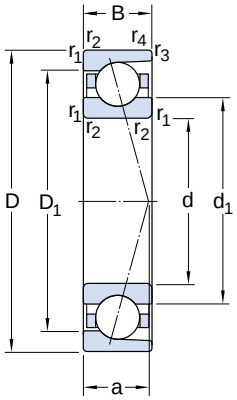
Tolerance class
P4A Dimensional accuracy to ISO class 4, running accuracy better than ISO class 4
PA9A Accuracy to ABMA class ABEC 9

Number of bearings in set
D 2 bearings in matched set
T 3 bearings in matched set
Q 4 bearings in matched set

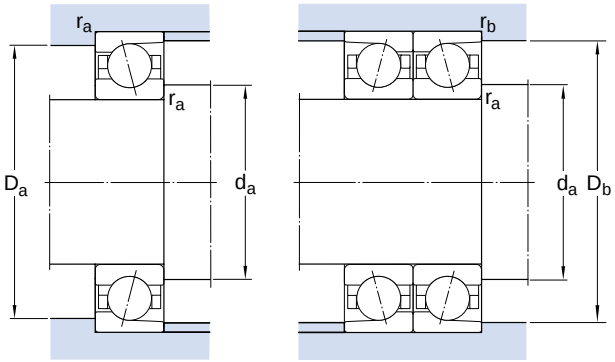
Bearing arrangement in matched set
B Back-to-back
F Face-to-face
T Tandem
BT Back-to-back/tandem
FT Face-to-face/tandem
BC Back-to-back of pairs in tandem
FC Face-to-face of pairs in tandem
G For universal pairing

Preload
A Light preload
B Medium preload
C Heavy preload
G.. Special preload, value in daN, e.g. G240

Product tables

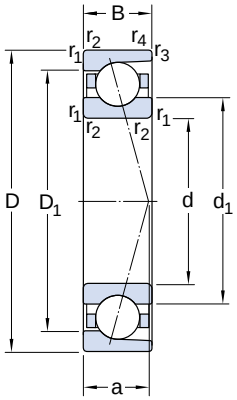


CD, ACD, CX and ACX

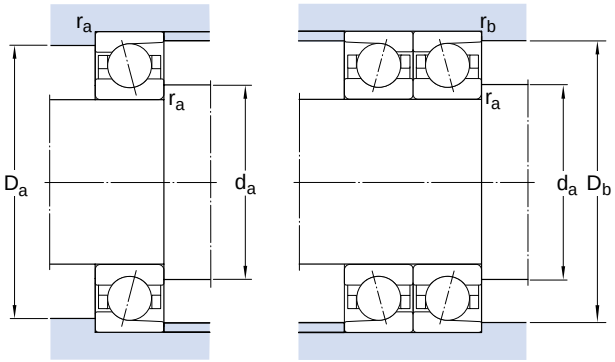


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
8	22	7	3 450	1 460	68	8,4	75 000	120 000	0,011	**708 CX**
9	24	7	3 710	1 730	80	8,8	67 000	100 000	0,014	**709 CX**
10	22	6	2 600	1 250	57	9,5	70 000	110 000	0,009	**71900 CX**
	22	6	2 510	1 200	55	–	63 000	95 000	0,009	**71900 ACX**
	26	8	5 070	2 400	110	8,3	67 000	100 000	0,018	**7000 CX**
	26	8	4 940	2 280	106	–	56 000	85 000	0,018	**7000 ACX**
	30	9	5 920	2 700	156	8,2	60 000	90 000	0,029	**7200 CX**
	30	9	5 720	2 600	150	–	53 000	80 000	0,029	**7200 ACX**
12	24	6	2 910	1 530	71	9,8	67 000	100 000	0,01	**71901 CX**
	24	6	2 760	1 460	67	–	60 000	90 000	0,01	**71901 ACX**
	28	8	5 530	2 750	127	8,7	60 000	90 000	0,02	**7001 CX**
	28	8	5 270	2 650	122	–	53 000	80 000	0,02	**7001 ACX**
	32	10	6 760	3 100	180	8,5	53 000	80 000	0,036	**7201 CX**
	32	10	6 630	3 000	176	–	48 000	70 000	0,036	**7201 ACX**
15	28	7	4 360	2 400	110	9,6	56 000	85 000	0,015	**71902 CX**
	28	7	4 160	2 280	104	–	50 000	75 000	0,015	**71902 ACX**
	32	9	6 240	3 450	160	9,3	50 000	75 000	0,028	**7002 CX**
	32	9	5 920	3 250	153	–	45 000	67 000	0,028	**7002 ACX**
	35	11	7 410	3 650	212	8,5	48 000	70 000	0,043	**7202 CX**
	35	11	7 150	3 550	204	–	43 000	63 000	0,043	**7202 ACX**
17	30	7	4 490	2 650	122	9,8	50 000	75 000	0,017	**71903 CX**
	30	7	4 360	2 500	116	–	45 000	67 000	0,017	**71903 ACX**
	35	10	6 500	3 800	176	9,1	48 000	70 000	0,037	**7003 CX**
	35	10	6 180	3 650	170	–	40 000	60 000	0,037	**7003 ACX**
	40	12	9 230	4 650	270	8,5	43 000	63 000	0,062	**7203 CX**
	40	12	8 840	4 500	260	–	38 000	56 000	0,062	**7203 ACX**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
8	11,8	17,6	0,3	0,1	6	10	20	20,1	0,3	0,1
9	13,5	19,9	0,3	0,1	6	11	22	22,1	0,3	0,1
10	13,6	17,8	0,3	0,1	5	12	20	20,5	0,3	0,1
	13,6	17,8	0,3	0,1	7	12	20	20,5	0,3	0,1
	15,1	21,3	0,3	0,1	6	12	24	24,1	0,3	0,1
	15,1	21	0,3	0,1	8	12	24	24,1	0,3	0,1
	16,8	23,3	0,6	0,3	7	15	25	27,1	0,6	0,3
	16,8	23,3	0,6	0,3	9	15	25	27,1	0,6	0,3
12	15,9	20,1	0,3	0,1	5	14	22	22,5	0,3	0,1
	15,9	20,1	0,3	0,1	7	14	22	22,5	0,3	0,1
	17,1	23,3	0,3	0,1	7	14	26	26,1	0,3	0,1
	17,1	23,3	0,3	0,1	9	14	26	26,1	0,3	0,1
	18,2	25,8	0,6	0,3	8	17	27	29,1	0,6	0,3
	18,2	25,8	0,6	0,3	10	17	27	29,1	0,6	0,3
15	19,1	23,9	0,3	0,1	6	17	26	26,5	0,3	0,1
	19,1	23,9	0,3	0,1	9	17	26	26,5	0,3	0,1
	20,6	26,8	0,3	0,1	8	17	30	30,1	0,3	0,1
	20,6	26,5	0,3	0,1	10	17	30	30,1	0,3	0,1
	21,5	29,1	0,6	0,3	9	20	30	33	0,6	0,3
	21,5	29,1	0,6	0,3	12	20	30	33	0,6	0,3
17	21,1	25,9	0,3	0,1	7	19	28	28,5	0,3	0,1
	21,1	25,9	0,3	0,1	9	19	28	28,5	0,3	0,1
	22,9	29,6	0,3	0,1	9	19	33	33,4	0,3	0,1
	22,9	29,2	0,3	0,1	11	19	33	33,4	0,3	0,1
	24,2	32,8	0,6	0,3	10	22	35	38	0,6	0,3
	24,2	32,8	0,6	0,3	13	22	35	38	0,6	0,3

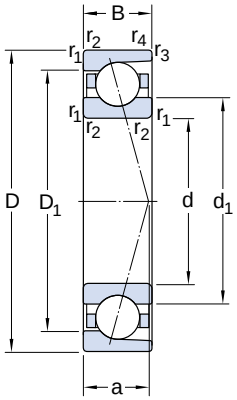


CD, ACD, CX and ACX

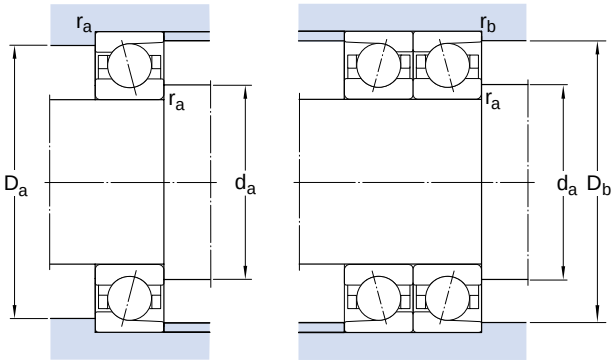


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
20	37	9	6 630	4 050	186	9,8	43 000	63 000	0,035	**71904 CX**
	37	9	6 240	3 900	180	–	38 000	56 000	0,035	**71904 ACX**
	42	12	10 400	6 100	280	9,2	38 000	56 000	0,065	**7004 CX**
	42	12	9 950	5 850	270	–	34 000	50 000	0,065	**7004 ACX**
	47	14	12 400	6 550	375	8,7	36 000	53 000	0,1	**7204 CX**
	47	14	11 900	6 200	360	–	32 000	48 000	0,1	**7204 ACX**
25	42	9	7 020	4 800	220	10	36 000	53 000	0,042	**71905 CX**
	42	9	6 630	4 550	212	–	32 000	48 000	0,042	**71905 ACX**
	47	12	11 400	7 350	340	9,6	34 000	50 000	0,075	**7005 CX**
	47	12	10 800	7 100	325	–	28 000	43 000	0,075	**7005 ACX**
	52	15	14 000	8 150	475	9,1	30 000	45 000	0,14	**7205 CX**
	52	15	13 500	7 800	450	–	26 000	40 000	0,14	**7205 ACX**
30	47	9	7 150	5 200	240	10	30 000	45 000	0,048	**71906 CX**
	47	9	6 760	4 900	228	–	26 000	40 000	0,048	**71906 ACX**
	55	13	14 600	10 000	465	9,4	28 000	43 000	0,11	**7006 CX**
	55	13	14 000	9 650	440	–	24 000	38 000	0,11	**7006 ACX**
	62	16	24 200	16 000	670	14	24 000	38 000	0,19	**7206 CD**
	62	16	23 400	15 300	640	–	20 000	34 000	0,19	**7206 ACD**
35	55	10	9 750	6 550	275	10	26 000	40 000	0,074	**71907 CD**
	55	10	9 230	6 200	260	–	22 000	36 000	0,074	**71907 ACD**
	62	14	15 600	9 500	400	9,7	22 000	36 000	0,15	**7007 CD**
	62	14	14 800	9 000	380	–	19 000	32 000	0,15	**7007 ACD**
	72	17	31 900	21 600	915	14	20 000	34 000	0,28	**7207 CD**
	72	17	30 700	20 800	880	–	18 000	30 000	0,28	**7207 ACD**
40	62	12	12 400	8 500	360	10	20 000	34 000	0,11	**71908 CD**
	62	12	11 700	8 000	340	–	18 000	30 000	0,11	**71908 ACD**
	68	15	16 800	11 000	465	10	19 000	32 000	0,19	**7008 CD**
	68	15	15 900	10 400	440	–	18 000	30 000	0,19	**7008 ACD**
	80	18	41 000	28 000	1 180	14	18 000	30 000	0,36	**7208 CD**
	80	18	39 000	27 000	1 140	–	16 000	26 000	0,36	**7208 ACD**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
20	25,4	31,6	0,3	0,15	8	22	35	35,5	0,3	0,1
	25,4	31,6	0,3	0,15	11	22	35	35,5	0,3	0,1
	26,9	35,1	0,6	0,3	10	25	37	39,1	0,6	0,3
	26,9	35,1	0,6	0,3	13	25	37	39,1	0,6	0,3
	29,1	38,7	1	0,3	12	26	41	44,1	1	0,3
	29,1	38,7	1	0,3	15	26	41	44,1	1	0,3
25	30,4	36,6	0,3	0,15	9	27	40	40,5	0,3	0,1
	30,4	36,6	0,3	0,15	12	27	40	40,5	0,3	0,1
	31,9	40,1	0,6	0,3	11	30	42	44,1	0,6	0,3
	31,9	40,1	0,6	0,3	15	30	42	44,1	0,6	0,3
	34,1	43,7	1	0,3	13	31	46	49,1	1	0,3
	34,1	43,7	1	0,3	17	31	46	49,1	1	0,3
30	35,4	41,6	0,3	0,15	10	32	45	45,5	0,3	0,1
	35,4	41,6	0,3	0,15	14	32	45	45,5	0,3	0,1
	38,1	46,9	1	0,3	12	36	49	52,1	1	0,3
	38,1	46,9	1	0,3	17	36	49	52,1	1	0,3
	40,3	51,7	1	0,3	14	36	56	60	1	0,3
	40,3	51,7	1	0,3	19	36	56	60	1	0,3
35	41,2	48,8	0,6	0,15	11	40	50	53,8	0,6	0,1
	41,2	48,8	0,6	0,15	16	40	50	53,8	0,6	0,1
	43,7	53,3	1	0,3	14	41	56	60	1	0,3
	43,7	53,3	1	0,3	19	41	56	60	1	0,3
	47	60	1,1	0,3	16	42	65	70	1	0,3
	47	60	1,1	0,3	21	42	65	70	1	0,3
40	46,7	55,3	0,6	0,15	13	45	57	60,8	0,6	0,1
	46,7	55,3	0,6	0,15	18	45	57	60,8	0,6	0,1
	49,2	58,8	1	0,3	15	46	62	66	1	0,3
	49,2	58,8	1	0,3	20	46	62	66	1	0,3
	53	67	1,1	0,6	17	47	73	75	1	0,6
	53	67	1,1	0,6	23	47	73	75	1	0,6

