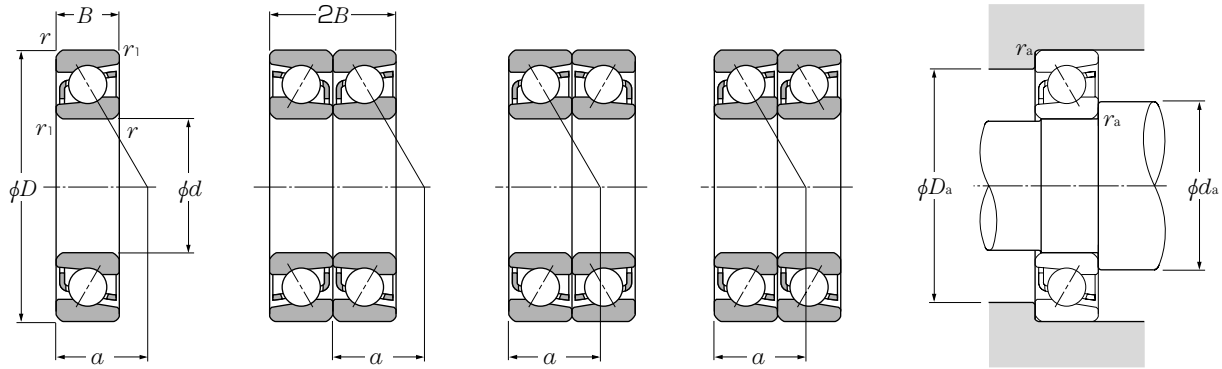


Single and Duplex Angular Contact Ball Bearings



Single

Back-to-back arrangement (DB)

Face-to-face arrangement (DF)

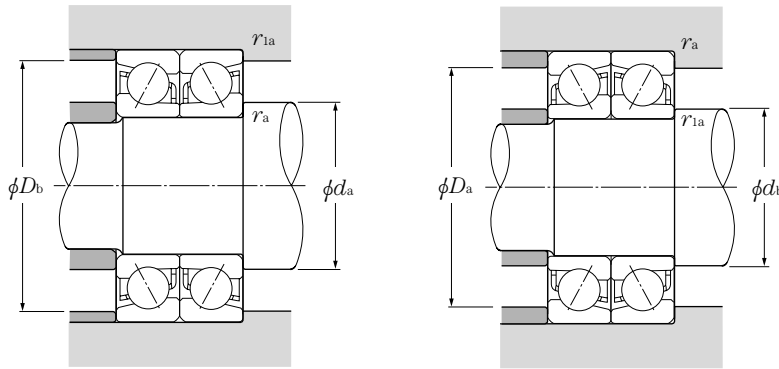
Tandem arrangement (DT)

