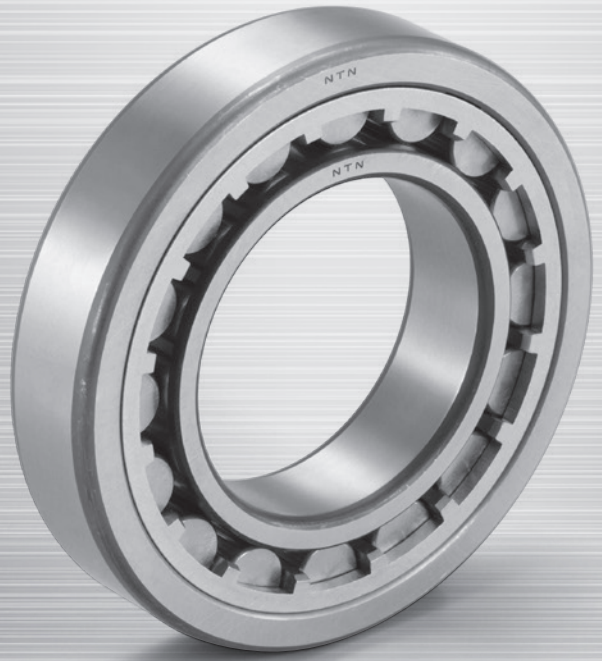
Cylindrical Roller Bearings





Cylindrical roller bearing



E Type cylindrical roller bearing



Double-row cylindrical roller bearing

1. Types, design features, and characteristics

Cylindrical roller bearings can accommodate heavy radial loads due to the line contact formed between their rolling elements and raceways. These bearings are also suitable for high speed applications since the rollers are guided by either inner or outer ring ribs. Cylindrical roller bearings are separable, allowing them to be easily installed and disassembled even when interference fits are required.

Among the various types of cylindrical roller bearings, E type and EA type have a high load capacity while maintaining standard boundary dimensions. HT type has a large axial load capacity, and HL type provides extended fatigue life in poor lubrication conditions. Multiple row bearing arrangements are also available.

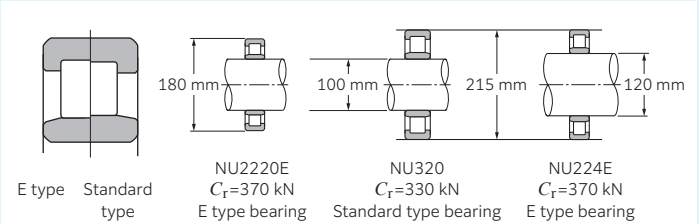
For extremely heavy load applications, the non-separable full complement SL type bearing offers special advantages. For SL type and four-row cylindrical roller bearings, see section "C. Special Application Bearings".

Table 1 shows the various types and characteristics of single row cylindrical roller bearings. **Table 2** shows the characteristics of non-standard type cylindrical roller bearings.

Table 1 Cylindrical roller bearing types and characteristics

Type code	Design	Characteristics
NU type N type	 NU type N type	● NU type outer rings have two ribs. The outer ring, roller, and cage assembly can be separated from the inner ring. N type inner rings have two ribs. The inner ring, roller, and cage assembly can be separated from the outer ring. ● Unable to accommodate any axial loading. ● This is widely used as the floating side bearing in a fixed-float arrangement.
NJ type NF type	 NJ type  NF type	● NJ type has two ribs on the outer ring, a single rib on the inner ring; NF type has a single rib on the outer ring, and two ribs on the inner ring. ● Can receive single direction axial loads. ● When there is no distinction between the fixed side and floating side bearing, these types can be used as a pair in close proximity.
NUP type NH type (NJ + HJ)	 NUP type  NH type	● NUP type has a collar ring attached to the ribless side of the inner ring; NH type is NJ type with an L type collar ring attached. All of these collar rings are separable, and therefore it is necessary to fix the inner ring axially. ● Can accommodate axial loads in either direction. ● Widely used as the shaft's fixed-side bearing.

Table 2 Non-standard type cylindrical roller bearing characteristics

Designation	Characteristics
E type and EA type Cylindrical roller bearing	● Boundary dimensions are the same as the standard type, but the diameter, length and number of the rollers have been increased, resulting in higher load capacity. ● Identified by the addition of "E" to the end of the basic roller number. ● Enables compact design due increased load rating. ● Rollers' inscribed circle diameter differs from the standard type rollers and therefore cannot be interchanged. ● EA type bearings are ULTAGE™ series[1].  Note: In the dimension tables, both E type and EA type are listed.
Cylindrical roller bearing for axial loads (HT type)	● Can accommodate larger axial loads than the standard type due to improved geometry of the rib roller end surface. ● Please consult **NTN** Engineering concerning necessary considerations, such as load, lubricant, and installation conditions.
Double-row cylindrical roller bearing	● NN type and NNU type are available. ● Widely used for applications requiring thin-walled bearings, such the main shafts of machine tools, rolling machine rollers, and in printing equipment. ● Internal radial clearance is adjusted for the spindle of machine tools by pressing the tapered bore of the inner ring on a tapered shaft. Remarks: For precision bearings for machine tools, see the special catalog "**Precision Rolling Bearings (CAT. No. 2260/E)**".

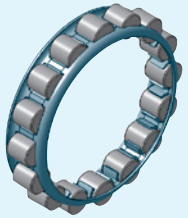
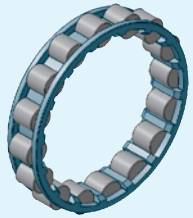
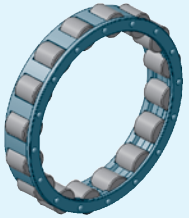
1) ULTAGE™ series cylindrical roller bearings are the products developed to meet the demands of "long operating life", "improved load capability", and "higher speed" that are required for various industrial machinery. For details, see the special catalog "**ULTAGE™ series Cylindrical Roller Bearings (CAT. No. 3037/E)**".

2. Standard cage type

Table 3 shows the standard cage types for cylindrical roller bearings.

The basic load ratings listed in the dimension charts correspond to use of the standard cages listed in **Table 3**. The basic load ratings listed in the dimension tables are for standard configurations. These ratings can change when a different cage type and number of rolling elements is utilized.

Table 3 Standard cage types

Cage type / Bearing series	Resin cage	Pressed cage	Machined cage	
			Single type	Studded double type
				
NU10	—	—	—	1005 to 10/500
NU2 NU2E NU2EA	— — 204EA to 219EA	208 to 230 — —	232 to 240 220E to 240E —	244 to 264 — —
NU22 NU22E NU22EA	— — 2204EA to 2218EA	2208 to 2230 — —	2232 to 2240 2219E to 2240E —	2244 to 2264 — —
NU3 NU3E NU3EA	— — 304EA to 315EA	308 to 324 — —	326 to 330 316E to 332E —	332 to 356 — —
NU23 NU23E NU23EA	— — 2304EA to 2315EA	2308 to 2320 — —	2322 to 2330 2316E to 2332E —	2332 to 2356 — —
NU4	—	405 to 416	—	—

Note: 1. Within the same bearing series, cage type is constant regardless of the cylindrical roller bearing type (NJ, NUP, N, NF).
2. For high speed and other special applications, machined cages can be manufactured when necessary. Consult **NTN** Engineering.
3. Among EA type bearings that use resin cages as standard, certain varieties use pressed cages. Consult **NTN** Engineering.
4. Although machined cages are the standard for two-row cylindrical roller bearings, resin cages may also be used in some of these bearings for machine tool applications.

3. Allowable misalignment

Edge loading due to misalignment under general load conditions should be avoided to prevent premature bearing failure, The maximum allowable misalignment based on bearing series can be found below. The values apply when the bearings are to be used as the floating side of NU and N types. For NJ, NUP, and NH types that are to be used for the fixed side, consult **NTN** Engineering. Depending on the magnitude of the axial load, the edge loading may exceed recommended limits, which could lead to a reduction in bearing life.