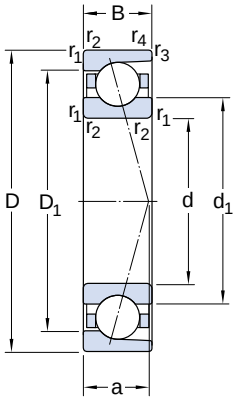


CD, ACD

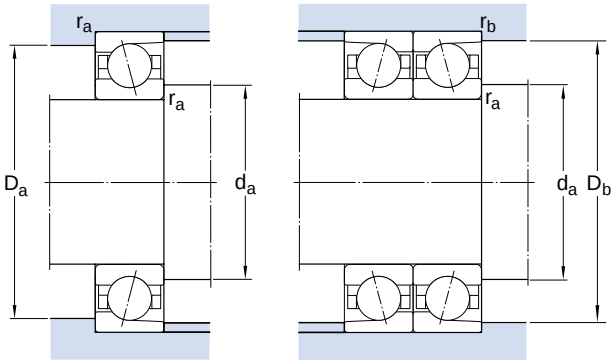


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
45	68	12	13 000	9 500	400	11	19 000	32 000	0,13	**71909 CD**
	68	12	12 400	9 000	380	–	17 000	28 000	0,13	**71909 ACD**
	75	16	28 600	22 400	950	15	18 000	30 000	0,23	**7009 CD**
	75	16	27 600	21 600	900	–	16 000	26 000	0,23	**7009 ACD**
	85	19	42 300	31 000	1 320	14	17 000	28 000	0,41	**7209 CD**
	85	19	41 000	30 000	1 250	–	15 000	24 000	0,41	**7209 ACD**
50	72	12	13 500	10 400	440	11	17 000	28 000	0,13	**71910 CD**
	72	12	12 700	9 800	415	–	16 000	26 000	0,13	**71910 ACD**
	80	16	29 600	24 000	1 020	15	17 000	28 000	0,25	**7010 CD**
	80	16	28 100	23 200	980	–	15 000	24 000	0,25	**7010 ACD**
	90	20	44 900	34 000	1 430	15	16 000	26 000	0,46	**7210 CD**
	90	20	42 300	32 500	1 390	–	14 000	22 000	0,46	**7210 ACD**
55	80	13	19 500	14 600	620	10	16 000	26 000	0,18	**71911 CD**
	80	13	18 200	13 700	585	–	15 000	24 000	0,18	**71911 ACD**
	90	18	39 700	32 500	1 370	15	15 000	24 000	0,37	**7011 CD**
	90	18	37 100	31 000	1 320	–	14 000	22 000	0,37	**7011 ACD**
	100	21	55 300	43 000	1 800	14	14 000	22 000	0,61	**7211 CD**
	100	21	52 700	40 500	1 730	–	13 000	20 000	0,61	**7211 ACD**
60	85	13	19 900	15 300	655	11	15 000	24 000	0,19	**71912 CD**
	85	13	18 600	14 600	620	–	14 000	22 000	0,19	**71912 ACD**
	95	18	40 300	34 500	1 500	15	14 000	22 000	0,4	**7012 CD**
	95	18	39 000	33 500	1 400	–	13 000	20 000	0,4	**7012 ACD**
	110	22	67 600	53 000	2 240	14	13 000	20 000	0,8	**7212 CD**
	110	22	63 700	50 000	2 120	–	11 000	18 000	0,8	**7212 ACD**
65	90	13	20 800	17 000	710	11	14 000	22 000	0,21	**71913 CD**
	90	13	19 500	16 000	680	–	13 000	20 000	0,21	**71913 ACD**
	100	18	41 600	37 500	1 600	16	14 000	22 000	0,42	**7013 CD**
	100	18	39 000	35 500	1 500	–	12 000	19 000	0,42	**7013 ACD**
	120	23	76 100	60 000	2 500	14	12 000	19 000	1	**7213 CD**
	120	23	72 800	57 000	2 400	–	10 000	17 000	1	**7213 ACD**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
45	52,2	60,8	0,6	0,15	14	50	63	66,8	0,6	0,1
	52,2	60,8	0,6	0,15	19	50	63	66,8	0,6	0,1
	54,7	65,3	1	0,3	16	51	69	73	1	0,3
	54,7	65,3	1	0,3	22	51	69	73	1	0,3
	57,5	72,5	1,1	0,6	18	52	78	80	1	0,6
	57,5	72,5	1,1	0,6	25	52	78	80	1	0,6
50	56,7	65,3	0,6	0,15	14	55	67	70,8	0,6	0,1
	56,7	65,3	0,6	0,15	20	55	67	70,8	0,6	0,1
	59,7	70,3	1	0,3	17	56	74	78	1	0,3
	59,7	70,3	1	0,3	17	56	74	78	1	0,3
	62,5	77,5	1,1	0,6	20	57	83	85	1	0,6
	62,5	77,5	1,1	0,6	27	57	83	85	1	0,6
55	62,7	72,3	1	0,3	16	61	74	78	1	0,3
	62,7	72,3	1	0,3	22	61	74	78	1	0,3
	66,3	78,7	1,1	0,6	19	62	83	86	1	0,6
	66,3	78,7	1,1	0,6	26	62	83	86	1	0,6
	69	85,9	1,5	0,6	21	64	91	95	1,5	0,6
	69	85,9	1,5	0,6	29	64	91	95	1,5	0,6
60	67,7	77,3	1	0,3	16	66	79	83	1	0,3
	67,7	77,3	1	0,3	23	66	79	83	1	0,3
	71,3	83,7	1,1	0,6	20	67	88	91	1	0,6
	71,3	83,7	1,1	0,6	27	67	88	91	1	0,6
	75,6	94,4	1,5	0,6	23	69	101	105	1,5	0,6
	75,6	94,4	1,5	0,6	31	69	101	105	1,5	0,6
65	72,7	82,3	1	0,3	17	71	84	88	1	0,3
	72,7	82,3	1	0,3	25	71	84	88	1	0,3
	76,3	88,7	1,1	0,6	20	72	93	96	1	0,6
	76,3	88,7	1,1	0,6	28	72	93	96	1	0,6
	82,5	103	1,5	0,6	24	74	111	115	1,5	0,6
	82,5	103	1,5	0,6	33	74	111	115	1,5	0,6

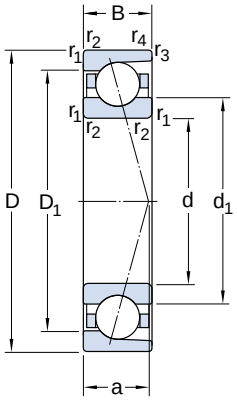


CD, ACD

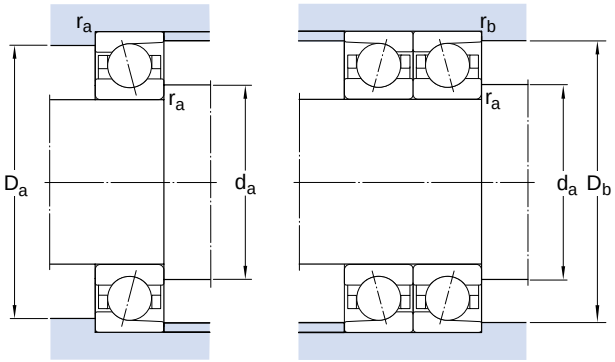


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
70	100	16	34 500	34 000	1 430	16	13 000	20 000	0,33	**71914 CD**
	100	16	32 500	32 500	1 370	–	11 000	18 000	0,33	**71914 ACD**
	110	20	52 000	45 500	1 930	15	12 000	19 000	0,59	**7014 CD**
	110	20	48 800	44 000	1 860	–	10 000	17 000	0,59	**7014 ACD**
	125	24	79 300	64 000	2 750	15	11 000	18 000	1,1	**7214 CD**
	125	24	76 100	62 000	2 600	–	9 500	16 000	1,1	**7214 ACD**
75	105	16	35 800	37 500	1 560	16	12 000	19 000	0,35	**71915 CD**
	105	16	33 800	35 500	1 500	–	10 000	17 000	0,35	**71915 ACD**
	115	20	52 700	49 000	2 080	16	11 000	18 000	0,62	**7015 CD**
	115	20	49 400	46 500	1 960	–	9 500	16 000	0,62	**7015 ACD**
	130	25	83 200	69 500	2 900	15	10 000	17 000	1,2	**7215 CD**
	130	25	79 300	67 000	2 800	–	9 000	15 000	1,2	**7215 ACD**
80	110	16	36 400	39 000	1 660	16	11 000	18 000	0,37	**71916 CD**
	110	16	34 500	36 500	1 560	–	9 500	16 000	0,37	**71916 ACD**
	125	22	65 000	61 000	2 550	16	10 000	17 000	0,85	**7016 CD**
	125	22	62 400	58 500	2 450	–	9 000	15 000	0,85	**7016 ACD**
	140	26	97 500	81 500	3 350	15	9 500	16 000	1,45	**7216 CD**
	140	26	92 300	78 000	3 200	–	8 500	14 000	1,45	**7216 ACD**
85	120	18	46 200	48 000	2 040	16	10 000	17 000	0,53	**71917 CD**
	120	18	43 600	45 500	1 930	–	9 000	15 000	0,53	**71917 ACD**
	130	22	67 600	65 500	2 650	16	9 500	16 000	0,89	**7017 CD**
	130	22	63 700	62 000	2 500	–	8 500	14 000	0,89	**7017 ACD**
	150	28	99 500	88 000	3 450	15	9 000	15 000	1,8	**7217 CD**
	150	28	95 600	85 000	3 350	–	8 000	13 000	1,8	**7217 ACD**
90	125	18	47 500	51 000	2 080	16	9 500	16 000	0,55	**71918 CD**
	125	18	44 200	48 000	1 960	–	8 500	14 000	0,55	**71918 ACD**
	140	24	79 300	76 500	3 000	16	9 000	15 000	1,15	**7018 CD**
	140	24	74 100	72 000	2 850	–	8 000	13 000	1,15	**7018 ACD**
	160	30	127 000	112 000	4 250	15	8 500	14 000	2,25	**7218 CD**
	160	30	121 000	106 000	4 050	–	7 500	12 000	2,25	**7218 ACD**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
70	79,3	90,7	1	0,3	19	76	94	98	1	0,3
	79,3	90,7	1	0,3	28	76	94	98	1	0,3
	82,9	97,1	1,1	0,6	22	77	103	106	1	0,6
	82,9	97,1	1,1	0,6	31	77	103	106	1	0,6
	87	108	1,5	0,6	25	79	116	120	1,5	0,6
	87	108	1,5	0,6	35	79	116	120	1,5	0,6
75	84,3	95,7	1	0,3	20	81	99	103	1	0,3
	84,3	95,7	1	0,3	29	81	99	103	1	0,3
	87,9	103	1,1	0,6	23	82	108	111	1	0,6
	87,9	103	1,1	0,6	32	82	108	111	1	0,6
	92	113	1,5	0,6	26	84	121	125	1,5	0,6
	92	113	1,5	0,6	37	84	121	125	1,5	0,6
80	89,3	101	1	0,3	21	86	104	108	1	0,3
	89,3	101	1	0,3	30	86	104	108	1	0,3
	94,4	111	1,1	0,6	25	87	118	121	1	0,6
	94,4	111	1,1	0,6	35	87	118	121	1	0,6
	98,6	122	2	1	28	90	130	134	2	1
	98,6	122	2	1	39	90	130	134	2	1
85	95,8	110	1,1	0,6	23	92	113	115	1	0,6
	95,8	110	1,1	0,6	23	92	113	115	1	0,6
	99,4	116	1,1	0,6	36	92	123	126	1	0,6
	106	130	2	1	30	95	140	144	2	1
	100	115	1,1	0,6	23	97	118	120	1	0,6
	100	115	1,1	0,6	23	97	118	120	1	0,6
90	100	115	1,1	0,6	23	97	118	120	1	0,6
	100	115	1,1	0,6	34	97	118	120	1	0,6
	106	124	1,5	0,6	39	99	131	135	1,5	0,6
	106	124	2	1	32	100	150	135	1,5	0,6
	111	139	2	1	32	100	150	154	2	1
	111	139	2	1	44	100	150	154	2	1