d 10 ~ 30mm

| d | Boundary dimensions | | | | | Basic load ratings | | | | Limiting speeds ¹⁾ | | Bearing ²⁾ numbers | Load center mm a | Mass kg single (approx.) |
|-----------|---------------------|-----|------|------------------------|---------------------------|------------------------|--------------------------|-------------------------|---------------------------|-------------------------------|--------------------------|-------------------------------|--------------------------|-----------------------------------|
| | D | B | $2B$ | $r_s \text{ min}^{3)}$ | $r_{1s} \text{ min}^{3)}$ | dynamic kN C_r | static kN C_{or} | dynamic kgf C_r | static kgf C_{or} | grease min ⁻¹ | oil min ⁻¹ | | | |
| 10 | 26 | 8 | 16 | 0.3 | 0.15 | 4.65 | 2.07 | 470 | 212 | 29 000 | 39 000 | 7000 | 9 | 0.023 |
| | 30 | 9 | 18 | 0.6 | 0.3 | 5.45 | 2.74 | 555 | 279 | 28 000 | 37 000 | 7200 | 10.5 | 0.029 |
| | 30 | 9 | 18 | 0.6 | 0.3 | 5.00 | 2.52 | 510 | 257 | 24 000 | 32 000 | 7200B | 13 | 0.029 |
| | 35 | 11 | 22 | 0.6 | 0.3 | 10.1 | 4.95 | 1 030 | 500 | 26 000 | 34 000 | 7300 | 12 | 0.04 |
| | 35 | 11 | 22 | 0.6 | 0.3 | 9.50 | 4.60 | 970 | 470 | 22 000 | 29 000 | 7300B | 15 | 0.041 |
| 12 | 28 | 8 | 16 | 0.3 | 0.15 | 5.05 | 2.46 | 515 | 251 | 26 000 | 35 000 | 7001 | 10 | 0.025 |
| | 32 | 10 | 20 | 0.6 | 0.3 | 7.60 | 3.95 | 775 | 405 | 25 000 | 33 000 | 7201 | 11.5 | 0.035 |
| | 32 | 10 | 20 | 0.6 | 0.3 | 7.00 | 3.65 | 775 | 405 | 21 000 | 28 000 | 7201B | 14 | 0.036 |
| | 37 | 12 | 24 | 1 | 0.6 | 11.2 | 5.25 | 1 140 | 535 | 23 000 | 30 000 | 7301 | 13 | 0.044 |
| | 37 | 12 | 24 | 1 | 0.6 | 10.5 | 4.95 | 1 080 | 505 | 19 000 | 26 000 | 7301B | 16.5 | 0.045 |
| 15 | 32 | 9 | 18 | 0.3 | 0.15 | 5.80 | 3.15 | 590 | 320 | 23 000 | 31 000 | 7002 | 11.5 | 0.035 |
| | 35 | 11 | 22 | 0.6 | 0.3 | 9.05 | 4.70 | 925 | 480 | 22 000 | 29 000 | 7202 | 12.5 | 0.046 |
| | 35 | 11 | 22 | 0.6 | 0.3 | 8.35 | 4.35 | 855 | 445 | 18 000 | 25 000 | 7202B | 16 | 0.046 |
| | 42 | 13 | 26 | 1 | 0.6 | 13.5 | 7.20 | 1 370 | 735 | 19 000 | 26 000 | 7302 | 15 | 0.055 |
| | 42 | 13 | 26 | 1 | 0.6 | 12.5 | 6.65 | 1 270 | 680 | 17 000 | 22 000 | 7302B | 19 | 0.057 |
| 17 | 35 | 10 | 20 | 0.3 | 0.15 | 7.15 | 3.85 | 730 | 390 | 21 000 | 28 000 | 7003 | 12.5 | 0.046 |
| | 40 | 12 | 24 | 0.6 | 0.3 | 12.0 | 6.60 | 1 220 | 675 | 19 000 | 26 000 | 7203 | 14.5 | 0.064 |
| | 40 | 12 | 24 | 0.6 | 0.3 | 11.0 | 6.10 | 1 120 | 625 | 17 000 | 22 000 | 7203B | 18 | 0.066 |
| | 47 | 14 | 28 | 1 | 0.6 | 15.9 | 8.65 | 1 630 | 880 | 18 000 | 24 000 | 7303 | 16 | 0.107 |
| | 47 | 14 | 28 | 1 | 0.6 | 14.8 | 8.00 | 1 510 | 820 | 15 000 | 20 000 | 7303B | 20.5 | 0.109 |
| 20 | 42 | 12 | 24 | 0.6 | 0.3 | 9.70 | 5.60 | 990 | 570 | 19 000 | 25 000 | 7004 | 15 | 0.08 |
| | 47 | 14 | 28 | 1 | 0.6 | 14.5 | 8.40 | 1 480 | 855 | 17 000 | 23 000 | 7204 | 17 | 0.1 |
| | 47 | 14 | 28 | 1 | 0.6 | 13.3 | 7.70 | 1 360 | 785 | 15 000 | 20 000 | 7204B | 21.5 | 0.102 |
| | 52 | 15 | 30 | 1.1 | 0.6 | 18.7 | 10.4 | 1 910 | 1 060 | 16 000 | 21 000 | 7304 | 18 | 0.138 |
| | 52 | 15 | 30 | 1.1 | 0.6 | 17.3 | 9.65 | 1 770 | 985 | 13 000 | 18 000 | 7304B | 22.5 | 0.141 |
| 25 | 42 | 9 | 18 | 0.3 | 0.15 | 7.15 | 4.95 | 730 | 505 | 17 000 | 22 000 | 7905 | 14 | 0.05 |
| | 47 | 12 | 24 | 0.6 | 0.3 | 10.7 | 6.85 | 1 100 | 700 | 16 000 | 21 000 | 7005 | 16.5 | 0.093 |
| | 52 | 15 | 30 | 1 | 0.6 | 16.2 | 10.3 | 1 650 | 1 050 | 14 000 | 19 000 | 7205 | 19 | 0.125 |
| | 52 | 15 | 30 | 1 | 0.6 | 14.8 | 9.40 | 1 510 | 960 | 12 000 | 16 000 | 7205B | 24 | 0.129 |
| | 62 | 17 | 34 | 1.1 | 0.6 | 26.4 | 15.8 | 2 690 | 1 610 | 13 000 | 17 000 | 7305 | 21 | 0.23 |
| | 62 | 17 | 34 | 1.1 | 0.6 | 24.4 | 14.6 | 2 490 | 1 490 | 11 000 | 15 000 | 7305B | 27 | 0.234 |
| 30 | 47 | 9 | 18 | 0.3 | 0.15 | 7.55 | 5.75 | 770 | 585 | 14 000 | 19 000 | 7906 | 15.5 | 0.058 |
| | 55 | 13 | 26 | 1 | 0.6 | 13.9 | 9.45 | 1 410 | 965 | 13 000 | 18 000 | 7006 | 19 | 0.135 |

1) This value achieved with machined cages; when pressed cages are used, 80% of this value is acceptable.
 2) Bearing numbers appended with the code "B" have a contact angle of 40°; bearings with this code have a contact angle of 30°.
 3) Smallest allowable dimension for chamfer dimension r .