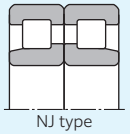
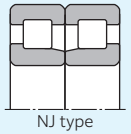
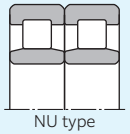
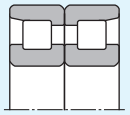
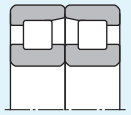
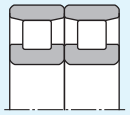
- Bearing series 0 or 1 ····· 1/1 000
- Bearing series 2 ····· 1/2 000
- Bearing series 0, 1, and 2 single-row ULTAGE™ series ····· 1/500
- Double-row cylindrical roller bearings[1)] ····· 1/2 000

1) Does not include high precision bearings for machine tool main shaft applications.

4. Combinations of cylindrical roller bearings

Table 4 shows the representative combinations of bearings.

Table 4 Combination type

Back-to-back arrangement (DB)	Face-to-face arrangement (DF)	Symmetrical parts arrangement (D2)
 NJ type	 NJ type	 NU type
 NF type	 NF type	 N type

Note: 1. Bearings are manufactured in a set so that two bearings receive a load evenly; therefore, they must be assembled together with identically numbered bearings and not mixed with other arrangements.
2. Triplex arrangements of bearings are also available. Consult **NTN** Engineering for details.

5. Tolerance of inscribed circle diameter and circumscribed circle diameter of rollers of interchangeable cylindrical roller bearings

Table 5 Tolerance of inscribed circle diameter and circumscribed circle diameter of rollers of interchangeable cylindrical roller bearings

Unit: μm

Nominal bore diameter d mm		Dimensional tolerance of roller inscribed circle diameter Δ_{Fw}		Dimensional tolerance of roller circumscribed circle diameter Δ_{Ew}	
Over	Incl.	Upper	Lower	Upper	Lower
17[1)]	20	+10	0	0	−10
20	50	+15	0	0	−15
50	120	+20	0	0	−20
120	200	+25	0	0	−25
200	250	+30	0	0	−30
250	315	+35	0	0	−35
315	400	+40	0	0	−40
400	500	+45	0	0	−45

1) 17 mm is included in this dimensional division.
Note: Interchangeable cylindrical roller bearings are bearings having the same number in the group. The bearing function is not impaired even if an outer ring is combined with an inner ring with rollers or an inner ring is combined with an outer ring with rollers.

6. Allowable speed of cylindrical roller bearing ULTAGE™ series

As the rotational speed of the bearing increases, the temperature of the bearing also increases because of the friction heat produced inside the bearing. Operation at excessive temperatures will significantly deteriorate the lubricant performance, causing abnormal temperature rises and seizure. Factors affecting the allowable speed of bearings are as follows.

(1) Bearing type
(2) Bearing size
(3) Lubrication (grease lubrication, circulating lubrication, oil lubrication, etc.)
(4) Bearing internal clearance (bearing internal clearance during operation)
(5) Bearing load
(6) Shaft and housing accuracy

The allowable speed specified in the bearing dimension table is the reference speed limit which allows for satisfactory heat dissipation and lubrication conditions before adversely affecting the bearing. The allowable speed of ULTAGE™ series cylindrical roller bearings specified in the catalog is defined as follows.

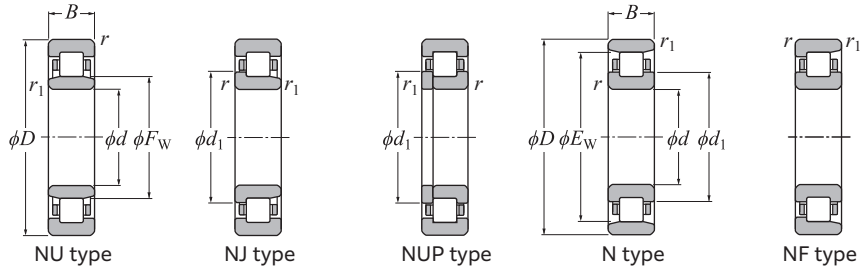
[Oil lubrication]
The allowable speed for oil lubrication is the speed at which the outer ring temperature reaches 80 °C with room temperature spindle oil (lubrication oil viscosity: ISO VG32) supplied at 1 liter/min under an operating load of 5 % of the basic static load rating C_{0r}.

[Grease lubrication]
The allowable speed for grease lubrication is the speed at which the outer ring temperature reaches 80 °C with lithium-based grease (consistency: NLGI3) filled 20 to 30 % of the free space under an operating load of 5 % of the basic static load rating C_{0r}.

In either of the lubrication methods, the bearing temperature rise differs if the usage condition (operating load, rotational speed pattern, lubricating condition, etc.) is different; therefore, the bearings must be selected with sufficient allowable speed as specified in the catalog.

If 80 % of the allowable speed specified in the dimension table is exceeded or the bearing is used under vibration or impact conditions, please consult **NTN** Engineering.

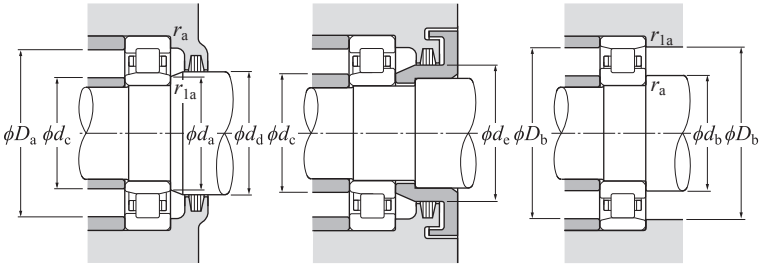
See section "9. Allowable speed" for the definition of the allowable speed of the cylindrical roller bearings that are not part of the ULTAGE™ series.