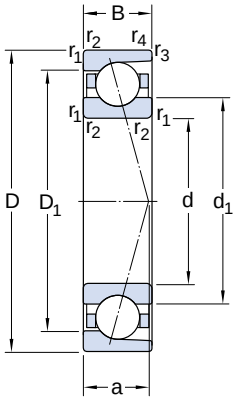


CD, ACD

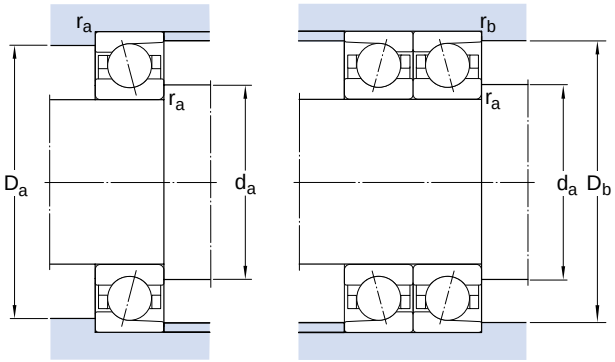


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
95	130	18	49 400	55 000	2 200	16	9 000	15 000	0,58	**71919 CD**
	130	18	46 200	52 000	2 080	–	8 500	14 000	0,58	**71919 ACD**
	145	24	81 900	80 000	3 100	16	8 500	14 000	1,2	**7019 CD**
	145	24	76 100	76 500	2 900	–	8 000	13 000	1,2	**7019 ACD**
	170	32	138 000	120 000	4 400	15	8 000	13 000	2,7	**7219 CD**
	170	32	133 000	114 000	4 250	–	7 500	12 000	2,7	**7219 ACD**
100	140	20	60 500	65 500	2 550	16	8 500	14 000	0,8	**71920 CD**
	140	20	57 200	63 000	2 400	–	8 000	13 000	0,8	**71920 ACD**
	150	24	83 200	85 000	3 200	16	8 500	14 000	1,25	**7020 CD**
	150	24	79 300	80 000	3 050	–	7 500	12 000	1,25	**7020 ACD**
	180	34	156 000	137 000	4 900	15	7 500	12 000	3,25	**7220 CD**
	180	34	148 000	129 000	4 650	–	7 000	11 000	3,25	**7220 ACD**
105	145	20	61 800	69 500	2 600	16	8 500	14 000	0,82	**71921 CD**
	145	20	57 200	65 500	2 500	–	7 500	12 000	0,82	**71921 ACD**
	160	26	95 600	96 500	3 600	16	8 000	13 000	1,6	**7021 CD**
	160	26	90 400	93 000	3 400	–	7 500	12 000	1,6	**7021 ACD**
	190	36	172 000	153 000	5 300	15	7 500	12 000	3,85	**7221 CD**
	190	36	163 000	146 000	5 100	–	6 700	10 000	3,85	**7221 ACD**
110	150	20	62 400	72 000	2 700	17	8 000	13 000	0,86	**71922 CD**
	150	20	58 500	68 000	2 550	–	7 500	12 000	0,86	**71922 ACD**
	170	28	111 000	108 000	3 900	16	7 500	12 000	1,95	**7022 CD**
	170	28	104 000	104 000	3 750	–	7 000	11 000	1,95	**7022 ACD**
	200	38	178 000	166 000	5 600	15	7 000	11 000	4,55	**7222 CD**
	200	38	168 000	160 000	5 400	–	6 700	10 000	4,55	**7222 ACD**
120	165	22	78 000	91 500	3 250	16	7 500	12 000	1,15	**71924 CD**
	165	22	72 800	86 500	3 050	–	7 000	11 000	1,15	**71924 ACD**
	180	28	114 000	122 000	4 250	16	7 000	11 000	2,1	**7024 CD**
	180	28	111 000	116 000	4 000	–	6 700	10 000	2,1	**7024 ACD**
	215	40	199 000	193 000	6 300	15	6 700	10 000	5,4	**7224 CD**
	215	40	190 000	183 000	6 000	–	6 000	9 000	5,4	**7224 ACD**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
95	105	120	1,1	0,6	24	102	123	125	1	0,6
	105	120	1,1	0,6	35	102	123	125	1	0,6
	111	129	1,5	0,6	28	104	136	140	1,5	0,6
	111	129	1,5	0,6	40	104	136	140	1,5	0,6
	118	147	2,1	1,1	34	107	158	163	2	1
	118	147	2,1	1,1	47	107	158	163	2	1
100	112	128	1,1	0,6	26	107	133	135	1	0,6
	112	128	1,1	0,6	38	107	133	135	1	0,6
	116	134	1,5	0,6	29	109	141	145	1,5	0,6
	116	134	1,5	0,6	41	109	141	145	1,5	0,6
	124	155	2,1	1,1	36	112	168	173	2	1
	124	155	2,1	1,1	50	112	168	173	2	1
105	117	133	1,1	0,6	27	112	138	140	1	0,6
	117	133	1,1	0,6	39	112	138	140	1	0,6
	122	143	2	1	31	115	150	154	2	1
	122	143	2	1	44	115	150	154	2	1
	131	164	2,1	1,1	38	117	178	183	2	1
	131	164	2,1	1,1	53	117	178	183	2	1
110	122	138	1,1	0,6	27	117	143	145	1	0,6
	122	138	1,1	0,6	40	117	143	145	1	0,6
	129	151	2	1	33	120	160	164	2	1
	129	151	2	1	47	120	160	164	2	1
	138	172	2,1	1,1	40	122	188	193	2	1
	138	172	2,1	1,1	55	122	188	193	2	1
120	133	152	1,1	0,6	30	127	158	160	1	0,6
	133	152	1,1	0,6	44	127	158	160	1	0,6
	139	161	2	1	34	130	170	174	2	1
	139	161	2	1	49	130	170	174	2	1
	150	187	2,1	1,1	43	132	203	208	2	1
	150	187	2,1	1,1	60	132	203	208	2	1

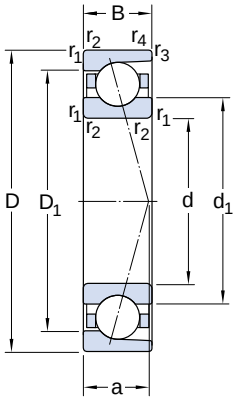


CD, ACD

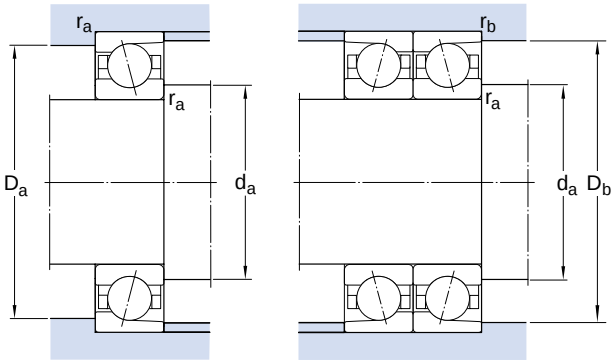


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
130	180	24	92 300	108 000	3 650	16	7 000	11 000	1,55	**71926 CD**
	180	24	87 100	102 000	3 450	–	6 700	10 000	1,55	**71926 ACD**
	200	33	148 000	156 000	5 200	16	6 700	10 000	3,2	**7026 CD**
	200	33	140 000	150 000	4 900	–	6 000	9 000	3,2	**7026 ACD**
140	190	24	95 600	116 000	3 900	17	6 700	10 000	1,65	**71928 CD**
	190	24	90 400	110 000	3 650	–	6 000	9 000	1,65	**71928 ACD**
	210	33	153 000	166 000	5 300	16	6 700	10 000	3,4	**7028 CD**
	210	33	146 000	156 000	5 100	–	5 600	8 500	3,4	**7028 ACD**
150	210	28	125 000	146 000	4 750	16	6 300	9 500	2,55	**71930 CD**
	210	28	119 000	140 000	4 500	–	5 000	8 500	2,55	**71930 ACD**
	225	35	172 000	190 000	5 850	16	6 000	9 000	4,15	**7030 CD**
	225	35	163 000	180 000	5 600	–	5 300	8 000	4,15	**7030 ACD**
160	220	28	130 000	160 000	5 000	16	6 000	9 000	2,7	**71932 CD**
	220	28	124 000	153 000	4 750	–	5 600	8 500	2,7	**71932 ACD**
	240	38	195 000	216 000	6 550	16	5 600	8 500	5,1	**7032 CD**
	240	38	182 000	204 000	6 200	–	5 000	7 500	5,1	**7032 ACD**
170	230	28	133 000	166 000	5 100	16	5 600	8 500	2,85	**71934 CD**
	230	28	124 000	156 000	4 800	–	5 000	7 500	2,85	**71934 ACD**
	260	42	212 000	245 000	7 100	16	5 300	8 000	6,85	**7034 CD**
	260	42	199 000	232 000	6 700	–	4 800	7 000	6,85	**7034 ACD**
180	250	33	168 000	212 000	6 100	16	5 300	8 000	4,2	**71936 CD**
	250	33	159 000	200 000	5 850	–	4 800	7 000	4,2	**71936 ACD**
	280	46	242 000	290 000	8 150	16	5 000	7 500	8,9	**7036 CD**
	280	46	229 000	275 000	7 650	–	4 300	6 300	8,9	**7036 ACD**
190	260	33	172 000	220 000	6 200	16	5 000	7 500	4,35	**71938 CD**
	260	33	163 000	208 000	5 850	–	4 500	6 700	4,35	**71938 ACD**
	290	46	247 000	300 000	8 300	16	4 800	7 000	9,35	**7038 CD**
	290	46	234 000	290 000	8 000	–	4 300	6 300	9,35	**7038 ACD**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
130	145	165	1,5	0,6	33	139	171	175	1,5	0,6
	145	165	1,5	0,6	48	139	171	175	1,5	0,6
	152	178	2	1	39	140	190	194	2	1
	152	178	2	1	55	140	190	194	2	1
140	155	175	1,5	0,6	34	149	181	185	1,5	0,6
	155	175	1,5	0,6	51	149	181	185	1,5	0,6
	162	188	2	1	40	150	200	204	2	1
	162	188	2	1	58	150	200	204	2	1
150	168	192	2	1	38	160	200	204	2	1
	168	192	2	1	56	160	200	204	2	1
	174	201	2,1	1	43	162	213	219	2	1
	174	201	2,1	1	62	162	213	219	2	1
160	178	202	2	1	40	170	210	214	2	1
	178	202	2	1	58	170	210	214	2	1
	185	215	2,1	1	46	172	228	234	2	1
	185	215	2,1	1	66	172	228	234	2	1
170	188	212	2	1	41	180	220	224	2	1
	188	212	2	1	61	180	220	224	2	1
	199	231	2,1	1,1	50	182	248	253	2	1
	199	231	2,1	1,1	71	182	248	253	2	1
180	201	229	2	1	45	190	240	244	2	1
	201	229	2	1	67	190	240	244	2	1
	212	248	2,1	1,1	54	192	268	273	2	1
	212	248	2,1	1,1	77	192	268	273	2	1
190	211	239	2	1	47	200	250	254	2	1
	211	239	2	1	69	200	250	254	2	1
	222	258	2,1	1,1	55	202	278	283	2	1
	222	258	2,1	1,1	79	202	278	283	2	1