Single and Duplex Angular Contact Ball Bearings



Dynamic equivalent radial load

$$P_r = X F_r + Y F_a$$

| Contact angle | e | Single, DT | | | | DB, DF | | | |
|---------------|------|------------------|---|---------------|------|------------------|------|---------------|------|
| | | $F_a/F_r \leq e$ | | $F_a/F_r > e$ | | $F_a/F_r \leq e$ | | $F_a/F_r > e$ | |
| | | X | Y | X | Y | X | Y | X | Y |
| 30° | 0.80 | 1 | 0 | 0.39 | 0.76 | 1 | 0.78 | 0.63 | 1.24 |
| 40° | 1.14 | 1 | 0 | 0.35 | 0.57 | 1 | 0.55 | 0.57 | 0.93 |

Static equivalent radial load

$$P_{or} = X_0 F_r + Y_0 F_a$$

| Contact angle | Single, DT | | DB, DF | |
|---------------|------------|-------|--------|-------|
| | X_0 | Y_0 | X_0 | Y_0 |
| 30° | 0.5 | 0.33 | 1 | 0.66 |
| 40° | 0.5 | 0.26 | 1 | 0.52 |

For single and DT arrangement,
When $P_{or} < F_r$ use $P_{or} = F_r$

| Basic load ratings | | | | Limiting speeds ¹⁾ | | Bearing numbers ²⁾ | | | Abutment and fillet dimensions | | | | | |
|---------------------------|--------------|----------------------------|---------------|-------------------------------|--------|-------------------------------|----|----|--------------------------------|--------------|--------------|--------------|-----------------|------------------|
| dynamic (duplex) kN | static kN | dynamic (duplex) kgf | static kgf | (duplex) min ⁻¹ | | DB | DF | DT | mm | | | | | |
| C_r | C_{or} | C_r | C_{or} | grease | oil | | | | d_a min | d_b min | D_a max | D_b max | r_{as} max | r_{1as} max |
| 7.50 | 4.15 | 765 | 425 | 23 000 | 31 000 | DB | DF | DT | 12.5 | 12.5 | 23.5 | 24.8 | 0.3 | 0.15 |
| 8.80 | 5.45 | 900 | 560 | 22 000 | 30 000 | DB | DF | DT | 14.5 | 12.5 | 25.5 | 27.5 | 0.6 | 0.3 |
| 8.10 | 5.05 | 825 | 515 | 19 000 | 26 000 | DB | DF | DT | 14.5 | 12.5 | 25.5 | 27.5 | 0.6 | 0.3 |
| 16.5 | 9.85 | 1 680 | 1 000 | 20 000 | 27 000 | DB | DF | DT | 14.5 | 12.5 | 30.5 | 32.5 | 0.6 | 0.3 |
| 15.4 | 9.20 | 1 570 | 940 | 18 000 | 24 000 | DB | DF | DT | 14.5 | 12.5 | 30.5 | 32.5 | 0.6 | 0.3 |
| 8.20 | 4.90 | 840 | 500 | 21 000 | 28 000 | DB | DF | DT | 14.5 | 14.5 | 25.5 | 26.8 | 0.3 | 0.15 |
| 12.3 | 7.95 | 1 260 | 810 | 20 000 | 26 000 | DB | DF | DT | 16.5 | 14.5 | 27.5 | 29.5 | 0.6 | 0.3 |
| 11.4 | 7.35 | 1 160 | 750 | 17 000 | 23 000 | DB | DF | DT | 16.5 | 14.5 | 27.5 | 29.5 | 0.6 | 0.3 |
| 18.2 | 10.5 | 1 850 | 1 070 | 18 000 | 24 000 | DB | DF | DT | 17.5 | 16.5 | 31.5 | 32.5 | 1 | 0.6 |
| 17.1 | 9.90 | 1 750 | 1 010 | 16 000 | 21 000 | DB | DF | DT | 17.5 | 16.5 | 31.5 | 32.5 | 1 | 0.6 |
| 9.40 | 6.30 | 960 | 640 | 18 000 | 24 000 | DB | DF | DT | 17.5 | 17.5 | 29.5 | 30.8 | 0.3 | 0.15 |
