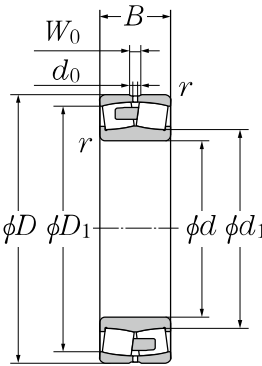
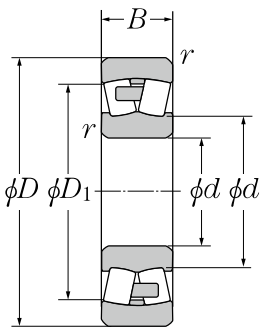


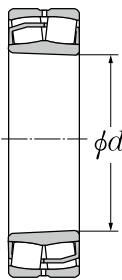
Cylindrical bore  
[EA type]



Cylindrical bore  
[EM type]



Cylindrical bore  
[213 type]

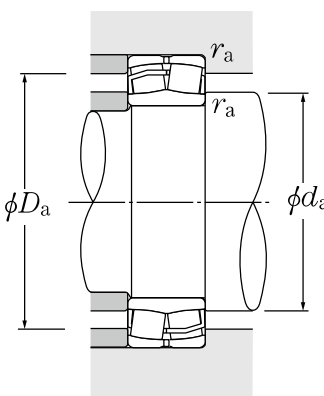


Tapered bore

d 65 ~ 95mm

| Boundary dimensions |     |      |                                  |                | Basic load rating |                 | Fatigue load limit | Allowable speed    |                 | Bearing numbers <sup>1)</sup> |                            |
|---------------------|-----|------|----------------------------------|----------------|-------------------|-----------------|--------------------|--------------------|-----------------|-------------------------------|----------------------------|
| mm                  |     |      |                                  |                | dynamic           | static          | kN                 | min <sup>-1</sup>  |                 | Cylindrical bore              | Tapered bore <sup>2)</sup> |
| d                   | D   | B    | r <sub>s min</sub> <sup>3)</sup> | W <sub>0</sub> | C <sub>r</sub>    | C <sub>0r</sub> | C <sub>u</sub>     | Grease lubrication | Oil lubrication |                               |                            |
| 65                  | 120 | 31   | 1.5                              | 8              | 3.5               | 226             | 224                | 18.2               | 4 400           | 5 500                         | *22213EAD1                 |
|                     | 120 | 31   | 1.5                              | 8              | 3.5               | 217             | 212                | 17.2               | 4 400           | 5 500                         | *22213EMD1                 |
|                     | 140 | 33   | 2.1                              | 7              | 4                 | 216             | 228                | 31.0               | 3 100           | 4 000                         | 21313                      |
|                     | 140 | 48   | 2.1                              | 9              | 4                 | 369             | 343                | 23.4               | 3 300           | 4 100                         | *22313EAD1                 |
|                     | 140 | 48   | 2.1                              | 9              | 4                 | 369             | 343                | 23.4               | 3 300           | 4 100                         | *22313EMD1                 |
| 70                  | 125 | 31   | 1.5                              | 7              | 3.5               | 235             | 240                | 20.1               | 4 100           | 5 200                         | *22214EAD1                 |
|                     | 125 | 31   | 1.5                              | 7              | 3.5               | 235             | 240                | 20.1               | 4 100           | 5 200                         | *22214EMD1                 |
|                     | 150 | 35   | 2.1                              | 7              | 4                 | 245             | 262                | 33.5               | 2 900           | 3 800                         | 21314                      |
|                     | 150 | 51   | 2.1                              | 10             | 5                 | 420             | 396                | 26.0               | 3 000           | 3 800                         | *22314EAD1                 |
|                     | 150 | 51   | 2.1                              | 10             | 5                 | 420             | 396                | 26.0               | 3 000           | 3 800                         | *22314EMD1                 |
| 75                  | 130 | 31   | 1.5                              | 7              | 3.5               | 244             | 249                | 21.1               | 4 000           | 5 000                         | *22215EAD1                 |
|                     | 130 | 31   | 1.5                              | 7              | 3.5               | 244             | 249                | 21.1               | 4 000           | 5 000                         | *22215EMD1                 |
|                     | 160 | 37   | 2.1                              | 7              | 4                 | 266             | 287                | 27.5               | 2 700           | 3 500                         | 21315                      |