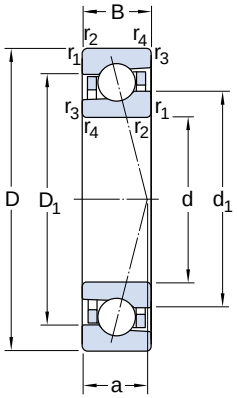


CD, ACD

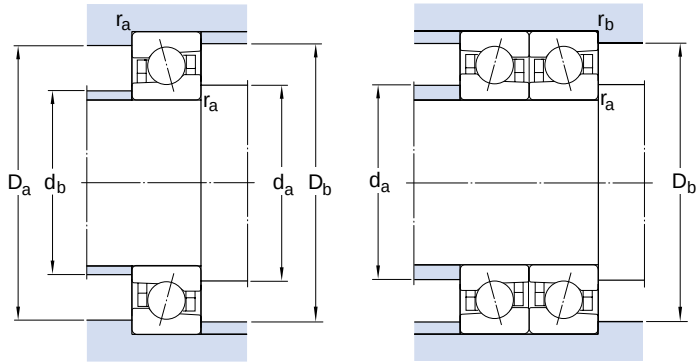


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
200	280	38	208 000	265 000	7 200	16	4 800	7 000	6,1	**71940 CD**
	280	38	199 000	250 000	6 800	–	4 300	6 300	6,1	**71940 ACD**
	310	51	296 000	390 000	10 200	16	4 500	6 700	12	**7040 CD**
	310	51	281 000	365 000	9 800	–	4 000	6 000	12	**7040 ACD**
220	300	38	221 000	300 000	7 800	16	4 300	6 300	6,6	**71944 CD**
	300	38	208 000	285 000	7 500	–	3 800	5 600	6,6	**71944 ACD**
	340	56	338 000	455 000	11 600	16	4 000	6 000	16	**7044 CD**
	340	56	319 000	440 000	11 000	–	3 600	5 300	16	**7044 ACD**
240	360	56	345 000	490 000	12 000	16	3 800	5 600	17	**7048 CD**
	360	56	325 000	465 000	11 400	–	3 200	4 800	17	**7048 ACD**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
200	224	256	2,1	1	51	212	268	274	2	1
	224	256	2,1	1	75	212	268	274	2	1
	234	276	2,1	1,1	60	212	298	303	2	1
	234	276	2,1	1,1	85	212	298	303	2	1
220	244	276	2,1	1	54	232	288	294	2	1
	244	276	2,1	1	80	232	288	294	2	1
	258	302	3	1,1	66	234	326	333	2,5	1
	258	302	3	1,1	94	234	326	333	2,5	1
240	278	322	3	1,1	68	254	346	353	2,5	1
	278	322	3	1,1	98	254	346	353	2,5	1

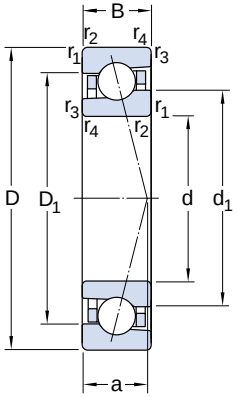


CE, ACE

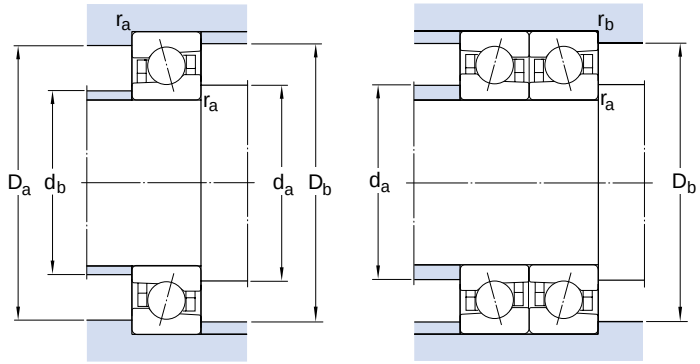


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
20	37	9	4 680	2 120	90	7	56 000	86 000	0,035	**71904 CE**
	37	9	4 420	2 040	85	–	49 000	77 000	0,035	**71904 ACE**
	42	12	7 020	3 050	129	6,5	51 600	79 000	0,063	**7004 CE**
	42	12	6 760	2 900	122	–	45 000	70 500	0,063	**7004 ACE**
25	42	9	5 270	2 700	114	7,2	47 500	73 000	0,042	**71905 CE**
	42	9	4 940	2 550	108	–	41 500	65 500	0,042	**71905 ACE**
	47	12	7 800	3 750	156	6,8	44 400	68 000	0,073	**7005 CE**
	47	12	7 410	3 550	150	–	38 800	61 000	0,073	**7005 ACE**
30	47	9	5 590	3 100	132	7,4	41 500	63 500	0,048	**71906 CE**
	47	9	5 270	2 900	125	–	36 200	57 000	0,048	**71906 ACE**
	55	13	10 100	5 100	216	6,9	37 600	57 600	0,108	**7006 CE**
	55	13	9 560	4 900	208	–	32 800	51 600	0,108	**7006 ACE**
35	55	10	7 610	4 400	186	7,3	35 500	54 400	0,075	**71907 CE**
	55	10	7 150	4 150	176	–	31 000	48 500	0,075	**71907 ACE**
	62	14	10 800	6 000	255	7,1	33 000	50 500	0,147	**7007 CE**
	62	14	10 400	5 700	240	–	28 800	45 300	0,147	**7007 ACE**
40	62	12	9 560	5 700	240	7,3	31 300	48 000	0,109	**71908 CE**
	62	12	9 230	5 400	228	–	27 400	43 000	0,109	**71908 ACE**
	68	15	11 700	6 800	290	7,3	29 600	45 300	0,184	**7008 CE**
	68	15	11 100	6 550	275	–	25 800	40 600	0,184	**7008 ACE**
45	68	12	10 100	6 400	270	7,5	28 300	43 100	0,129	**71909 CE**
	68	12	9 560	6 100	255	–	24 500	38 600	0,129	**71909 ACE**
	75	16	14 000	8 500	360	7,3	26 600	40 800	0,231	**7009 CE**
	75	16	13 300	8 000	340	–	23 300	36 600	0,231	**7009 ACE**
50	72	12	10 600	7 100	300	7,6	26 200	40 000	0,131	**71910 CE**
	72	12	9 950	6 700	285	–	22 900	36 000	0,131	**71910 ACE**
	80	16	14 800	9 500	400	7,4	24 600	37 600	0,251	**7010 CE**
	80	16	14 000	9 000	380	–	21 500	33 800	0,251	**7010 ACE**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
20	25,6	31,4	0,3	0,2	8,4	22	35	35,8	0,3	0,1
	25,6	31,4	0,3	0,2	11,3	22	35	35,8	0,3	0,1
	27,2	34,8	0,6	0,6	10,3	25	37	40,3	0,6	0,6
	27,2	34,8	0,6	0,6	13,4	25	37	40,3	0,6	0,6
25	30,6	36,4	0,3	0,2	9,1	27	40	40,8	0,3	0,1
	30,6	36,4	0,3	0,2	12,5	27	40	40,8	0,3	0,1
	32,2	39,9	0,6	0,6	10,9	30	42	45,1	0,6	0,6
	32,2	39,9	0,6	0,6	14,6	30	42	45,1	0,6	0,6
30	35,6	41,4	0,3	0,2	9,7	32	45	45,8	0,3	0,1
	35,6	41,4	0,3	0,2	13,6	32	45	45,8	0,3	0,1
	38,3	46,8	1	1	12,3	35	50	52,8	1	1
	38,3	46,8	1	1	16,6	35	50	52,8	1	1
35	41,6	48,4	0,6	0,2	11,1	40	50	53,8	0,6	0,1
	41,6	48,4	0,6	0,2	15,7	40	50	53,8	0,6	0,1
	44,3	52,8	1	1	13,6	41	56	59,5	1	1
	44,3	52,8	1	1	18,5	41	56	59,5	1	1
40	47,1	54,9	0,6	0,2	12,9	45	57	60,8	0,6	0,1
	47,1	54,9	0,6	0,2	18,1	45	57	60,8	0,6	0,1
	49,8	58,3	1	1	14,9	46	62	65,3	1	1
	49,8	58,3	1	1	20,3	46	62	65,3	1	1
45	52,6	60,4	0,6	0,2	13,7	50	63	66,8	0,6	0,1
	52,6	60,4	0,6	0,2	19,4	50	63	66,8	0,6	0,1
	55,3	64,8	1	1	16,2	51	69	72	1	1
	55,3	64,8	1	1	22,2	51	69	72	1	1
50	57,1	64,9	0,6	0,2	14,3	55	67	70,8	0,6	0,1
	57,1	64,9	0,6	0,2	20,4	55	67	70,8	0,6	0,1
	60,3	69,8	1	1	16,9	55	74	76,8	1	1
	60,3	69,8	1	1	23,4	55	74	76,8	1	1

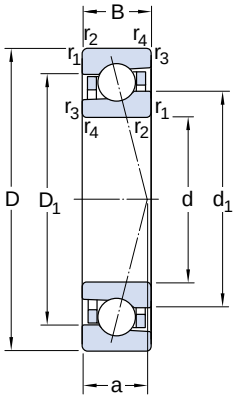


CE, ACE

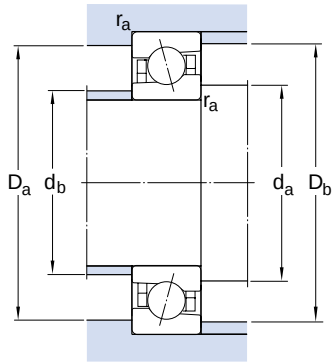


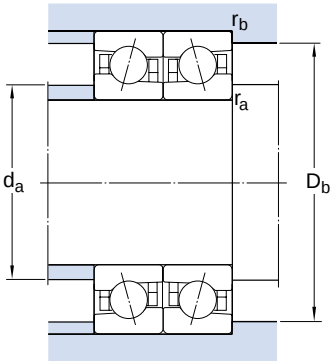
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
55	80	13	15 300	10 000	425	7,5	23 600	36 000	0,175	**71911 CE**
	80	13	14 600	9 500	400	–	20 600	32 000	0,175	**71911 ACE**
	90	18	15 600	10 600	450	7,5	22 000	33 700	0,387	**7011 CE**
	90	18	14 800	10 000	425	–	19 200	30 300	0,387	**7011 ACE**
60	85	13	15 600	10 600	450	7,5	22 000	33 600	0,187	**71912 CE**
	85	13	14 800	10 000	425	–	19 100	30 000	0,187	**71912 ACE**
	95	18	16 300	11 600	490	7,6	20 600	31 600	0,415	**7012 CE**
	95	18	15 300	11 000	465	–	18 000	28 300	0,415	**7012 ACE**
65	90	13	16 300	11 600	490	7,6	20 500	31 500	0,2	**71913 CE**
	90	13	15 300	11 000	465	–	18 000	28 000	0,2	**71913 ACE**
	100	18	16 800	12 700	540	7,7	19 300	29 600	0,443	**7013 CE**
	100	18	15 900	12 000	510	–	16 900	26 600	0,443	**7013 ACE**
70	100	16	21 600	15 000	640	7,5	18 500	28 700	0,324	**71914 CE**
	100	16	20 300	14 300	600	–	16 400	25 500	0,324	**71914 ACE**
	110	20	22 500	16 600	695	7,5	17 700	27 200	0,607	**7014 CE**
	110	20	21 600	15 600	670	–	15 500	24 400	0,607	**7014 ACE**
75	105	16	22 500	16 600	695	7,5	17 500	27 000	0,345	**71915 CE**
	105	16	21 600	15 600	670	–	15 500	24 000	0,345	**71915 ACE**
	115	20	22 900	17 300	735	7,6	16 800	25 700	0,639	**7015 CE**
	115	20	21 600	16 300	695	–	14 700	23 100	0,639	**7015 ACE**
80	110	16	22 900	17 300	735	7,6	16 600	25 500	0,363	**71916 CE**
	110	16	21 600	16 300	695	–	14 500	23 000	0,363	**71916 ACE**
	125	22	29 100	21 600	900	7,5	15 600	23 900	0,846	**7016 CE**
	125	22	27 600	20 400	850	–	13 600	21 400	0,846	**7016 ACE**
85	120	18	29 100	21 600	900	7,5	15 500	23 800	0,516	**71917 CE**
	120	18	27 600	20 400	850	–	13 500	21 200	0,516	**71917 ACE**
	130	22	29 600	22 800	930	7,6	14 800	22 700	0,887	**7017 CE**
	130	22	28 100	21 600	880	–	13 000	20 400	0,887	**7017 ACE**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
55	62,7	72,3	1	0,3	15,7	61	74	78	1	0,3
	62,7	72,3	1	0,3	22,5	61	74	78	1	0,3
	67,8	77,3	1,1	1,1	18,9	62	82	86,4	1	1
	67,7	77,3	1,1	1,1	26,2	62	82	86,4	1	1
60	67,7	77,3	1	0,3	16,4	66	79	83	1	0,3
	67,7	77,3	1	0,3	23,7	66	79	83	1	0,3
	72,8	82,3	1,1	1,1	19,5	67	88	91	1	1
	72,8	82,3	1,1	1,1	27,3	67	88	91	1	1
65	72,7	82,3	1	0,3	17,0	71	84	88	1	0,3
	72,7	82,3	1	0,3	24,8	71	84	88	1	0,3
	77,8	87,3	1,1	1,1	20,2	72	93	96	1	1
	77,8	87,3	1,1	1,1	28,5	72	93	96	1	1
70	79,2	90,8	1	0,3	19,6	76	94	98	1	0,3
	79,2	90,8	1	0,3	28,1	76	94	98	1	0,3
	84,3	95,8	1,1	1,1	22,2	77	103	106	1	1
	84,3	95,8	1,1	1,1	31,3	77	103	106	1	1
75	84,2	95,8	1	0,3	20,2	81	99	103	1	0,3
	84,2	95,8	1	0,3	29,3	81	99	103	1	0,3
	89,3	100,8	1,1	1,1	22,9	82	108	111	1	1
	89,3	100,8	1,1	1,1	32,5	82	108	111	1	1
80	89,2	100,8	1	0,3	20,9	86	104	108	1	0,3
	89,2	100,8	1	0,3	30,5	86	104	108	1	0,3
	95,9	109,2	1,1	1,1	24,9	87	118	121	1	1
	95,9	109,2	1,1	1,1	35,2	87	118	121	1	1
85	95,8	109,2	1,1	0,6	22,9	92	113	115	1	0,6
	95,8	109,2	1,1	0,6	33,2	92	113	115	1	0,6
	100,9	114,2	1,1	1,1	25,6	92	123	126	1	1
	100,9	114,2	1,1	1,1	36,4	92	123	126	1	1