d 20–45 mm

Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Allowable speed [2] min^{-1}		Bearing number [3] [4] [5]				
d	D	B	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	NU type	NJ type	NUP type	N type	NF type
20	47	14	1	0.6	32.5	24.7	3.00	15 000	21 600	∗NU204EA	NJ	NUP	N	NF
	47	18	1	0.6	38.5	31.0	3.75	14 000	19 200	∗NU2204EA	NJ	NUP	N	NF
	52	15	1.1	0.6	37.5	26.9	3.25	13 000	18 000	∗NU304EA	NJ	NUP	N	NF
	52	21	1.1	0.6	49.5	39.0	4.75	12 000	16 800	∗NU2304EA	NJ	NUP	N	NF
25	47	12	0.6	0.3	16.7	14.1	1.72	16 000	19 000	NU1005	NJ	NUP	N	—
	52	15	1	0.6	34.5	27.7	3.40	13 000	18 000	∗NU205EA	NJ	NUP	N	NF
	52	18	1	0.6	41.5	34.5	4.25	11 000	15 600	∗NU2205EA	NJ	NUP	N	NF
	62	17	1.1	1.1	49.0	37.5	4.55	11 000	15 600	∗NU305EA	NJ	NUP	N	NF
	62	24	1.1	1.1	67.5	56.0	6.85	9 700	13 200	∗NU2305EA	NJ	NUP	N	NF
	80	21	1.5	1.5	51.5	40.0	4.85	8 500	10 000	NU405	NJ	NUP	N	NF
30	55	13	1	0.6	21.8	19.6	2.39	14 000	16 000	NU1006	NJ	NUP	N	—
	62	16	1	0.6	46.0	37.5	4.55	11 000	15 600	∗NU206EA	NJ	NUP	N	NF
	62	20	1	0.6	58.0	50.0	6.10	9 700	13 200	∗NU2206EA	NJ	NUP	N	NF
	72	19	1.1	1.1	63.0	50.0	6.15	9 300	13 200	∗NU306EA	NJ	NUP	N	NF
	72	27	1.1	1.1	88.0	77.5	9.45	8 300	11 600	∗NU2306EA	NJ	NUP	N	NF
	90	23	1.5	1.5	69.5	55.0	6.70	7 300	8 500	NU406	NJ	NUP	N	NF
35	62	14	1	0.6	25.1	23.2	2.82	12 000	15 000	NU1007	NJ	NUP	N	—
	72	17	1.1	0.6	59.5	50.0	6.10	9 500	13 200	∗NU207EA	NJ	NUP	N	NF
	72	23	1.1	0.6	73.0	65.5	7.95	8 500	12 000	∗NU2207EA	NJ	NUP	N	NF
	80	21	1.5	1.1	83.5	71.0	8.65	8 100	11 500	∗NU307EA	NJ	NUP	N	NF
	80	31	1.5	1.1	117	109	13.3	7 200	10 200	∗NU2307EA	NJ	NUP	N	NF
	100	25	1.5	1.5	83.5	69.0	8.40	6 400	7 500	NU407	NJ	NUP	N	NF
40	68	15	1	0.6	30.5	29.0	3.55	11 000	13 000	NU1008	NJ	NUP	N	—
	80	18	1.1	1.1	48.5	43.0	5.25	9 400	11 000	∗∗NU208	NJ	NUP	N	NF
	80	18	1.1	1.1	66.0	55.5	6.75	8 500	12 000	∗NU208EA	NJ	NUP	N	NF
	80	23	1.1	1.1	64.5	62.0	7.55	8 500	10 000	∗∗NU2208	NJ	NUP	N	—
	80	23	1.1	1.1	85.5	77.5	9.45	7 600	10 700	∗NU2208EA	NJ	NUP	N	NF
	90	23	1.5	1.5	65.0	57.0	6.95	8 000	9 400	∗∗NU308	NJ	NUP	N	NF
	90	23	1.5	1.5	98.5	81.5	9.95	7 200	10 200	∗NU308EA	NJ	NUP	N	NF
	90	33	1.5	1.5	91.5	88.0	10.7	7 000	8 200	∗∗NU2308	NJ	NUP	N	—
	90	33	1.5	1.5	135	122	14.9	6 400	9 000	∗NU2308EA	NJ	NUP	N	NF
	110	27	2	2	106	89.0	10.9	5 700	6 700	NU408	NJ	NUP	N	NF
45	75	16	1	0.6	34.5	34.0	4.10	9 900	12 000	NU1009	NJ	NUP	N	—

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.
3) Bearing numbers marked "∗" designate ULTAGE™ series bearings.
4) Bearing marked "∗∗" are going to be integrated with ULTAGE™ series.

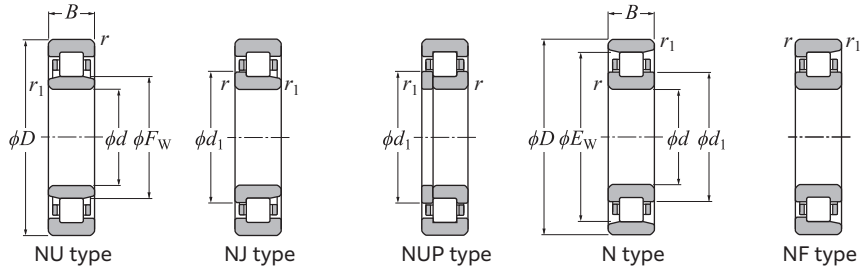


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm									Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min. [6]	r_{as} Max.	r_{1as} Max.	NU type (approx.)	N type (approx.)
26.5	41.5	29.5	24	25	26	29	32	42	42	42	1	0.6	0.115	0.11
26.5	41.5	29.5	24	25	26	29	32	42	42	42	1	0.6	0.146	0.144
27.5	45.5	31.1	24	26.5	27	30	33	45.5	45.5	45.5	1	0.6	0.176	0.147
27.5	45.5	31.1	24	26.5	27	30	33	45.5	45.5	45.5	1	0.6	0.242	0.212
30.5	41.5	32.7	27	29	30	32	33	43	45	42.5	0.6	0.3	0.092	0.091
31.5	46.5	34.5	29	30	31	34	37	47	47	47	1	0.6	0.151	0.13
31.5	46.5	34.5	29	30	31	34	37	47	47	47	1	0.6	0.186	0.163
34	54	38	31.5	31.5	33	37	40	55.5	55.5	55	1	1	0.275	0.242
34	54	38	31.5	31.5	33	37	40	55.5	55.5	55	1	1	0.386	0.345
38.8	62.8	43.6	33	33	38	41	46	72	72	64	1.5	1.5	0.55	0.536
36.5	48.5	38.9	34	35	35	38	39.5	50	51	49.5	1	0.6	0.13	0.128
37.5	55.5	41.1	34	35	37	40	44	57	57	56.5	1	0.6	0.226	0.205
37.5	55.5	41.1	34	35	37	40	44	57	57	56.5	1	0.6	0.297	0.259
40.5	62.5	44.9	36.5	36.5	40	44	48	65.5	65.5	64	1	1	0.398	0.353
40.5	62.5	44.9	36.5	36.5	40	44	48	65.5	65.5	64	1	1	0.58	0.526
45	73	50.5	38	38	44	47	52	82	82	74	1.5	1.5	0.751	0.732
42	55	44.6	39	40	41	44	45	57	58	56	1	0.6	0.179	0.176
44	64	48	39	41.5	43	46	50	65.5	65.5	65.5	1	0.6	0.327	0.294
44	64	48	39	41.5	43	46	50	65.5	65.5	65.5	1	0.6	0.455	0.405
46.2	70.2	51	41.5	43	45	48	53	72	72	71.5	1.5	1	0.545	0.483
46.2	70.2	51	41.5	43	45	48	53	72	72	71.5	1.5	1	0.78	0.737
53	83	59	43	43	52	55	61	92	92	84	1.5	1.5	0.99	0.965
47	61	49.8	44	45	46	49	50.5	63	64	62	1	0.6	0.22	0.217
50	70	54.2	46.5	46.5	49	52	56	73.5	73.5	72	1	1	0.378	0.37
49.5	71.5	53.9	46.5	46.5	49	52	56	73.5	73.5	72.5	1	1	0.426	0.365
50	70	54.2	46.5	46.5	49	52	56	73.5	73.5	72	1	1	0.49	0.48
49.5	71.5	53.9	46.5	46.5	49	52	56	73.5	73.5	72.5	1	1	0.552	0.491
53.5	77.5	58.4	48	48	51	55	60	82	82	80	1.5	1.5	0.658	0.643
52	80	57.6	48	48	51	55	60	82	82	81.5	1.5	1.5	0.754	0.658
53.5	77.5	58.4	48	48	51	55	60	82	82	80	1.5	1.5	0.951	0.932
52	80	57.6	48	48	51	55	60	82	82	81.5	1.5	1.5	1.06	0.952
58	92	64.8	49	49	57	60	67	101	101	93	2	2	1.3	1.27
52.5	67.5	55.5	49	50	52	54	56	70	71	68.5	1	0.6	0.28	0.276

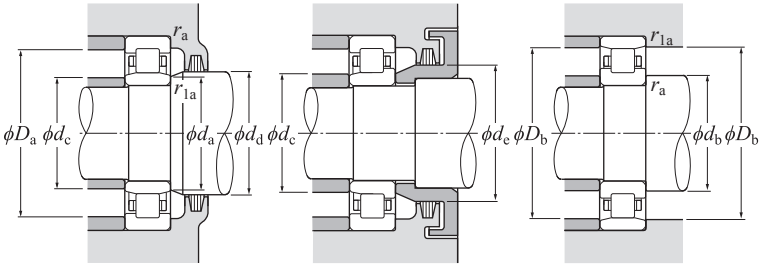
5) Bearing numbers having no standard form are switched to E type or ULTAGE™ series.
6) Does not apply to the sides of the outer ring rib of NF type bearings.