| 14.7 | 9.40 | 1 500 | 960 | 17 000 | 23 000 | DB | DF | DT | 19.5 | 17.5 | 30.5 | 32.5 | 0.6 | 0.3 |
| 13.6 | 8.70 | 1 390 | 885 | 15 000 | 20 000 | DB | DF | DT | 19.5 | 17.5 | 30.5 | 32.5 | 0.6 | 0.3 |
| 21.9 | 14.4 | 2 230 | 1 470 | 15 000 | 21 000 | DB | DF | DT | 20.5 | 19.5 | 36.5 | 37.5 | 1 | 0.6 |
| 20.3 | 13.3 | 2 070 | 1 360 | 13 000 | 18 000 | DB | DF | DT | 20.5 | 19.5 | 36.5 | 37.5 | 1 | 0.6 |
| 11.6 | 7.65 | 1 190 | 780 | 17 000 | 22 000 | DB | DF | DT | 19.5 | 19.5 | 32.5 | 33.8 | 0.3 | 0.15 |
| 19.4 | 13.2 | 1 980 | 1 350 | 15 000 | 21 000 | DB | DF | DT | 21.5 | 19.5 | 35.5 | 37.5 | 0.6 | 0.3 |
| 17.9 | 12.2 | 1 830 | 1 250 | 13 000 | 18 000 | DB | DF | DT | 21.5 | 19.5 | 35.5 | 37.5 | 0.6 | 0.3 |
| 25.9 | 17.3 | 2 640 | 1 760 | 14 000 | 19 000 | DB | DF | DT | 22.5 | 21.5 | 41.5 | 42.5 | 1 | 0.6 |
| 24.0 | 16.0 | 2 450 | 1 640 | 12 000 | 16 000 | DB | DF | DT | 22.5 | 21.5 | 41.5 | 42.5 | 1 | 0.6 |
| 15.8 | 11.2 | 1 610 | 1 140 | 15 000 | 20 000 | DB | DF | DT | 24.5 | 24.5 | 37.5 | 39.5 | 0.6 | 0.3 |
| 23.6 | 16.8 | 2 400 | 1 710 | 14 000 | 18 000 | DB | DF | DT | 25.5 | 24.5 | 41.5 | 42.5 | 1 | 0.6 |
| 21.6 | 15.4 | 2 200 | 1 570 | 12 000 | 16 000 | DB | DF | DT | 25.5 | 24.5 | 41.5 | 42.5 | 1 | 0.6 |
| 30.5 | 20.8 | 3 100 | 2 130 | 12 000 | 17 000 | DB | DF | DT | 27 | 24.5 | 45 | 47.5 | 1 | 0.6 |
| 28.2 | 19.3 | 2 870 | 1 970 | 11 000 | 14 000 | DB | DF | DT | 27 | 24.5 | 45 | 47.5 | 1 | 0.6 |
| 11.6 | 9.95 | 1 180 | 1 010 | 13 000 | 18 000 | DB | DF | DT | 27.5 | 27.5 | 39.5 | 40.8 | 0.3 | 0.15 |
| 17.5 | 13.7 | 1 780 | 1 400 | 12 000 | 17 000 | DB | DF | DT | 29.5 | 29.5 | 42.5 | 44.5 | 0.6 | 0.3 |
| 26.3 | 20.6 | 2 690 | 2 100 | 11 000 | 15 000 | DB | DF | DT | 30.5 | 29.5 | 46.5 | 47.5 | 1 | 0.6 |
| 24.0 | 18.8 | 2 450 | 1 920 | 10 000 | 13 000 | DB | DF | DT | 30.5 | 29.5 | 46.5 | 47.5 | 1 | 0.6 |
| 43.0 | 31.5 | 4 400 | 3 250 | 10 000 | 14 000 | DB | DF | DT | 32 | 29.5 | 55 | 57.5 | 1 | 0.6 |
| 39.5 | 29.3 | 4 050 | 2 980 | 9 100 | 12 000 | DB | DF | DT | 32 | 29.5 | 55 | 57.5 | 1 | 0.6 |
| 12.3 | 11.5 | 1 250 | 1 170 | 12 000 | 15 000 | DB | DF | DT | 32.5 | 32.5 | 44.5 | 45.8 | 0.3 | 0.15 |
| 22.5 | 18.9 | 2 300 | 1 930 | 11 000 | 14 000 | DB | DF | DT | 35.5 | 35.5 | 49.5 | 50.5 | 1 | 0.6 |

Note: For bearing series 79 and 70, inner rings are constructed with groove abutments on both sides. Therefore, the inner ring chamfer dimension r_1 is identical to dimension r . Furthermore, the radius r_{1a} of the shaft corner roundness is likewise identical to r_a .