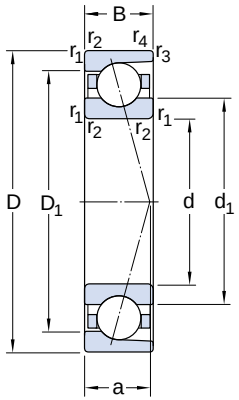
CE, ACE



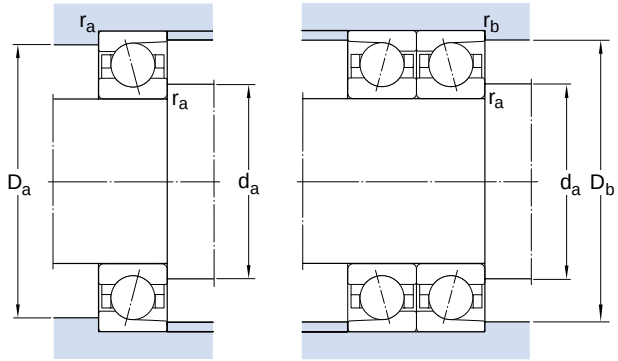


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
90	125	18	29 600	22 800	930	7,6	14 500	22 600	0,54	**71918 CE**
	125	18	28 100	21 600	880	–	13 000	20 200	0,54	**71918 ACE**
	140	24	37 100	28 000	1 100	7,5	13 900	21 300	1,146	**7018 CE**
	140	24	35 100	26 500	1 040	–	12 100	19 000	1,146	**7018 ACE**
95	130	18	31 200	24 500	980	7,6	14 000	21 500	0,57	**71919 CE**
	130	18	29 600	23 200	930	–	12 300	19 000	0,57	**71919 ACE**
	145	24	37 700	29 000	1 140	7,5	13 300	20 400	1,195	**7019 CE**
	145	24	35 800	28 000	1 080	–	11 600	18 300	1,195	**7019 ACE**
100	140	20	37 700	29 000	1 140	7,5	13 100	20 200	0,773	**71920 CE**
	140	20	35 800	28 000	1 080	–	11 500	18 000	0,773	**71920 ACE**
	150	24	39 000	30 500	1 160	7,6	12 800	19 600	1,245	**7020 CE**
	150	24	36 400	29 000	1 100	–	11 200	17 500	1,245	**7020 ACE**
105	145	20	39 000	30 500	1 160	7,6	12 800	19 500	0,805	**71921 CE**
	145	20	36 400	29 000	1 100	–	11 200	17 500	0,805	**71921 ACE**
110	150	20	39 700	32 000	1 200	7,6	12 100	18 500	0,837	**71922 CE**
	150	20	37 100	30 500	1 120	–	10 500	16 600	0,837	**71922 ACE**
120	165	22	49 400	40 500	1 430	7,6	11 100	17 000	1,148	**71924 CE**
	165	22	46 200	38 000	1 370	–	9 500	15 000	1,148	**71924 ACE**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
90	100,8	114,2	1,1	0,6	23,6	97	118	120	1	0,6
	100,8	114,2	1,1	0,6	34,4	97	118	120	1	0,6
	107,4	122,7	1,5	1,5	27,6	99	131	135	1,5	1,5
	107,4	122,7	1,5	1,5	39,2	99	131	135	1,5	1,5
95	105,8	119,2	1,1	0,6	24,3	102	123	125	1	0,6
	105,8	119,2	1,1	0,6	35,6	102	123	125	1	0,6
	112,4	127,7	1,5	1,5	28,3	104	136	140	1,5	1,5
	112,4	127,7	1,5	1,5	40,4	104	136	140	1,5	1,5
100	112,3	127,7	1,1	0,6	26,3	107	133	135	1	0,6
	112,3	127,7	1,1	0,6	38,4	107	133	135	1	0,6
	117,4	132,7	1,5	1,5	29,0	109	141	145	1,5	1,5
	117,4	132,7	1,5	1,5	41,5	109	141	145	1,5	1,5
105	117,3	132,7	1,1	0,6	27,0	112	138	140	1	0,6
	117,3	132,7	1,1	0,6	39,5	112	138	140	1	0,6
110	122,3	137,7	1,1	0,6	27,6	117	143	145	1	0,6
	122,3	137,7	1,1	0,6	40,7	117	143	145	1	0,6
120	133,9	151,1	1,1	0,6	30,3	127	158	160	1	0,6
	133,9	151,1	1,1	0,6	44,7	127	158	160	1	0,6

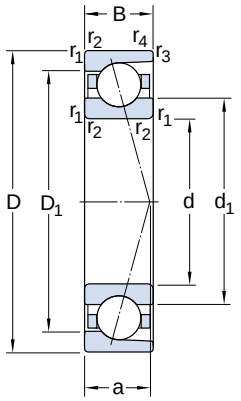


CD, ACD, CX and ACX

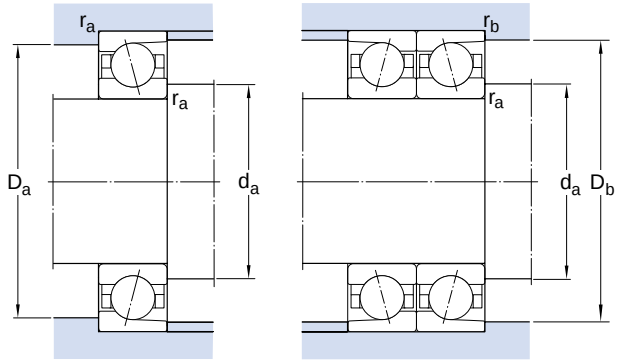


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
8	22	7	3 450	1 460	68	8,4	80 000	120 000	0,01	**708 CX/HC**
9	24	7	3 710	1 730	80	8,8	80 000	120 000	0,01	**709 CX/HC**
10	22	6	2 600	1 250	57	9,5	80 000	120 000	0,008	**71900 CX/HC**
	22	6	2 510	1 200	55	–	75 000	110 000	0,008	**71900 ACX/HC**
	26	8	5 070	2 400	110	8,3	75 000	110 000	0,016	**7000 CX/HC**
	26	8	4 940	2 280	106	–	70 000	100 000	0,016	**7000 ACX/HC**
	30	9	5 920	2 700	156	8,2	70 000	100 000	0,025	**7200 CX/HC**
	30	9	5 720	2 600	150	–	67 000	95 000	0,025	**7200 ACX/HC**
12	24	6	2 910	1 530	71	9,8	75 000	110 000	0,009	**71901 CX/HC**
	24	6	2 760	1 460	67	–	70 000	100 000	0,009	**71901 ACX/HC**
	28	8	5 530	2 750	127	8,7	70 000	100 000	0,017	**7001 CX/HC**
	28	8	5 270	2 650	122	–	67 000	95 000	0,017	**7001 ACX/HC**
	32	10	6 760	3 100	180	8,5	67 000	95 000	0,032	**7201 CX/HC**
	32	10	6 630	3 000	176	–	60 000	85 000	0,032	**7201 ACX/HC**
15	28	7	4 360	2 400	110	9,6	67 000	95 000	0,013	**71902 CX/HC**
	28	7	4 160	2 280	104	–	63 000	90 000	0,013	**71902 ACX/HC**
	32	9	6 240	3 450	160	9,3	63 000	90 000	0,025	**7002 CX/HC**
	32	9	5 920	3 250	153	–	56 000	80 000	0,025	**7002 ACX/HC**
	35	11	7 410	3 650	212	8,5	60 000	85 000	0,037	**7202 CX/HC**
	35	11	7 150	3 550	204	–	53 000	75 000	0,037	**7202 ACX/HC**
17	30	7	4 490	2 650	122	9,8	63 000	90 000	0,015	**71903 CX/HC**
	30	7	4 360	2 500	116	–	56 000	80 000	0,015	**71903 ACX/HC**
	35	10	6 500	3 800	176	9,1	56 000	80 000	0,032	**7003 CX/HC**
	35	10	6 180	3 650	170	–	53 000	75 000	0,032	**7003 ACX/HC**
	40	12	9 230	4 650	270	8,5	43 000	63 000	0,062	**7203 CX/HC**
	40	12	8 840	4 500	260	–	38 000	56 000	0,062	**7203 ACX/HC**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
8	11,8	17,6	0,3	0,1	6	10	20	20,1	0,3	0,1
9	13,5	19,9	0,3	0,1	6	11	22	22,1	0,3	0,1
10	13,6	17,8	0,3	0,1	5	12	20	20,5	0,3	0,1
	13,6	17,8	0,3	0,1	7	12	20	20,5	0,3	0,1
	15,1	21,3	0,3	0,1	6	12	24	24,1	0,3	0,1
	15,1	21	0,3	0,1	8	12	24	24,1	0,3	0,1
	16,8	23,3	0,6	0,3	7	15	25	27,1	0,6	0,3
	16,8	23,3	0,6	0,3	9	15	25	27,1	0,6	0,3
12	15,9	20,1	0,3	0,1	5	14	22	22,5	0,3	0,1
	15,9	20,1	0,3	0,1	7	14	22	22,5	0,3	0,1
	17,1	23,3	0,3	0,1	7	14	26	26,1	0,3	0,1
	17,1	23,3	0,3	0,1	9	14	26	26,1	0,3	0,1
	18,2	25,8	0,6	0,3	8	17	27	29,1	0,6	0,3
	18,2	25,8	0,6	0,3	10	17	27	29,1	0,6	0,3
15	19,1	23,9	0,3	0,1	6	17	26	26,5	0,3	0,1
	19,1	23,9	0,3	0,1	9	17	26	26,5	0,3	0,1
	20,6	26,8	0,3	0,1	8	17	30	30,1	0,3	0,1
	20,6	26,5	0,3	0,1	10	17	30	30,1	0,3	0,1
	21,5	29,1	0,6	0,3	9	20	30	33	0,6	0,3
	21,5	29,1	0,6	0,3	12	20	30	33	0,6	0,3
17	21,1	25,9	0,3	0,1	7	19	28	28,5	0,3	0,1
	21,1	25,9	0,3	0,1	9	19	28	28,5	0,3	0,1
	22,9	29,6	0,3	0,1	9	19	33	33,4	0,3	0,1
	22,9	29,2	0,3	0,1	11	19	33	33,4	0,3	0,1
	24,2	32,8	0,6	0,3	10	22	35	38	0,6	0,3
	24,2	32,8	0,6	0,3	13	22	35	38	0,6	0,3