d 45–60 mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed 2) min^{-1} Grease lubrication	Oil lubrication	Bearing number 3) 4) NU type	NJ type	NUP type	N type	NF type
d	D	B	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	C_r	C_{0r}	C_u							
45	85	19	1.1	1.1	51.0	47.0	5.70	8 400	9 900	**NU209	NJ	NUP	N	NF
	85	19	1.1	1.1	74.5	66.5	8.10	7 600	10 800	*NU209EA	NJ	NUP	N	NF
	85	23	1.1	1.1	68.0	68.0	8.25	7 600	9 000	**NU2209	NJ	NUP	N	—
	85	23	1.1	1.1	90.0	84.5	10.3	6 800	9 600	*NU2209EA	NJ	NUP	N	NF
	100	25	1.5	1.5	82.0	71.0	8.65	7 200	8 400	**NU309	NJ	NUP	N	NF
	100	25	1.5	1.5	115	98.5	12.0	6 500	9 100	*NU309EA	NJ	NUP	N	NF
	100	36	1.5	1.5	110	104	12.7	6 300	7 400	**NU2309	NJ	NUP	N	—
	100	36	1.5	1.5	162	153	18.7	5 700	8 200	*NU2309EA	NJ	NUP	N	NF
	120	29	2	2	119	102	12.4	5 100	6 000	NU409	NJ	NUP	N	NF
50	80	16	1	0.6	35.5	36.0	4.40	8 900	11 000	NU1010	NJ	NUP	N	—
	90	20	1.1	1.1	53.5	51.0	6.20	7 600	9 000	**NU210	NJ	NUP	N	NF
	90	20	1.1	1.1	81.5	76.5	9.30	6 900	9 700	*NU210EA	NJ	NUP	N	NF
	90	23	1.1	1.1	71.0	73.5	9.00	6 900	8 100	**NU2210	NJ	NUP	N	—
	90	23	1.1	1.1	98.5	97.0	11.9	6 200	8 800	*NU2210EA	NJ	NUP	N	NF
	110	27	2	2	96.5	86.0	10.5	6 500	7 700	**NU310	NJ	NUP	N	NF
	110	27	2	2	130	113	13.8	5 900	8 300	*NU310EA	NJ	NUP	N	NF
	110	40	2	2	134	131	16.0	5 700	6 700	**NU2310	NJ	NUP	N	—
	110	40	2	2	192	187	22.7	5 200	7 300	*NU2310EA	NJ	NUP	N	NF
	130	31	2.1	2.1	143	124	15.1	4 700	5 500	NU410	NJ	NUP	N	NF
55	90	18	1.1	1	42.0	44.0	5.35	8 200	9 700	NU1011	NJ	NUP	N	—
	100	21	1.5	1.1	64.5	62.5	7.60	6 900	8 200	**NU211	NJ	NUP	N	NF
	100	21	1.5	1.1	102	98.5	12.0	6 300	8 900	*NU211EA	NJ	NUP	N	NF
	100	25	1.5	1.1	83.5	87.0	10.6	6 300	7 400	**NU2211	NJ	NUP	N	—
	100	25	1.5	1.1	120	122	14.8	5 600	7 900	*NU2211EA	NJ	NUP	N	NF
	120	29	2	2	123	111	13.6	5 900	7 000	**NU311	NJ	NUP	N	NF
	120	29	2	2	162	143	17.4	5 300	7 600	*NU311EA	NJ	NUP	N	NF
	120	43	2	2	164	162	19.8	5 200	6 100	**NU2311	NJ	NUP	N	—
	120	43	2	2	238	233	28.4	4 700	6 700	*NU2311EA	NJ	NUP	N	NF
	140	33	2.1	2.1	154	138	16.9	4 300	5 000	NU411	NJ	NUP	N	NF
60	95	18	1.1	1	44.5	48.5	5.95	7 500	8 800	NU1012	NJ	NUP	N	—
	110	22	1.5	1.5	76.0	75.0	9.15	6 400	7 600	**NU212	NJ	NUP	N	NF
	110	22	1.5	1.5	115	107	13.1	5 800	8 200	*NU212EA	NJ	NUP	N	NF
	110	28	1.5	1.5	107	116	14.1	5 800	6 800	**NU2212	NJ	NUP	N	—
	110	28	1.5	1.5	155	157	19.1	5 200	7 300	*NU2212EA	NJ	NUP	N	NF

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.
3) Bearing numbers marked "*" designate ULTAGE™ series bearings.
4) Bearing marked "**" are going to be integrated with ULTAGE™ series.

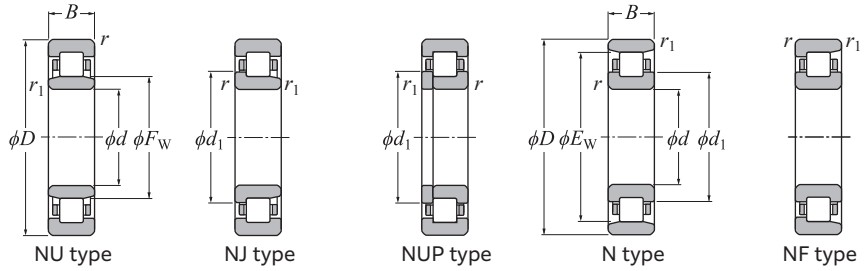


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm								Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.5)	r_{as} Max.	r_{las} Max.	NU type (approx.)	N type (approx.)
55	75	59	51.5	51.5	54	57	61	78.5	78.5	77	1	1	0.432	0.423
54.5	76.5	58.9	51.5	51.5	54	57	61	78.5	78.5	77.5	1	1	0.495	0.423
55	75	59	51.5	51.5	54	57	61	78.5	78.5	77	1	1	0.53	0.52
54.5	76.5	58.9	51.5	51.5	54	57	61	78.5	78.5	77.5	1	1	0.6	0.533
58.5	86.5	64	53	53	57	60	66	92	92	89	1.5	1.5	0.877	0.857
58.5	88.5	64.5	53	53	57	60	66	92	92	90.5	1.5	1.5	0.996	0.865
58.5	86.5	64	53	53	57	60	66	92	92	89	1.5	1.5	1.27	1.24
58.5	88.5	64.5	53	53	57	60	66	92	92	90.5	1.5	1.5	1.41	1.3
64.5	100.5	71.8	54	54	63	66	74	111	111	102	2	2	1.62	1.58
57.5	72.5	60.5	54	55	57	59	61	75	76	73.5	1	0.6	0.295	0.291
60.4	80.4	64.6	56.5	56.5	58	62	67	83.5	83.5	83	1	1	0.47	0.46
59.5	81.5	63.9	56.5	56.5	58	62	67	83.5	83.5	82.5	1	1	0.503	0.47
60.4	80.4	64.6	56.5	56.5	58	62	67	83.5	83.5	83	1	1	0.571	0.56
59.5	81.5	63.9	56.5	56.5	58	62	67	83.5	83.5	82.5	1	1	0.587	0.584
65	95	71	59	59	63	67	73	101	101	98	2	2	1.14	1.11
65	97	71.4	59	59	63	67	73	101	101	99	2	2	1.3	1.12
65	95	71	59	59	63	67	73	101	101	98	2	2	1.7	1.67
65	97	71.4	59	59	63	67	73	101	101	99	2	2	1.9	1.75
70.8	110.8	78.8	61	61	69	73	81	119	119	112	2	2	2.02	1.97
64.5	80.5	67.7	60	61.5	63	66	68.5	83.5	85	81.5	1	1	0.442	0.435
66.5	88.5	70.8	61.5	63	65	68	73	92	93.5	91	1.5	1	0.638	0.626
66	90	70.8	61.5	63	65	68	73	92	92	91	1.5	1	0.675	0.635
66.5	88.5	70.8	61.5	63	65	68	73	92	93.5	91	1.5	1	0.773	0.758
66	90	70.8	61.5	63	65	68	73	92	92	91	1.5	1	0.807	0.805
70.5	104.5	77.2	64	64	69	72	80	111	111	107	2	2	1.45	1.42
70.5	106.5	77.7	64	64	69	72	80	111	111	108.5	2	2	1.65	1.43
70.5	104.5	77.2	64	64	69	72	80	111	111	107	2	2	2.17	2.13
70.5	106.5	77.7	64	64	69	72	80	111	111	108.5	2	2	2.37	2.23
77.2	117.2	85.2	66	66	76	79	87	129	129	119	2	2	2.48	2.42
69.5	85.5	72.7	65	66.5	68	71	73.5	88.5	90	86.5	1	1	0.474	0.467
73.5	97.5	78.4	68	68	71	75	80	102	102	100	1.5	1.5	0.818	0.802
72	100	77.6	68	68	71	75	80	102	102	101	1.5	1.5	0.923	0.798
73.5	97.5	78.4	68	68	71	75	80	102	102	100	1.5	1.5	1.06	1.04
72	100	77.6	68	68	71	75	80	102	102	101	1.5	1.5	1.21	1.08

