

Angular Contact Ball Bearings

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Angular contact ball bearing



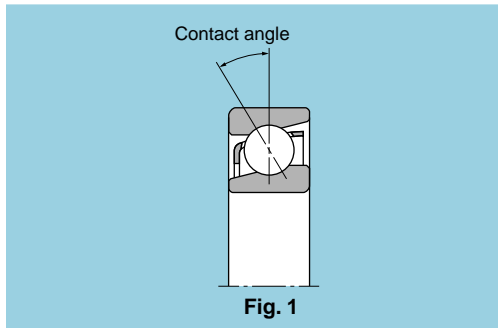
High speed use angular contact ball bearings



Ultra high speed use angular contact ball bearing

Angular contact ball bearings

Angular contact ball bearings are non-separable type bearings of series 79, 70, 72, 72B, 73 and 73B. The line connecting the contact points of the steel ball and inner ring and the ball and outer ring create an angle with the line drawn in the radial direction called the contact angle. The standard contact angle is 30°, however, the "B" suffix bearings have a 40° contact angle.



In addition to radial loads, relatively heavy axial loads in one direction can be accommodated by an angular contact ball bearing. The larger the contact angle, the larger the loading capacity becomes. Since an axial load is generated from a radial force, two of these bearings are generally used in pairs by facing each other.

The types of cages for angular contact ball bearings are given in Table 1.

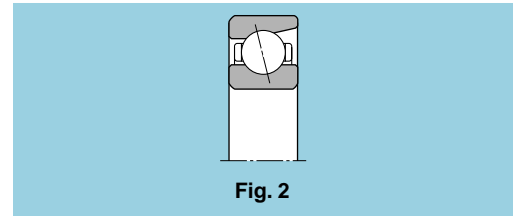
Table 1 The standard cages for angular contact ball bearings

| Bearing series | Pressed cage | Machined cage |
|----------------|--------------|---------------|
| 79 | — | 7905~7960 |
| 70 | — | 7000~7040 |
| 72 | 7200~7222 | 7224~7240 |
| 72B | 7200B~7222B | 7224B~7240B |
| 73 | 7300~7322 | 7324~7340 |
| 73B | 7300B~7322B | 7324~7340B |

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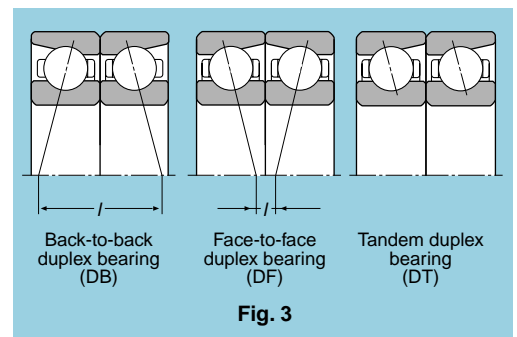
Angular contact bearing series (78C, 79C, 70C, 72C, and 73C) are used in high speed applications. The contact angle is 15°, as represented by the "C" suffix. An accuracy of Class 5 or ISO more severe grade is applied to all these bearings. These bearings are used in applications requiring high accuracy and high speed.

Machined cages made of a laminated phenol resin or a high tensile brass casting, or an injection molded fiber-reinforced synthetic resin cage are used in the bearings.



Duplex arrangement angular contact ball bearings

Three types of duplex arrangements for angular contact ball bearings are available as shown in Fig. 3.





Four-point contact ball bearing



Double row angular contact ball bearing (With filling slot)



Double row angular contact ball bearings (Without filling slot)

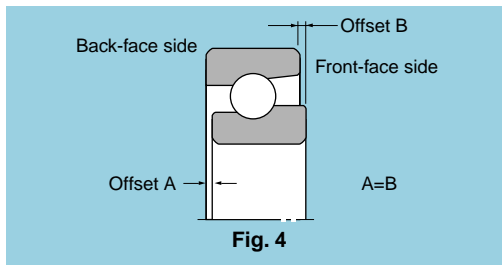
Radial loads and axial loads in either direction can be accommodated by back-to-back (DB) or face-to-face (DF) duplex angular contact ball bearings. The back-to-back duplex type bearing (DB) has a large distance, l , between the acting load center of the bearing, and the loading capacity of the moment force is large. The face-to-face duplex type bearing (DF) has smaller loading capacity of moment force than that of the back-to-back duplex type bearing (DB), but it has a larger allowable misalignment angle.

Radial loads and heavy axial loads can be accommodated by tandem duplex type bearings (DT), however, the axial loads can be applied in only one direction.

Duplex angular contact ball bearings are manufactured in a set to the clearance and/or pre-loading value specified by the user. Therefore, these bearings must be assembled together and should not be mixed with other sets.

Flush ground

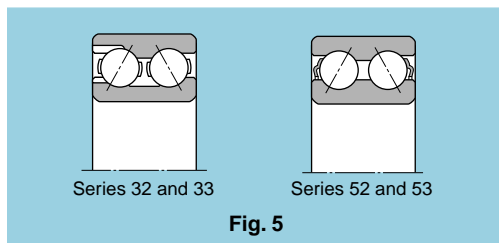
"Flush ground" is the name given to the method, as shown in Fig. 4, to grind the stick out of faces A and B of the bearing to the same value. In such a manner, a stated clearance or precluding value can be obtained by using bearings having identical symbols for clearance or preloading by combining either the DB or DF type. Regarding Type DT bearings, a combination for uniformly loading the force can also be obtained by optionally assorting the bearings. The flush ground is applied to all ultra high speed angular contact ball bearings.



Double row angular contact ball bearings

The structure of double row angular contact ball bearings are designed by arranging two the single row angular contact ball bearings in back-to-back duplex form (DB) so that the inner and outer rings, are respectively, each formed into one piece.

There are two types of these bearings. One groups is bearings series 32 and 33 with filling slots for one row of balls. The bearings can receive moment loads and axial loads in either direction. Series 32 and 33 bearings should be assembled so that the main axial load is received on the balls which are arranged in the row without filling slot. The contact angle for double row angular contact ball bearings is 30°.



The pressed cages and machined cages shown in Table 2 are also used in double row angular contact ball bearings.

Table 2 The standard cages for double row angular contact ball bearings

| Bearing series | Pressed cage | Machined cage |
|----------------|--------------|---------------|
| 32 | 3200~3215 | 3216~3220 |
| 33 | 3302~3313 | 3314, 3315 |
| 52 | 5200~5218 | 5219, 5220 |
| 53 | 5302~5315 | — |

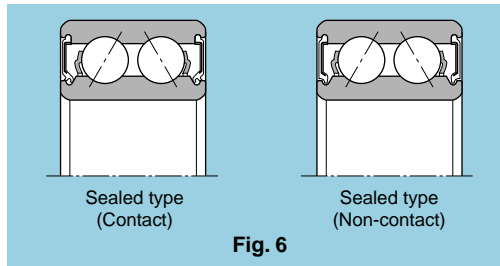
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For double row angular contact ball bearings of series 52 and 53, sealed and shielded types are also manufactured by NTN.

Like shielded type bearings, sealed double row angular contact ball bearings, have the same boundary dimensions as those of the open type bearings.

Sealed type

Sealed type bearings also have the function of keeping foreign matter out and grease in.



Shielded type

Shielded type bearings have the function of protecting against the penetration of foreign material and preventing grease leakage by means of the steel shield.