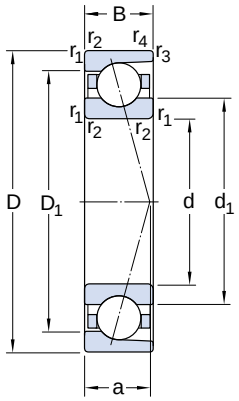


CD, ACD, CX and ACX

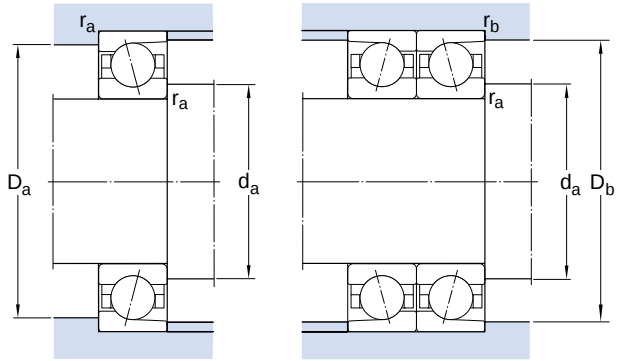


Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Calculation factor**	**Speed ratings** Lubrication grease	oil spot	**Mass**	**Designation**
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
20	37	9	6 630	4 050	186	9,8	53 000	75 000	0,031	**71904 CX/HC**
	37	9	6 240	3 900	180	–	48 000	67 000	0,031	**71904 ACX/HC**
	42	12	10 400	6 100	280	9,2	48 000	67 000	0,058	**7004 CX/HC**
	42	12	9 950	5 850	270	–	43 000	60 000	0,058	**7004 ACX/HC**
	47	14	12 400	6 550	375	8,7	43 000	60 000	0,089	**7204 CX/HC**
	47	14	11 900	6 200	360	–	40 000	56 000	0,089	**7204 ACX/HC**
25	42	9	7 020	4 800	220	10	45 000	63 000	0,037	**71905 CX/HC**
	42	9	6 630	4 550	212	–	40 000	56 000	0,037	**71905 ACX/HC**
	47	12	11 400	7 350	340	9,6	40 000	56 000	0,066	**7005 CX/HC**
	47	12	10 800	7 100	325	–	38 000	53 000	0,066	**7005 ACX/HC**
	52	15	14 000	8 150	475	9,1	38 000	53 000	0,12	**7205 CX/HC**
	52	15	13 500	7 800	450	–	34 000	48 000	0,12	**7205 ACX/HC**
30	47	9	7 150	5 200	240	10	38 000	53 000	0,043	**71906 CX/HC**
	47	9	6 760	4 900	228	–	34 000	48 000	0,043	**71906 ACX/HC**
	55	13	14 600	10 000	465	9,4	34 000	48 000	0,094	**7006 CX/HC**
	55	13	14 000	9 650	440	–	32 000	45 000	0,094	**7006 ACX/HC**
	62	16	24 200	16 000	670	14	32 000	45 000	0,17	**7206 CD/HC**
	62	16	23 400	15 300	640	–	28 000	40 000	0,17	**7206 ACD/HC**
35	55	10	9 750	6 550	275	10	32 000	45 000	0,065	**71907 CD/HC**
	55	10	9 230	6 200	260	–	30 000	43 000	0,065	**71907 ACD/HC**
	62	14	15 600	9 500	400	9,7	30 000	43 000	0,13	**7007 CD/HC**
	62	14	14 800	9 000	380	–	26 000	38 000	0,13	**7007 ACD/HC**
	72	17	31 900	21 600	915	14	26 000	38 000	0,24	**7207 CD/HC**
	72	17	30 700	20 800	880	–	22 000	34 000	0,24	**7207 ACD/HC**
40	62	12	12 400	8 500	360	10	28 000	40 000	0,096	**71908 CD/HC**
	62	12	11 700	8 000	340	–	24 000	36 000	0,096	**71908 ACD/HC**
	68	15	16 800	11 000	465	10	26 000	38 000	0,16	**7008 CD/HC**
	68	15	15 900	10 400	440	–	22 000	34 000	0,16	**7008 ACD/HC**
	80	18	41 000	28 000	1 180	14	22 000	34 000	0,3	**7208 CD/HC**
	80	18	39 000	27 000	1 140	–	20 000	32 000	0,3	**7208 ACD/HC**

Dimensions						**Abutment and fillet dimensions**				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
20	25,4	31,6	0,3	0,15	8	22	35	35,5	0,3	0,1
	25,4	31,6	0,3	0,15	11	22	35	35,5	0,3	0,1
	26,9	35,1	0,6	0,3	10	25	37	39,1	0,6	0,3
	26,9	35,1	0,6	0,3	13	25	37	39,1	0,6	0,3
	29,1	38,7	1	0,3	12	26	41	44,1	1	0,3
	29,1	38,7	1	0,3	15	26	41	44,1	1	0,3
25	30,4	36,6	0,3	0,15	9	27	40	40,5	0,3	0,1
	30,4	36,6	0,3	0,15	12	27	40	40,5	0,3	0,1
	31,9	40,1	0,6	0,3	11	30	42	44,1	0,6	0,3
	31,9	40,1	0,6	0,3	15	30	42	44,1	0,6	0,3
	34,1	43,7	1	0,3	13	31	46	49,1	1	0,3
	34,1	43,7	1	0,3	17	31	46	49,1	1	0,3
30	35,4	41,6	0,3	0,15	10	32	45	45,5	0,3	0,1
	35,4	41,6	0,3	0,15	14	32	45	45,5	0,3	0,1
	38,1	46,9	1	0,3	12	36	49	52,1	1	0,3
	38,1	46,9	1	0,3	17	36	49	52,1	1	0,3
	40,3	51,7	1	0,3	14	36	56	60	1	0,3
	40,3	51,7	1	0,3	19	36	56	60	1	0,3
35	41,2	48,8	0,6	0,15	11	40	50	53,8	0,6	0,1
	41,2	48,8	0,6	0,15	16	40	50	53,8	0,6	0,1
	43,7	53,3	1	0,3	14	41	56	60	1	0,3
	43,7	53,3	1	0,3	19	41	56	60	1	0,3
	47	60	1,1	0,3	16	42	65	70	1	0,3
	47	60	1,1	0,3	21	42	65	70	1	0,3
40	46,7	55,3	0,6	0,15	13	45	57	60,8	0,6	0,1
	46,7	55,3	0,6	0,15	18	45	57	60,8	0,6	0,1
	49,2	58,8	1	0,3	15	46	62	66	1	0,3
	49,2	58,8	1	0,3	20	46	62	66	1	0,3
	53	67	1,1	0,6	17	47	73	75	1	0,6
	53	67	1,1	0,6	23	47	73	75	1	0,6

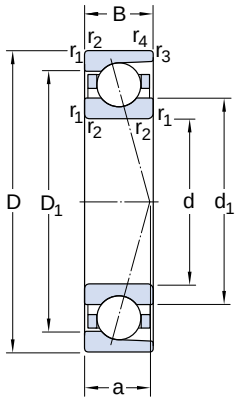


CD, ACD

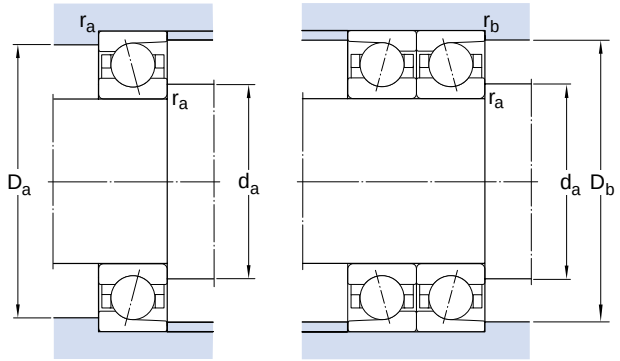


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
45	68	12	13 000	9 500	400	11	24 000	36 000	0,11	**71909 CD/HC**
	68	12	12 400	9 000	380	–	22 000	34 000	0,11	**71909 ACD/HC**
	75	16	28 600	22 400	950	15	22 000	34 000	0,2	**7009 CD/HC**
	75	16	27 600	21 600	900	–	20 000	32 000	0,2	**7009 ACD/HC**
	85	19	42 300	31 000	1 320	14	20 000	32 000	0,34	**7209 CD/HC**
	85	19	41 000	30 000	1 250	–	18 000	28 000	0,34	**7209 ACD/HC**
50	72	12	13 500	10 400	440	11	22 000	34 000	0,11	**71910 CD/HC**
	72	12	12 700	9 800	415	–	19 000	30 000	0,11	**71910 ACD/HC**
	80	16	29 600	24 000	1020	15	20 000	32 000	0,21	**7010 CD/HC**
	80	16	28 100	23 200	980	–	18 000	28 000	0,21	**7010 ACD/HC**
	90	20	44 900	34 000	1 430	15	19 000	30 000	0,38	**7210 CD/HC**
	90	20	42 300	32 500	1 390	–	17 000	26 000	0,38	**7210 ACD/HC**
55	80	13	19 500	14 600	620	10	19 000	30 000	0,15	**71911 CD/HC**
	80	13	18 200	13 700	585	–	18 000	28 000	0,15	**71911 ACD/HC**
	90	18	39 700	32 500	1 370	15	18 000	28 000	0,31	**7011 CD/HC**
	90	18	37 100	31 000	1 320	–	17 000	26 000	0,31	**7011 ACD/HC**
	100	21	55 300	43 000	1 800	14	17 000	26 000	0,51	**7211 CD/HC**
	100	21	52 700	40 500	1 730	–	16 000	24 000	0,51	**7211 ACD/HC**
60	85	13	19 900	15 300	655	11	18 000	28 000	0,16	**71912 CD/HC**
	85	13	18 600	14 600	620	–	17 000	26 000	0,16	**71912 ACD/HC**
	95	18	40 300	34 500	1 500	15	17 000	26 000	0,34	**7012 CD/HC**
	95	18	39 000	33 500	1 400	–	16 000	24 000	0,34	**7012 ACD/HC**
	110	22	67 600	53 000	2 240	14	16 000	24 000	0,65	**7212 CD/HC**
	110	22	63 700	50 000	2 120	–	15 000	22 000	0,65	**7212 ACD/HC**
65	90	13	20 800	17 000	710	11	17 000	26 000	0,17	**71913 CD/HC**
	90	13	19 500	16 000	680	–	16 000	24 000	0,17	**71913 ACD/HC**
	100	18	41 600	37 500	1 600	16	16 000	24 000	0,36	**7013 CD/HC**
	100	18	39 000	35 500	1 500	–	15 000	22 000	0,36	**7013 ACD/HC**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
45	52,2	60,8	0,6	0,15	14	50	63	66,8	0,6	0,1
	52,2	60,8	0,6	0,15	19	50	63	66,8	0,6	0,1
	54,7	65,3	1	0,3	16	51	69	73	1	0,3
	54,7	65,3	1	0,3	22	51	69	73	1	0,3
	57,5	72,5	1,1	0,6	18	52	78	80	1	0,6
	57,5	72,5	1,1	0,6	25	52	78	80	1	0,6
50	56,7	65,3	0,6	0,15	14	55	67	70,8	0,6	0,1
	56,7	65,3	0,6	0,15	20	55	67	70,8	0,6	0,1
	59,7	70,3	1	0,3	17	56	74	78	1	0,3
	59,7	70,3	1	0,3	17	56	74	78	1	0,3
	62,5	77,5	1,1	0,6	20	57	83	85	1	0,6
	62,5	77,5	1,1	0,6	27	57	83	85	1	0,6
55	62,7	72,3	1	0,3	16	61	74	78	1	0,3
	62,7	72,3	1	0,3	22	61	74	78	1	0,3
	66,3	78,7	1,1	0,6	19	62	83	86	1	0,6
	66,3	78,7	1,1	0,6	26	62	83	86	1	0,6
	69	85,9	1,5	0,6	21	64	91	95	1,5	0,6
	69	85,9	1,5	0,6	29	64	91	95	1,5	0,6
60	67,7	77,3	1	0,3	16	66	79	83	1	0,3
	67,7	77,3	1	0,3	23	66	79	83	1	0,3
	71,3	83,7	1,1	0,6	20	67	88	91	1	0,6
	71,3	83,7	1,1	0,6	27	67	88	91	1	0,6
	75,6	94,4	1,5	0,6	23	69	101	105	1,5	0,6
	75,6	94,4	1,5	0,6	31	69	101	105	1,5	0,6
65	72,7	82,3	1	0,3	17	71	84	88	1	0,3
	72,7	82,3	1	0,3	25	71	84	88	1	0,3
	76,3	88,7	1,1	0,6	20	72	93	96	1	0,6
	76,3	88,7	1,1	0,6	28	72	93	96	1	0,6