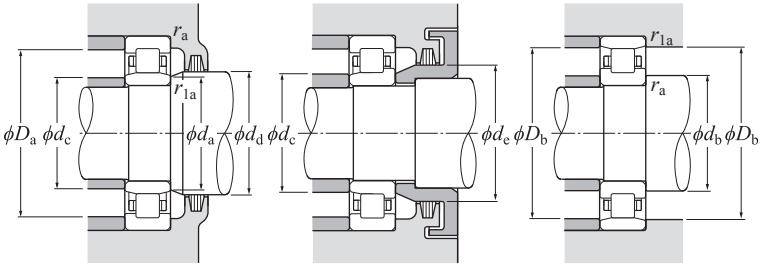
5) Does not apply to the sides of the outer ring rib of NF type bearings.



d 60–75 mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed 2) min^{-1} Grease lubrication	Oil lubrication	Bearing number 3) 4) NU type	NJ type	NUP type	N type	NF type
d	D	B	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	C_r	C_{0r}	C_u							
60	130	31	2.1	2.1	137	126	15.4	5 500	6 500	**NU312	NJ	NUP	N	NF
	130	31	2.1	2.1	177	157	19.1	4 900	7 000	*NU312EA	NJ	NUP	N	NF
	130	46	2.1	2.1	187	188	22.9	4 800	5 700	**NU2312	NJ	NUP	N	—
	130	46	2.1	2.1	263	262	32.0	4 400	6 200	*NU2312EA	NJ	NUP	N	NF
	150	35	2.1	2.1	185	168	20.2	3 900	4 600	NU412	NJ	NUP	N	NF
65	100	18	1.1	1	45.5	51.0	6.30	7 000	8 200	NU1013	NJ	NUP	N	—
	120	23	1.5	1.5	93.0	94.5	11.5	5 900	7 000	**NU213	NJ	NUP	N	NF
	120	23	1.5	1.5	127	119	14.5	5 400	7 600	*NU213EA	NJ	NUP	N	NF
	120	31	1.5	1.5	133	149	18.2	5 400	6 300	**NU2213	NJ	NUP	N	—
	120	31	1.5	1.5	176	181	22.1	4 800	6 700	*NU2213EA	NJ	NUP	N	NF
	140	33	2.1	2.1	150	139	16.8	5 100	6 000	**NU313	NJ	NUP	N	NF
	140	33	2.1	2.1	213	191	23.1	4 600	6 500	*NU313EA	NJ	NUP	N	NF
	140	48	2.1	2.1	208	212	25.7	4 400	5 200	**NU2313	NJ	NUP	N	—
	140	48	2.1	2.1	293	287	34.5	4 100	5 800	*NU2313EA	NJ	NUP	N	NF
	160	37	2.1	2.1	202	186	21.9	3 600	4 300	NU413	NJ	NUP	N	NF
70	110	20	1.1	1	64.5	70.5	8.60	6 500	7 600	NU1014	NJ	NUP	N	—
	125	24	1.5	1.5	92.5	95.0	11.6	5 500	6 500	**NU214	NJ	NUP	N	NF
	125	24	1.5	1.5	140	137	16.7	5 000	7 100	*NU214EA	NJ	NUP	N	NF
	125	31	1.5	1.5	132	151	18.4	5 000	5 900	**NU2214	NJ	NUP	N	—
	125	31	1.5	1.5	184	194	23.7	4 500	6 200	*NU2214EA	NJ	NUP	N	NF
	150	35	2.1	2.1	175	168	20.0	4 700	5 500	**NU314	NJ	NUP	N	NF
	150	35	2.1	2.1	242	222	26.2	4 200	6 000	*NU314EA	NJ	NUP	N	NF
	150	51	2.1	2.1	247	262	31.0	4 100	4 800	**NU2314	NJ	NUP	N	—
	150	51	2.1	2.1	325	325	38.0	3 800	5 300	*NU2314EA	NJ	NUP	N	NF
	180	42	3	3	253	236	26.8	3 400	4 000	NU414	NJ	NUP	N	NF
75	115	20	1.1	1	66.5	74.5	9.10	6 100	7 100	NU1015	NJ	NUP	N	—
	130	25	1.5	1.5	107	111	13.4	5 100	6 000	**NU215	NJ	NUP	N	NF
	130	25	1.5	1.5	154	156	18.9	4 700	6 600	*NU215EA	NJ	NUP	N	NF
	130	31	1.5	1.5	144	162	19.6	4 700	5 500	**NU2215	NJ	NUP	N	—
	130	31	1.5	1.5	191	207	25.0	4 200	5 900	*NU2215EA	NJ	NUP	N	NF
	160	37	2.1	2.1	211	205	23.8	4 400	5 200	**NU315	NJ	NUP	N	NF
	160	37	2.1	2.1	284	263	30.5	4 000	5 600	*NU315EA	NJ	NUP	N	NF
	160	55	2.1	2.1	286	300	35.0	3 800	4 500	**NU2315	NJ	NUP	N	—
	160	55	2.1	2.1	390	395	45.5	3 500	4 900	*NU2315EA	NJ	NUP	N	NF
	190	45	3	3	291	274	30.5	3 200	3 700	NU415	NJ	NUP	N	NF

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.
3) Bearing numbers marked "*" designate ULTAGE™ series bearings.
4) Bearing marked "**" are going to be integrated with ULTAGE™ series.