|                     | 160 | 55   | 2.1                              | 10             | 5                 | 491             | 467                | 29.8               | 2 900           | 3 600                         | *22315EAD1                 |
|                     | 160 | 55   | 2.1                              | 10             | 5                 | 491             | 467                | 29.8               | 2 900           | 3 600                         | *22315EMD1                 |
| 80                  | 140 | 33   | 2                                | 8              | 3.5               | 278             | 287                | 24.0               | 3 700           | 4 600                         | *22216EAD1                 |
|                     | 140 | 33   | 2                                | 8              | 3.5               | 267             | 272                | 22.8               | 3 700           | 4 600                         | *22216EMD1                 |
|                     | 170 | 39   | 2.1                              | 7              | 4                 | 289             | 315                | 30.5               | 2 500           | 3 300                         | 21316                      |
|                     | 170 | 58   | 2.1                              | 10             | 5                 | 541             | 522                | 32.5               | 2 700           | 3 400                         | *22316EAD1                 |
|                     | 170 | 58   | 2.1                              | 10             | 5                 | 541             | 522                | 32.5               | 2 700           | 3 400                         | *22316EMD1                 |
| 85                  | 150 | 36   | 2                                | 8              | 3.5               | 324             | 330                | 27.1               | 3 400           | 4 300                         | *22217EAD1                 |
|                     | 150 | 36   | 2                                | 8              | 3.5               | 324             | 330                | 27.1               | 3 400           | 4 300                         | *22217EMD1                 |
|                     | 180 | 41   | 3                                | 7              | 4                 | 320             | 355                | 45.0               | 2 400           | 3 100                         | 21317                      |
|                     | 180 | 60   | 3                                | 11             | 5                 | 599             | 604                | 36.4               | 2 600           | 3 200                         | *22317EAD1                 |
|                     | 180 | 60   | 3                                | 11             | 5                 | 599             | 604                | 36.4               | 2 600           | 3 200                         | *22317EMD1                 |
| 90                  | 160 | 40   | 2                                | 10             | 4.5               | 384             | 398                | 30.2               | 3 200           | 4 000                         | *22218EAD1                 |
|                     | 160 | 40   | 2                                | 10             | 4.5               | 384             | 398                | 30.2               | 3 200           | 4 000                         | *22218EMD1                 |
|                     | 160 | 52.4 | 2                                | 9              | 4                 | 467             | 513                | 30.0               | 2 600           | 3 200                         | *23218EMD1                 |
|                     | 190 | 43   | 3                                | 7              | 4                 | 355             | 400                | 50.5               | 2 300           | 3 000                         | 21318                      |
|                     | 190 | 64   | 3                                | 12             | 5                 | 668             | 652                | 40.0               | 2 500           | 3 000                         | *22318EAD1                 |
| 95                  | 170 | 43   | 2.1                              | 10             | 4.5               | 416             | 417                | 33.4               | 3 000           | 3 800                         | *22219EAD1                 |
|                     | 170 | 43   | 2.1                              | 10             | 4.5               | 416             | 417                | 33.4               | 3 000           | 3 800                         | *22219EMD1                 |