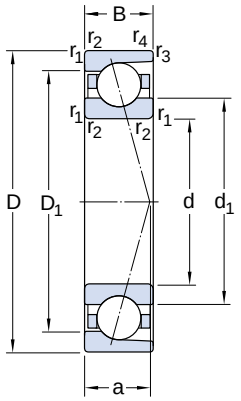


CD, ACD

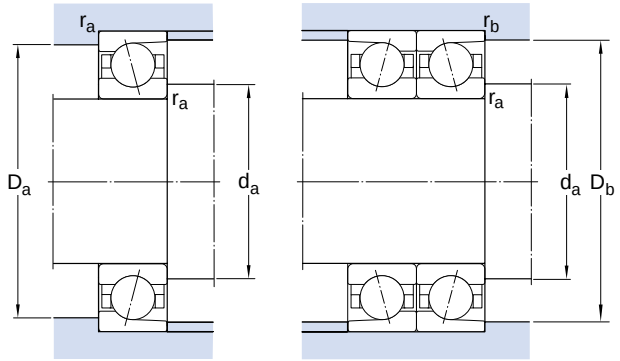


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
70	100	16	34 500	34 000	1 430	16	16 000	24 000	0,28	**71914 CD/HC**
	100	16	32 500	32 500	1 370	–	15 000	22 000	0,28	**71914 ACD/HC**
	110	20	52 000	45 500	1 930	15	15 000	22 000	0,49	**7014 CD/HC**
	110	20	48 800	44 000	1 860	–	14 000	20 000	0,49	**7014 ACD/HC**
75	105	16	35 800	37 500	1 560	16	15 000	22 000	0,3	**71915 CD/HC**
	105	16	33 800	35 500	1 500	–	14 000	20 000	0,3	**71915 ACD/HC**
	115	20	52 700	49 000	2 080	16	15 000	22 000	0,52	**7015 CD/HC**
	115	20	49 400	46 500	1 960	–	13 000	19 000	0,52	**7015 ACD/HC**
80	110	16	36 400	39 000	1 660	16	15 000	22 000	0,31	**71916 CD/HC**
	110	16	34 500	36 500	1 560	–	13 000	19 000	0,31	**71916 ACD/HC**
	125	22	65 000	61 000	2 550	16	14 000	20 000	0,71	**7016 CD/HC**
	125	22	62 400	58 500	2 450	–	12 000	18 000	0,71	**7016 ACD/HC**
85	120	18	46 200	48 000	2 040	16	14 000	20 000	0,44	**71917 CD/HC**
	120	18	43 600	45 500	1 930	–	12 000	18 000	0,44	**71917 ACD/HC**
	130	22	67 600	65 500	2 650	16	13 000	19 000	0,74	**7017 CD/HC**
	130	22	63 700	62 000	2 500	–	11 000	17 000	0,74	**7017 ACD/HC**
90	125	18	47 500	51 000	2 080	16	13 000	19 000	0,47	**71918 CD/HC**
	125	18	44 200	48 000	1 960	–	11 000	17 000	0,47	**71918 ACD/HC**
	140	24	79 300	76 500	3 000	16	12 000	18 000	0,95	**7018 CD/HC**
	140	24	74 100	72 000	2 850	–	10 000	16 000	0,95	**7018 ACD/HC**
95	130	18	49 400	55 000	2 200	16	12 000	18 000	0,49	**71919 CD/HC**
	130	18	46 200	52 000	2 080	–	10 000	16 000	0,49	**71919 ACD/HC**
	145	24	81 900	80 000	3 100	16	11 000	17 000	1	**7019 CD/HC**
	145	24	76 100	76 500	2 900	–	9 500	15 000	1	**7019 ACD/HC**
100	140	20	60 500	65 500	2 550	16	11 000	17 000	0,66	**71920 CD/HC**
	140	20	57 200	63 000	2 400	–	9 500	15 000	0,66	**71920 ACD/HC**
	150	24	83 200	85 000	3 200	16	10 000	16 000	1,05	**7020 CD/HC**
	150	24	79 300	80 000	3 050	–	9 500	15 000	1,05	**7020 ACD/HC**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
70	79,3	90,7	1	0,3	19	76	94	98	1	0,3
	79,3	90,7	1	0,3	28	76	94	98	1	0,3
	82,9	97,1	1,1	0,6	22	77	103	106	1	0,6
	82,9	97,1	1,1	0,6	31	77	103	106	1	0,6
75	84,3	95,7	1	0,3	20	81	99	103	1	0,3
	84,3	95,7	1	0,3	29	81	99	103	1	0,3
	87,9	103	1,1	0,6	23	82	108	111	1	0,6
	87,9	103	1,1	0,6	32	82	108	111	1	0,6
80	89,3	101	1	0,3	21	86	104	108	1	0,3
	89,3	101	1	0,3	30	86	104	108	1	0,3
	94,4	111	1,1	0,6	25	87	118	121	1	0,6
	94,4	111	1,1	0,6	35	87	118	121	1	0,6
85	95,8	110	1,1	0,6	23	92	113	115	1	0,6
	95,8	110	1,1	0,6	23	92	113	115	1	0,6
	99,4	116	1,1	0,6	36	92	123	126	1	0,6
	106	130	2	1	30	95	140	144	2	1
90	100	115	1,1	0,6	23	97	118	120	1	0,6
	100	115	1,1	0,6	34	97	118	120	1	0,6
	106	124	1,5	0,6	39	99	131	135	1,5	0,6
	106	124	2	1	32	100	150	135	1,5	0,6
95	105	120	1,1	0,6	24	102	123	125	1	0,6
	105	120	1,1	0,6	35	102	123	125	1	0,6
	111	129	1,5	0,6	28	104	136	140	1,5	0,6
	111	129	1,5	0,6	40	104	136	140	1,5	0,6
100	112	128	1,1	0,6	26	107	133	135	1	0,6
	112	128	1,1	0,6	38	107	133	135	1	0,6
	116	134	1,5	0,6	29	109	141	145	1,5	0,6
	116	134	1,5	0,6	41	109	141	145	1,5	0,6

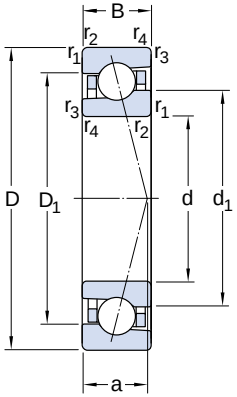


CD, ACD

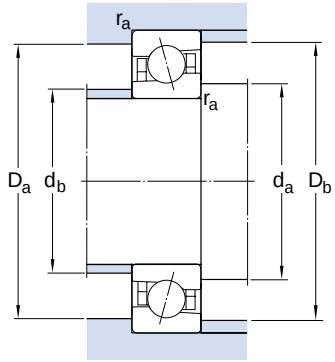


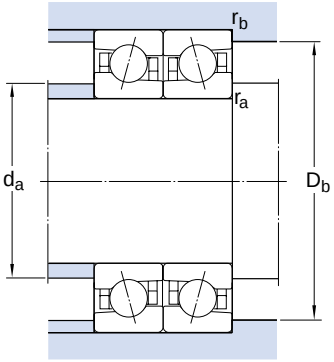
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Calculation factor**	**Speed ratings** Lubrication grease	oil spot	**Mass**	**Designation**
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
105	145	20	61 800	69 500	2 600	16	10 000	16 000	0,69	**71921 CD/HC**
	145	20	57 200	65 500	2 500	–	9 500	50 000	0,69	**71921 ACD/HC**
110	150	20	62 400	72 000	2 700	17	10 000	16 000	0,72	**71922 CD/HC**
	150	20	58 500	68 000	2 550	–	9 000	14 000	0,72	**71922 ACD/HC**
120	165	22	78 000	91 500	3 250	16	9 000	14 000	0,97	**71924 CD/HC**
	165	22	72 800	86 500	3 050	–	8 500	17 000	0,97	**71924 ACD/HC**
130	180	24	92 300	108 000	3 650	16	8 500	13 000	1,3	**71926 CD/HC**
	180	24	87 100	102 000	3 450	–	8 000	12 000	1,3	**71926 ACD/HC**
140	190	24	95 600	116 000	3 900	17	8 000	12 000	1,35	**71928 CD/HC**
	190	24	90 400	110 000	3 650	–	7 500	11 000	1,35	**71928 ACD/HC**

Dimensions						**Abutment and fillet dimensions**				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
105	117	133	1,1	0,6	27	112	138	140	1	0,6
	117	133	1,1	0,6	39	112	138	140	1	0,6
110	122	138	1,1	0,6	27	117	143	145	1	0,6
	122	138	1,1	0,6	40	117	143	145	1	0,6
120	133	152	1,1	0,6	30	127	158	160	1	0,6
	133	152	1,1	0,6	44	127	158	160	1	0,6
130	145	165	1,5	0,6	33	139	171	175	1,5	0,6
	145	165	1,5	0,6	48	139	171	175	1,5	0,6
140	155	175	1,5	0,6	34	149	181	185	1,5	0,6
	155	175	1,5	0,6	51	149	181	185	1,5	0,6



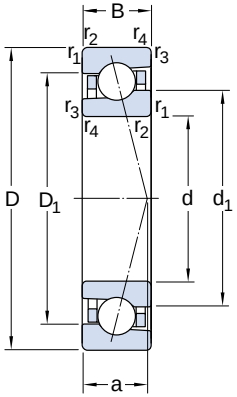
CE, ACE



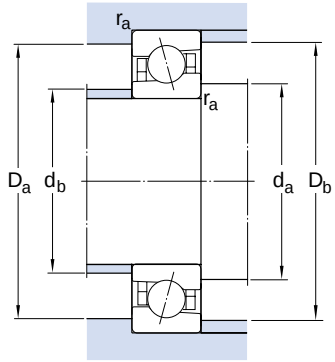


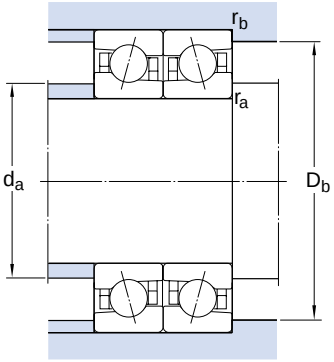
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
20	37	9	4 680	2 120	90	7	63 000	98 000	0,032	**71904 CE/HC**
	37	9	4 420	2 040	85	–	56 000	87 000	0,032	**71904 ACE/HC**
	42	12	7 020	3 050	129	6,5	58 000	90 000	0,056	**7004 CE/HC**
	42	12	6 760	2 900	122	–	51 200	80 000	0,056	**7004 ACE/HC**
25	42	9	5 270	2 700	114	7,2	53 500	83 000	0,038	**71905 CE/HC**
	42	9	4 940	2 550	108	–	47 500	74 000	0,038	**71905 ACE/HC**
	47	12	7 800	3 750	156	6,8	50 000	77 000	0,064	**7005 CE/HC**
	47	12	7 410	3 550	150	–	44 100	69 000	0,064	**7005 ACE/HC**
30	47	9	5 590	3 100	132	7,4	46 500	72 700	0,043	**71906 CE/HC**
	47	9	5 270	2 900	125	–	41 500	64 900	0,043	**71906 ACE/HC**
	55	13	10 100	5 100	216	6,9	42 300	65 800	0,095	**7006 CE/HC**
	55	13	9 560	4 900	208	–	37 500	58 700	0,095	**7006 ACE/HC**
35	55	10	7 610	4 400	186	7,3	40 000	62 200	0,066	**71907 CE/HC**
	55	10	7 150	4 150	176	–	35 500	55 500	0,066	**71907 ACE/HC**
	62	14	10 800	6 000	255	7,1	37 000	57 700	0,132	**7007 CE/HC**
	62	14	10 400	5 700	240	–	32 700	51 400	0,132	**7007 ACE/HC**
40	62	12	9 560	5 700	240	7,3	35 100	54 900	0,097	**71908 CE/HC**
	62	12	9 230	5 400	228	–	31 200	49 000	0,097	**71908 ACE/HC**
	68	15	11 700	6 800	290	7,3	33 100	51 800	0,167	**7008 CE/HC**
	68	15	11 100	6 550	275	–	29 500	46 200	0,167	**7008 ACE/HC**
45	68	12	10 100	6 400	270	7,5	31 500	49 500	0,116	**71909 CE/HC**
	68	12	9 560	6 100	255	–	28 200	44 200	0,116	**71909 ACE/HC**
	75	16	14 000	8 500	360	7,3	30 000	46 600	0,208	**7009 CE/HC**
	75	16	13 300	8 000	340	–	26 500	41 600	0,208	**7009 ACE/HC**
50	72	12	10 600	7 100	300	7,6	29 500	45 900	0,116	**71910 CE/HC**
	72	12	9 950	6 700	285	–	26 200	40 000	0,116	**71910 ACE/HC**
	80	16	14 800	9 500	400	7,4	27 500	43 000	0,226	**7010 CE/HC**
	80	16	14 000	9 000	380	–	24 500	38 000	0,226	**7010 ACE/HC**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
20	25,6	31,4	0,3	0,2	8,4	22	35	35,8	0,3	0,1
	25,6	31,4	0,3	0,2	11,3	22	35	35,8	0,3	0,1
	27,2	34,8	0,6	0,6	10,3	25	37	40,3	0,6	0,6
	27,2	34,8	0,6	0,6	13,4	25	37	40,3	0,6	0,6
25	30,6	36,4	0,3	0,2	9,07	27	40	40,8	0,3	0,1
	30,6	36,4	0,3	0,2	12,5	27	40	40,8	0,3	0,1
	32,2	39,9	0,6	0,6	10,9	30	42	45,1	0,6	0,6
	32,2	39,9	0,6	0,6	14,6	30	42	45,1	0,6	0,6
30	35,6	41,4	0,3	0,2	9,74	32	45	45,8	0,3	0,1
	35,6	41,4	0,3	0,2	13,6	32	45	45,8	0,3	0,1
	38,3	46,8	1	1	12,3	35	50	52,8	1	1
	38,3	46,8	1	1	16,6	35	50	52,8	1	1
35	41,6	48,4	0,6	0,2	11,1	40	50	53,8	0,6	0,1
	41,6	48,4	0,6	0,2	15,7	40	50	53,8	0,6	0,1
	44,3	52,8	1	1	13,6	41	56	59,5	1	1
	44,3	52,8	1	1	18,5	41	56	59,5	1	1
40	47,1	54,9	0,6	0,2	12,9	45	57	60,8	0,6	0,1
	47,1	54,9	0,6	0,2	18,1	45	57	60,8	0,6	0,1
	49,8	58,3	1	1	14,9	46	62	65,3	1	1
	49,8	58,3	1	1	20,3	46	62	65,3	1	1
45	52,6	60,4	0,6	0,2	13,7	50	63	66,8	0,6	0,1
	52,6	60,4	0,6	0,2	19,4	50	63	66,8	0,6	0,1
	55,3	64,8	1	1	16,2	51	69	72	1	1
	55,3	64,8	1	1	22,2	51	69	72	1	1
50	57,1	64,9	0,6	0,2	14,3	55	67	70,8	0,6	0,1
	57,1	64,9	0,6	0,2	20,4	55	67	70,8	0,6	0,1
	60,3	69,8	1	1	16,9	55	74	76,8	1	1
	60,3	69,8	1	1	23,4	55	74	76,8	1	1