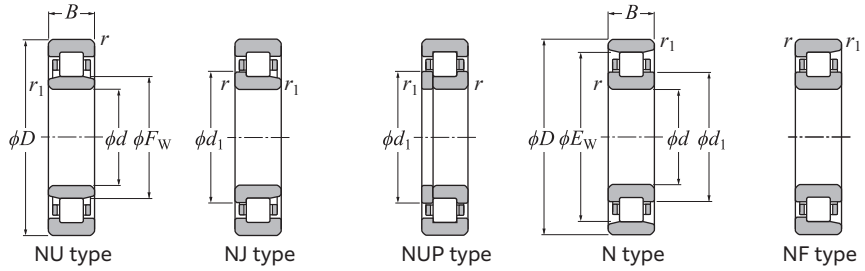


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm									Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.5)	r_{as} Max.	r_{las} Max.	NU type (approx.)	N type (approx.)
77	113	84.2	71	71	75	79	86	119	119	116	2	2	1.8	1.76
77	115	84.6	71	71	75	79	86	119	119	117	2	2	2.05	1.77
77	113	84.2	71	71	75	79	86	119	119	116	2	2	2.71	2.66
77	115	84.6	71	71	75	79	86	119	119	117	2	2	2.96	2.73
83	127	91.8	71	71	82	85	94	139	139	128	2	2	3	2.93
74.5	90.5	77.7	70	71.5	73	76	78.5	93.5	95	91.5	1	1	0.485	0.477
79.6	105.6	84.8	73	73	77	81	87	112	112	108	1.5	1.5	1.02	1
78.5	108.5	84.5	73	73	77	81	87	112	112	110	1.5	1.5	1.21	1.01
79.6	105.6	84.8	73	73	77	81	87	112	112	108	1.5	1.5	1.4	1.37
78.5	108.5	84.5	73	73	77	81	87	112	112	110	1.5	1.5	1.6	1.44
83.5	121.5	91	76	76	81	85	93	129	129	125	2	2	2.23	2.18
82.5	124.5	91	76	76	81	85	93	129	129	127	2	2	2.54	2.2
83.5	121.5	91	76	76	81	85	93	129	129	125	2	2	3.27	3.2
82.5	124.5	91	76	76	81	85	93	129	129	127	2	2	3.48	3.25
89.3	135.3	98.5	76	76	88	91	100	149	149	137	2	2	3.6	3.5
80	100	84	75	76.5	78	82	85	103.5	105	101	1	1	0.699	0.689
84.5	110.5	89.6	78	78	82	86	92	117	117	114	1.5	1.5	1.12	1.1
83.5	113.5	89.5	78	78	82	86	92	117	117	115	1.5	1.5	1.3	1.13
84.5	110.5	89.6	78	78	82	86	92	117	117	114	1.5	1.5	1.47	1.44
83.5	113.5	89.5	78	78	82	86	92	117	117	115	1.5	1.5	1.7	1.52
90	130	98	81	81	87	92	100	139	139	134	2	2	2.71	2.65
89	133	98	81	81	87	92	100	139	139	136	2	2	3.1	2.75
90	130	98	81	81	87	92	100	139	139	134	2	2	3.98	3.9
89	133	98	81	81	87	92	100	139	139	136	2	2	4.25	3.95
100	152	110.5	83	83	99	102	112	167	167	153	2.5	2.5	5.24	5.1
85	105	89	80	81.5	83	87	90	108.5	110	106	1	1	0.738	0.727
88.5	116.5	94	83	83	87	90	96	122	122	120	1.5	1.5	1.23	1.21
88.5	118.5	94.5	83	83	87	90	96	122	122	120	1.5	1.5	1.41	1.28
88.5	116.5	94	83	83	87	90	96	122	122	120	1.5	1.5	1.55	1.52
88.5	118.5	94.5	83	83	87	90	96	122	122	120	1.5	1.5	1.79	1.61
95.5	139.5	104.2	86	86	93	97	106	149	149	143	2	2	3.28	3.21
95	143	104.6	86	86	93	97	106	149	149	146	2	2	3.74	3.28
95.5	139.5	104.2	86	86	93	97	106	149	149	143	2	2	4.87	4.77
95	143	104.6	86	86	93	97	106	149	149	—	2	2	5.25	4.85
104.5	160.5	116	88	88	103	107	118	177	177	162	2.5	2.5	6.22	6.06

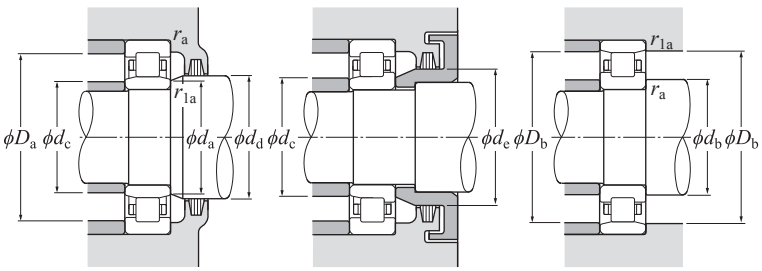
5) Does not apply to the sides of the outer ring rib of NF type bearings.



d 80–95 mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed 2) min^{-1} Grease lubrication	Oil lubrication	Bearing number 3) 4) NU type	NJ type	NUP type	N type	NF type
d	D	B	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	C_r	C_{0r}	C_u							
80	125	22	1.1	1	80.0	90.5	11.0	5 700	6 700	NU1016	NJ	NUP	N	—
	140	26	2	2	118	122	14.5	4 800	5 700	**NU216	NJ	NUP	N	NF
	140	26	2	2	165	167	19.7	4 400	6 100	*NU216EA	NJ	NUP	N	NF
	140	33	2	2	163	186	22.0	4 400	5 100	**NU2216	NJ	NUP	N	—
	140	33	2	2	220	243	28.7	3 900	5 500	*NU2216EA	NJ	NUP	N	NF
	170	39	2.1	2.1	211	207	23.7	4 100	4 800	NU316	NJ	NUP	N	NF
	170	39	2.1	2.1	284	282	32.0	3 700	4 400	NU316E	NJ	NUP	N	NF
	170	58	2.1	2.1	305	330	38.0	3 600	4 200	NU2316	NJ	NUP	N	—
	170	58	2.1	2.1	395	430	49.0	3 300	3 900	NU2316E	NJ	NUP	N	NF
	200	48	3	3	330	315	34.5	3 000	3 500	NU416	NJ	NUP	N	NF
85	130	22	1.1	1	82.5	95.5	11.4	5 400	6 300	NU1017	NJ	NUP	N	—
	150	28	2	2	134	140	16.3	4 500	5 300	**NU217	NJ	NUP	N	NF
	150	28	2	2	198	199	23.0	4 100	5 800	*NU217EA	NJ	NUP	N	NF
	150	36	2	2	188	218	25.3	4 100	4 800	**NU2217	NJ	NUP	N	—
	150	36	2	2	257	279	32.5	3 700	5 200	*NU2217EA	NJ	NUP	N	NF
	180	41	3	3	235	228	25.6	3 900	4 600	NU317	NJ	NUP	N	NF
	180	41	3	3	325	330	37.0	3 500	4 100	NU317E	NJ	NUP	—	—
	180	60	3	3	350	380	43.0	3 400	4 000	NU2317	NJ	NUP	N	—
	180	60	3	3	435	485	54.0	3 100	3 700	NU2317E	NJ	NUP	—	—
90	140	24	1.5	1.1	98.0	114	13.4	5 100	5 900	NU1018	NJ	NUP	N	—
	160	30	2	2	169	178	20.3	4 300	5 000	**NU218	NJ	NUP	N	NF
	160	30	2	2	215	217	24.7	3 900	5 500	*NU218EA	NJ	NUP	N	NF
	160	40	2	2	219	248	28.3	3 900	4 600	**NU2218	NJ	NUP	N	—
	160	40	2	2	286	315	35.5	3 500	4 900	*NU2218EA	NJ	NUP	N	NF
	190	43	3	3	266	265	29.3	3 700	4 300	NU318	NJ	NUP	N	NF
	190	43	3	3	350	355	39.0	3 300	3 900	NU318E	NJ	NUP	—	—
	190	64	3	3	360	395	43.5	3 200	3 800	NU2318	NJ	NUP	N	—
	190	64	3	3	485	535	58.5	2 900	3 400	NU2318E	NJ	NUP	—	—
95	145	24	1.5	1.1	101	120	13.9	4 800	5 600	NU1019	NJ	NUP	N	—
	170	32	2.1	2.1	184	195	21.8	4 000	4 700	**NU219	NJ	NUP	N	NF
	170	32	2.1	2.1	260	265	29.6	3 600	5 200	*NU219EA	NJ	NUP	N	NF
	170	43	2.1	2.1	256	298	33.5	3 600	4 300	NU2219	NJ	NUP	N	—
	170	43	2.1	2.1	315	370	41.5	3 300	3 800	NU2219E	NJ	NUP	N	NF
	200	45	3	3	287	289	31.5	3 400	4 000	NU319	NJ	NUP	N	NF
	200	45	3	3	370	385	42.0	3 100	3 600	NU319E	NJ	NUP	—	—

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.
3) Bearing numbers marked "*" designate ULTAGE™ series bearings.
4) Bearing marked "**" are going to be integrated with ULTAGE™ series.