1) Bearing part numbers with \* are ULTAGE Series and have outer ring oil holes and oil grooves as standard.  
2) "K" indicates bearings having a tapered bore with a taper ratio of 1:12. 3) Smallest allowable dimension for chamfer dimension r.  
B-220



Dynamic equivalent radial load  
 $P_r = X F_r + Y F_a$

| $\frac{F_a}{F_r} \leq e$ |                | $\frac{F_a}{F_r} > e$ |                |
|--------------------------|----------------|-----------------------|----------------|
| X                        | Y              | X                     | Y              |
| 1                        | Y <sub>1</sub> | 0.67                  | Y <sub>2</sub> |

Static equivalent radial load  
 $P_{0r} = F_r + Y_0 F_a$

For values of e, Y<sub>1</sub>, Y<sub>2</sub> and Y<sub>0</sub> see the table below.

| Installation-related dimensions |                    |                    |                |                     | Constant | Axial load factors |                |                |  | Mass (approx.) kg |              |
|---------------------------------|--------------------|--------------------|----------------|---------------------|----------|--------------------|----------------|----------------|--|-------------------|--------------|
| mm                              |                    |                    |                |                     |          |                    |                |                |  | Cylindrical bore  | Tapered bore |
| d <sub>1</sub>                  | d <sub>a min</sub> | D <sub>a max</sub> | D <sub>1</sub> | r <sub>as max</sub> | e        | Y <sub>1</sub>     | Y <sub>2</sub> | Y <sub>0</sub> |  |                   |              |
| 78                              | 74                 | 111                | 107            | 1.5                 | 0.24     | 2.79               | 4.15           | 2.73           |  | 1.52              | 1.49         |
| 78                              | 74                 | 111                | 107            | 1.5                 | 0.24     | 2.79               | 4.15           | 2.73           |  | 1.53              | 1.5          |
| 85                              | 77                 | 128                | 119            | 2                   | 0.25     | 2.69               | 4.00           | 2.63           |  | 2.55              | 2.51         |
| 81                              | 77                 | 128                | 122            | 2.1                 | 0.33     | 2.06               | 3.06           | 2.01           |  | 3.48              | 3.41         |
| 81                              | 77                 | 128                | 122            | 2.1                 | 0.33     | 2.06               | 3.06           | 2.01           |  | 3.5               | 3.43         |
| 84                              | 79                 | 116                | 113            | 1.5                 | 0.22     | 3.01               | 4.48           | 2.94           |  | 1.61              | 1.58         |
| 84                              | 79                 | 116                | 113            | 1.5                 | 0.22     | 3.01               | 4.48           | 2.94           |  | 1.64              | 1.6          |
| 91                              | 82                 | 138                | 126            | 2                   | 0.25     | 2.69               | 4.00           | 2.63           |  | 3.18              | 3.14         |
| 85                              | 82                 | 138                | 131            | 2.1                 | 0.34     | 2.00               | 2.98           | 1.96           |  | 4.25              | 4.16         |
| 85                              | 82                 | 138                | 131            | 2.1                 | 0.34     | 2.00               | 2.98           | 1.96           |  | 4.31              | 4.22         |
| 88                              | 84                 | 121                | 118            | 1.5                 | 0.22     | 3.14               | 4.67           | 3.07           |  | 1.67              | 1.64         |
| 88                              | 84                 | 121                | 118            | 1.5                 | 0.22     | 3.14               | 4.67           | 3.07           |  | 1.71              | 1.67         |
| 99                              | 87                 | 148                | 136            | 2                   | 0.24     | 2.84               | 4.23           | 2.78           |  | 3.81              | 3.76         |
| 91                              | 87                 | 148                | 139            | 2.1                 | 0.34     | 2.00               | 2.98           | 1.96           |  | 5.18              | 5.07         |
| 91                              | 87                 | 148                | 139            | 2.1                 | 0.34     | 2.00               | 2.98           | 1.96           |  | 5.27              | 5.16         |
| 94                              | 91                 | 129                | 127            | 2                   | 0.22     | 3.14               | 4.67           | 3.07           |  | 2.09              | 2.05         |
| 94                              | 91                 | 129                | 127            | 2                   | 0.22     | 3.14               | 4.67           | 3.07           |  | 2.11              | 2.07         |
| 105                             | 92                 | 158                | 144            | 2                   | 0.23     | 2.95               | 4.40           | 2.89           |  | 4.53              | 4.47         |
| 98                              | 92                 | 158                | 148            | 2.1                 | 0.34     | 2.00               | 2.98           | 1.96           |  | 6.12              | 5.99         |
| 98                              | 92                 | 158                | 148            | 2.1                 | 0.34     | 2.00               | 2.98           | 1.96           |  | 6.28              | 6.15         |
| 100                             | 96                 | 139                | 137            | 2                   | 0.22     | 3.07               | 4.57           | 3.00           |  | 2.59              | 2.54         |
| 100                             | 96                 | 139                | 137            | 2                   | 0.22     | 3.07               | 4.57           | 3.00           |  | 2.67              | 2.62         |
| 111                             | 99                 | 166                | 152            | 2.5                 | 0.25     | 2.69               | 4.00           | 2.63           |  | 5.35              | 5.28         |
| 107                             | 99                 | 166                | 157            | 3                   | 0.32     | 2.09               | 3.11           | 2.04           |  | 7.18              | 7.04         |
| 107                             | 99                 | 166                | 157            | 3                   | 0.32     | 2.09               | 3.11           | 2.04           |  | 7.29              | 7.15         |
| 105                             | 101                | 149                | 144            | 2                   | 0.23     | 2.90               | 4.31           | 2.83           |  | 3.34              | 3.27         |
| 105                             | 101                | 149                | 144            | 2                   | 0.23     | 2.90               | 4.31           | 2.83           |  | 3.43              | 3.37         |
| 104                             | 101                | 149                | 141            | 2                   | 0.30     | 2.25               | 3.34           | 2.20           |  | 4.43              | 4.31         |
| 119                             | 104                | 176                | 162            | 2.5                 | 0.24     | 2.84               | 4.23           | 2.78           |  | 6.3               | 6.21         |
| 110                             | 104                | 176                | 166            | 3                   | 0.33     | 2.06               | 3.06           | 2.01           |  | 8.42              | 8.25         |
| 110                             | 104                | 176                | 166            | 3                   | 0.33     | 2.06               | 3.06           | 2.01           |  | 8.53              | 8.35         |
| 110                             | 107                | 158                | 153            | 2.1                 | 0.23     | 2.95               | 4.40           | 2.89           |  | 3.98              | 3.9          |
| 110                             | 107                | 158                | 153            | 2.1                 | 0.23     | 2.95               | 4.40           | 2.89           |  | 4.06              | 3.98         |

Note: For the bearings other than ULTAGE Series, outer rings with oil inlets and oil grooves can also be made based on your request.  
In this case, supplementary suffix "D1" is added after a bearing number. Example: 21317D1  
B-221