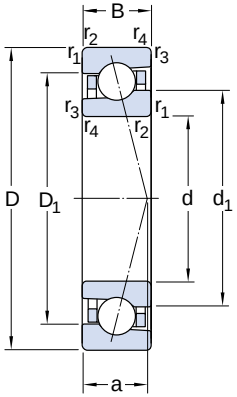
CE, ACE



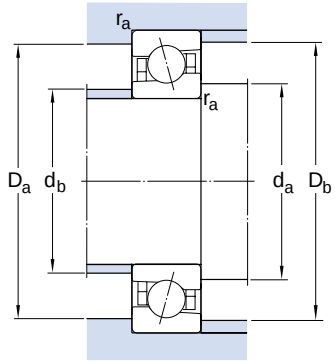


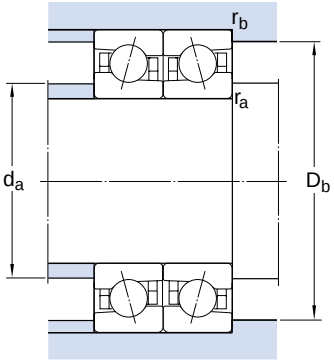
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
55	80	13	15 300	10 000	425	7,5	26 500	41 000	0,149	**71911 CE/HC**
	80	13	14 600	9 500	400	–	23 500	37 000	0,149	**71911 ACE/HC**
	90	18	15 600	10 600	450	7,5	24 700	38 000	0,36	**7011 CE/HC**
	90	18	14 800	10 000	425	–	22 000	34 000	0,36	**7011 ACE/HC**
60	85	13	15 600	10 600	450	7,5	24 600	38 000	0,159	**71912 CE/HC**
	85	13	14 800	10 000	425	–	22 000	34 000	0,159	**71912 ACE/HC**
	95	18	16 300	11 600	490	7,6	23 000	36 000	0,385	**7012 CE/HC**
	95	18	15 300	11 000	465	–	20 500	32 000	0,385	**7012 ACE/HC**
65	90	13	16 300	11 600	490	7,6	23 100	36 000	0,17	**71913 CE/HC**
	90	13	15 300	11 000	465	–	20 500	32 000	0,17	**71913 ACE/HC**
	100	18	16 800	12 700	540	7,7	21 700	33 000	0,411	**7013 CE/HC**
	100	18	15 900	12 000	510	–	19 100	30 000	0,411	**7013 ACE/HC**
70	100	16	21 600	15 000	640	7,5	21 100	32 000	0,276	**71914 CE/HC**
	100	16	20 300	14 300	600	–	18 600	29 000	0,276	**71914 ACE/HC**
	110	20	22 500	16 600	695	7,5	20 000	31 000	0,555	**7014 CE/HC**
	110	20	21 600	15 600	670	–	17 500	27 000	0,555	**7014 ACE/HC**
75	105	16	22 500	16 600	695	7,5	20 000	31 000	0,294	**71915 CE/HC**
	105	16	21 600	15 600	670	–	17 500	27 000	0,294	**71915 ACE/HC**
	115	20	22 900	17 300	735	7,6	18 600	29 000	0,586	**7015 CE/HC**
	115	20	21 600	16 300	695	–	16 600	26 000	0,586	**7015 ACE/HC**
80	110	16	22 900	17 300	735	7,6	18 800	29 000	0,309	**71916 CE/HC**
	110	16	21 600	16 300	695	–	16 600	26 000	0,309	**71916 ACE/HC**
	125	22	29 100	21 600	900	7,5	17 500	27 000	0,768	**7016 CE/HC**
	125	22	27 600	20 400	850	–	15 500	24 000	0,768	**7016 ACE/HC**
85	120	18	29 100	21 600	900	7,5	17 500	27 000	0,438	**71917 CE/HC**
	120	18	27 600	20 400	850	–	15 500	24 000	0,438	**71917 ACE/HC**
	130	22	29 600	22 800	930	7,6	16 500	26 000	0,805	**7017 CE/HC**
	130	22	28 100	21 600	880	–	14 600	23 000	0,805	**7017 ACE/HC**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
55	62,7	72,3	1	0,3	15,7	61	74	78	1	0,3
	62,7	72,3	1	0,3	22,5	61	74	78	1	0,3
	67,8	77,3	1,1	1,1	18,9	62	82	86,4	1	1
	67,7	77,3	1,1	1,1	26,2	62	82	86,4	1	1
60	67,7	77,3	1	0,3	16,4	66	79	83	1	0,3
	67,7	77,3	1	0,3	23,7	66	79	83	1	0,3
	72,8	82,3	1,1	1,1	19,5	67	88	91	1	1
	72,8	82,3	1,1	1,1	27,3	67	88	91	1	1
65	72,7	82,3	1	0,3	17	71	84	88	1	0,3
	72,7	82,3	1	0,3	24,8	71	84	88	1	0,3
	77,8	87,3	1,1	1,1	20,2	72	93	96	1	1
	77,8	87,3	1,1	1,1	28,5	72	93	96	1	1
70	79,2	90,8	1	0,3	19,6	76	94	98	1	0,3
	79,2	90,8	1	0,3	28,1	76	94	98	1	0,3
	84,3	95,8	1,1	1,1	22,2	77	103	106	1	1
	84,3	95,8	1,1	1,1	31,3	77	103	106	1	1
75	84,2	95,8	1	0,3	20,2	81	99	103	1	0,3
	84,2	95,8	1	0,3	29,3	81	99	103	1	0,3
	89,3	100,8	1,1	1,1	22,9	82	108	111	1	1
	89,3	100,8	1,1	1,1	32,5	82	108	111	1	1
80	89,2	100,8	1	0,3	20,9	86	104	108	1	0,3
	89,2	100,8	1	0,3	30,5	86	104	108	1	0,3
	95,9	109,2	1,1	1,1	24,9	87	118	121	1	1
	95,9	109,2	1,1	1,1	35,2	87	118	121	1	1
85	95,8	109,2	1,1	0,6	22,9	92	113	115	1	0,6
	95,8	109,2	1,1	0,6	33,2	92	113	115	1	0,6
	100,9	114,2	1,1	1,1	25,6	92	123	126	1	1
	100,9	114,2	1,1	1,1	36,4	92	123	126	1	1



CE, ACE





Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Calculation factor	Speed ratings Lubrication grease	oil spot	Mass	Designation
d	D	B	C	C_0	P_u	f_0				
mm			N		N	–	r/min		kg	–
90	125	18	29 600	22 800	930	7,6	16 500	26 000	0,459	**71918 CE/HC**
	125	18	28 100	21 600	880	–	15 600	23 000	0,459	**71918 ACE/HC**
	140	24	37 100	28 000	1 100	7,5	15 500	24 000	1,028	**7018 CE/HC**
	140	24	35 100	26 500	1 040	–	13 800	21 000	1,028	**7018 ACE/HC**
95	130	18	31 200	24 500	980	7,6	16 000	24 000	0,482	**71919 CE/HC**
	130	18	29 600	23 200	930	–	14 200	22 000	0,482	**71919 ACE/HC**
	145	24	37 700	29 000	1 140	7,5	15 000	23 000	1,074	**7019 CE/HC**
	145	24	35 800	28 000	1 080	–	13 100	20 000	1,074	**7019 ACE/HC**
100	140	20	37 700	29 000	1 140	7,5	15 000	23 000	0,651	**71920 CE/HC**
	140	20	35 800	28 000	1 080	–	13 300	20 000	0,651	**71920 ACE/HC**
	150	24	39 000	30 500	1 160	7,6	14 400	22 000	1,119	**7020 CE/HC**
	150	24	36 400	29 000	1 100	–	12 600	19 000	1,119	**7020 ACE/HC**
105	145	20	39 000	30 500	1 160	7,6	14 400	22 000	0,678	**71921 CE/HC**
	145	20	36 400	29 000	1 100	–	12 800	20 000	0,678	**71921 ACE/HC**
110	150	20	39 700	32 000	1 200	7,6	13 700	21 000	0,705	**71922 CE/HC**
	150	20	37 100	30 500	1 120	–	12 100	19 000	0,705	**71922 ACE/HC**
120	165	22	49 400	40 500	1 430	7,6	12 500	19 000	0,96	**71924 CE/HC**
	165	22	46 200	38 000	1 370	–	11 200	17 000	0,96	**71924 ACE/HC**

Dimensions						Abutment and fillet dimensions				
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm						mm				
90	100,8	114,2	1,1	0,6	23,6	97	118	120	1	0,6
	100,8	114,2	1,1	0,6	34,4	97	118	120	1	0,6
	107,4	122,7	1,5	1,5	27,6	99	131	135	1,5	1,5
	107,4	122,7	1,5	1,5	39,2	99	131	135	1,5	1,5
95	105,8	119,2	1,1	0,6	24,3	102	123	125	1	0,6
	105,8	119,2	1,1	0,6	35,6	102	123	125	1	0,6
	112,4	127,7	1,5	1,5	28,3	104	136	140	1,5	1,5
	112,4	127,7	1,5	1,5	40,4	104	136	140	1,5	1,5
100	112,3	127,7	1,1	0,6	26,3	107	133	135	1	0,6
	112,3	127,7	1,1	0,6	38,4	107	133	135	1	0,6
	117,4	132,7	1,5	1,5	29	109	141	145	1,5	1,5
	117,4	132,7	1,5	1,5	41,5	109	141	145	1,5	1,5
105	117,3	132,7	1,1	0,6	27	112	138	140	1	0,6
	117,3	132,7	1,1	0,6	39,5	112	138	140	1	0,6
110	122,3	137,7	1,1	0,6	27,6	117	143	145	1	0,6
	122,3	137,7	1,1	0,6	40,7	117	143	145	1	0,6
120	133,9	151,1	1,1	0,6	30,3	127	158	160	1	0,6
	133,9	151,1	1,1	0,6	44,7	127	158	160	1	0,6