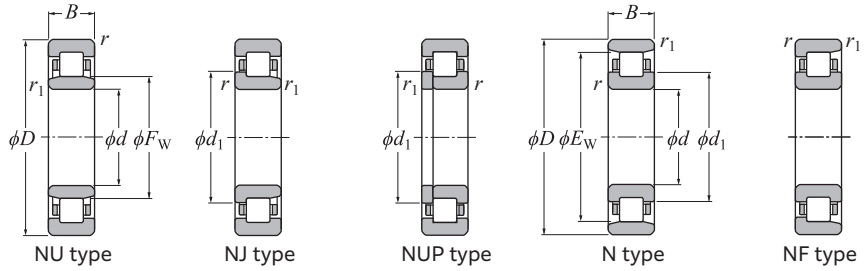


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm								Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.5)	r_{as} Max.	r_{las} Max.	NU type (approx.)	N type (approx.)
91.5	113.5	95.9	85	86.5	90	94	97	118.5	120	114.5	1	1	0.98	0.965
95.3	125.3	101.2	89	89	94	97	104	131	131	128	2	2	1.5	1.47
95.3	127.3	101.7	89	89	94	97	104	131	131	128.5	2	2	1.67	1.56
95.3	125.3	101.2	89	89	94	97	104	131	131	128	2	2	1.93	1.89
95.3	127.3	101.7	89	89	94	97	104	131	131	128.5	2	2	2.12	2.02
103	147	111.8	91	91	99	105	114	159	159	151	2	2	3.86	3.77
101	151	111	91	91	99	105	114	159	159	154	2	2	4.22	4.12
103	147	111.8	91	91	99	105	114	159	159	151	2	2	5.79	5.67
101	151	111	91	91	99	105	114	159	159	154	2	2	6.25	5.78
110	170	122	93	93	109	112	124	187	187	172	2.5	2.5	7.32	7.14
96.5	118.5	100.9	90	91.5	95	99	102	123.5	125	119.5	1	1	1.03	1.01
101.8	133.8	108.2	94	94	99	104	110	141	141	137	2	2	1.87	1.83
100.5	136.5	107.7	94	94	99	104	110	141	141	138	2	2	2.11	1.93
101.8	133.8	108.2	94	94	99	104	110	141	141	137	2	2	2.44	2.39
100.5	136.5	107.7	94	94	99	104	110	141	141	138	2	2	2.68	2.52
108	156	117.5	98	98	106	110	119	167	167	160	2.5	2.5	4.54	4.44
108	—	118.4	98	—	106	110	119	167	—	—	2.5	2.5	4.81	—
108	156	117.5	98	98	106	110	119	167	167	160	2.5	2.5	6.7	6.57
108	—	118.4	98	—	106	110	119	167	—	—	2.5	2.5	7.16	—
103	127	107.8	96.5	98	101	106	109	132	133.5	129	1.5	1	1.33	1.31
107	143	114.2	99	99	105	109	116	151	151	146	2	2	2.3	2.25
107	145	114.6	99	99	105	109	116	151	151	147	2	2	2.44	2.37
107	143	114.2	99	99	105	109	116	151	151	146	2	2	3.1	3.04
107	145	114.6	99	99	105	109	116	151	151	147	2	2	3.33	3.2
115	165	125	103	103	111	117	127	177	177	169	2.5	2.5	5.3	5.18
113.5	—	124.7	103	—	111	117	127	177	—	—	2.5	2.5	5.72	—
115	165	125	103	103	111	117	127	177	177	169	2.5	2.5	7.95	7.79
113.5	—	124.7	103	—	111	117	127	177	—	—	2.5	2.5	8.56	—
108	132	112.8	101.5	103	106	111	114	137	138.5	134	1.5	1	1.4	1.38
113.5	151.5	121	106	106	111	116	123	159	159	155	2	2	2.78	2.72
112.5	154.5	121	106	106	111	116	123	159	159	156.5	2	2	3.02	2.85
113.5	151.5	121	106	106	111	116	123	159	159	155	2	2	3.79	3.71
112.5	154.5	121	106	106	111	116	123	159	159	156.5	2	2	4.14	3.84
121.5	173.5	132	108	108	119	124	134	187	187	178	2.5	2.5	6.13	5.99
121.5	—	132.7	108	—	119	124	134	187	—	—	2.5	2.5	6.62	—

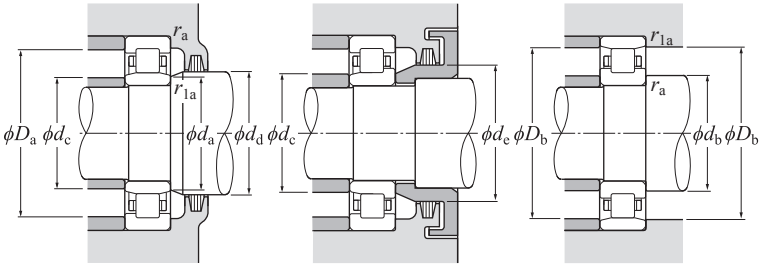
5) Does not apply to the sides of the outer ring rib of NF type bearings.



d 95–130 mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed 2) min^{-1} Grease lubrication	Allowable speed 2) min^{-1} Oil lubrication	Bearing number NU type	NJ type	NUP type	N type	NF type
d	*D*	*B*	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	C_r	C_{0r}	C_u							
95	200	67	3	3	410	460	50.0	3 000	3 500	**NU2319**	**NJ**	**NUP**	**N**	—
	200	67	3	3	510	585	63.0	2 700	3 200	**NU2319E**	**NJ**	**NUP**	—	—
	150	24	1.5	1.1	103	126	14.4	4 600	5 400	**NU1020**	**NJ**	**NUP**	**N**	—
	180	34	2.1	2.1	203	217	23.9	3 800	4 500	**NU220**	**NJ**	**NUP**	**N**	**NF**
	180	34	2.1	2.1	277	305	33.5	3 500	4 100	**NU220E**	**NJ**	**NUP**	—	—
	180	46	2.1	2.1	286	340	37.5	3 500	4 100	**NU2220**	**NJ**	**NUP**	**N**	—
100	180	46	2.1	2.1	370	445	49.0	3 100	3 600	**NU2220E**	**NJ**	**NUP**	—	—
	215	47	3	3	330	335	36.0	3 300	3 800	**NU320**	**NJ**	**NUP**	**N**	**NF**
	215	47	3	3	420	425	45.0	2 900	3 500	**NU320E**	**NJ**	**NUP**	—	—
	215	73	3	3	455	505	54.0	2 900	3 400	**NU2320**	**NJ**	**NUP**	**N**	—
	215	73	3	3	630	715	76.0	2 600	3 100	**NU2320E**	**NJ**	**NUP**	—	—
	160	26	2	1.1	117	142	16.0	4 300	5 100	**NU1021**	**NJ**	**NUP**	**N**	—
105	190	36	2.1	2.1	223	241	26.1	3 600	4 300	**NU221**	**NJ**	**NUP**	**N**	**NF**
	225	49	3	3	355	360	37.5	3 100	3 700	**NU321**	**NJ**	**NUP**	**N**	**NF**
	170	28	2	1.1	146	174	19.2	4 100	4 800	**NU1022**	**NJ**	**NUP**	**N**	—
	200	38	2.1	2.1	266	290	31.0	3 400	4 000	**NU222**	**NJ**	**NUP**	**N**	**NF**
	200	38	2.1	2.1	325	365	39.0	3 100	3 700	**NU222E**	**NJ**	**NUP**	—	—
	200	53	2.1	2.1	350	415	44.0	3 100	3 700	**NU2222**	**NJ**	**NUP**	**N**	—
110	200	53	2.1	2.1	425	515	55.0	2 800	3 300	**NU2222E**	**NJ**	**NUP**	—	—
	240	50	3	3	395	400	41.5	3 000	3 500	**NU322**	**NJ**	**NUP**	**N**	**NF**
	240	50	3	3	500	525	54.0	2 700	3 100	**NU322E**	**NJ**	**NUP**	—	—
	240	80	3	3	670	790	81.5	2 600	3 100	**NU2322**	**NJ**	**NUP**	**N**	—
	240	80	3	3	750	880	90.5	2 400	2 800	**NU2322E**	**NJ**	**NUP**	—	—
	180	28	2	1.1	154	191	20.6	3 800	4 400	**NU1024**	**NJ**	**NUP**	**N**	—
	215	40	2.1	2.1	288	320	33.5	3 200	3 700	**NU224**	**NJ**	**NUP**	**N**	**NF**
	215	40	2.1	2.1	370	420	44.0	2 900	3 400	**NU224E**	**NJ**	**NUP**	—	—
	215	58	2.1	2.1	385	460	48.0	2 900	3 400	**NU2224**	**NJ**	**NUP**	**N**	—
120	215	58	2.1	2.1	500	620	64.5	2 600	3 000	**NU2224E**	**NJ**	**NUP**	—	—
	260	55	3	3	500	510	51.0	2 700	3 200	**NU324**	**NJ**	**NUP**	**N**	**NF**
	260	55	3	3	585	610	61.0	2 400	2 800	**NU324E**	**NJ**	**NUP**	—	—
	260	86	3	3	785	920	92.5	2 400	2 800	**NU2324**	**NJ**	**NUP**	**N**	—
	260	86	3	3	880	1 030	103	2 200	2 500	**NU2324E**	**NJ**	**NUP**	—	—
130	200	33	2	1.1	191	238	24.9	3 400	4 000	**NU1026**	**NJ**	**NUP**	**N**	—

1) Smallest allowable dimension for chamfer dimension *r* or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.

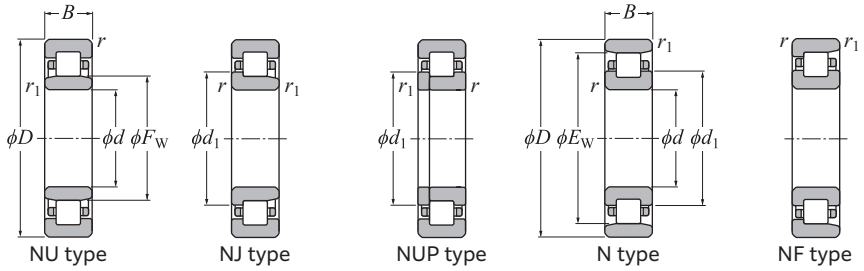


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm									Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.3)	r_{as} Max.	r_{las} Max.	**NU** type (approx.)	**N** type (approx.)
121.5	173.5	132	108	108	119	124	134	187	187	178	2.5	2.5	9.2	9.02
121.5	—	132.7	108	—	119	124	134	187	—	—	2.5	2.5	9.8	—
113	137	117.8	106.5	108	111	116	119	142	143.5	139	1.5	1	1.45	1.43
120	160	128	111	111	117	122	130	169	169	164	2	2	3.33	3.26
119	—	128	111	—	117	122	130	169	—	—	2	2	3.66	—
120	160	128	111	111	117	122	130	169	169	164	2	2	4.57	4.48
119	—	128	111	—	117	122	130	169	—	—	2	2	5.01	—
129.5	185.5	140.5	113	113	125	132	143	202	202	190	2.5	2.5	7.49	7.32
127.5	—	140.3	113	—	125	132	143	202	—	—	2.5	2.5	8.57	—
129.5	185.5	140.5	113	113	125	132	143	202	202	190	2.5	2.5	11.7	11.5
127.5	—	140.3	113	—	125	132	143	202	—	—	2.5	2.5	12.8	—
119.5	145.5	124.7	111.5	114	118	122	126	151	153.5	147.5	2	1	1.84	1.81
126.8	168.8	135	116	116	124	129	137	179	179	173	2	2	3.95	3.87
135	195	147	118	118	132	137	149	212	212	199	2.5	2.5	8.53	8.33
125	155	131	116.5	119	124	128	132	161	163.5	157	2	1	2.33	2.3
132.5	178.5	141.5	121	121	130	135	144	189	189	182	2	2	4.63	4.54
132.5	—	142.1	121	—	130	135	144	189	—	—	2	2	4.27	—
132.5	178.5	141.5	121	121	130	135	144	189	189	182	2	2	6.56	6.43
132.5	—	142.1	121	—	130	135	144	189	—	—	2	2	7.4	—
143	207	155.5	123	123	140	145	158	227	227	211	2.5	2.5	10	9.77
143	—	156.6	123	—	140	145	158	227	—	—	2.5	2.5	11.1	11.4
143	207	155.5	123	123	140	145	158	227	227	211	2.5	2.5	17.1	16.8
143	—	156.6	123	—	140	145	158	227	—	—	2.5	2.5	19.4	—
135	165	141	126.5	129	134	138	142	171	173.5	167	2	1	2.44	2.4
143.5	191.5	153	131	131	141	146	156	204	204	196	2	2	5.57	5.46
143.5	—	153.9	131	—	141	146	156	204	—	—	2	2	5.97	—
143.5	191.5	153	131	131	141	146	156	204	204	196	2	2	8.19	8.03
143.5	—	153.9	131	—	141	146	156	204	—	—	2	2	9.18	—
154	226	168.5	133	133	151	156	171	247	247	230	2.5	2.5	12.8	12.5
154	—	169.2	133	—	151	156	171	247	—	—	2.5	2.5	13.9	—
154	226	168.5	133	133	151	156	171	247	247	230	2.5	2.5	21.5	21.1
154	—	169.2	133	—	151	156	171	247	—	—	2.5	2.5	26.1	—
148	182	154.8	136.5	139	146	151	156	191	193.5	184	2	1	3.69	3.63

3) Does not apply to the sides of the outer ring rib of **NF** type bearings.

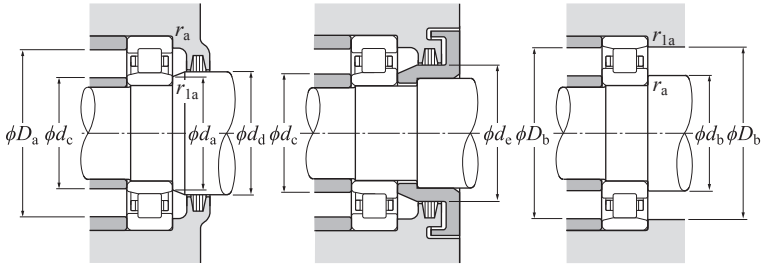


NU type NJ type NUP type N type NF type

d 130–160 mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed[2] min^{-1} Grease lubrication	Oil lubrication	Bearing number NU type	NJ type	NUP type	N type	NF type
d	*D*	*B*	$r_{s\,min}$[1]	$r_{1s\,min}$[1]	C_r	C_{0r}	C_u							
130	230	40	3	3	300	340	35.0	2 900	3 400	**NU226**	NJ	NUP	N	NF
	230	40	3	3	405	455	46.0	2 600	3 100	**NU226E**	NJ	NUP	—	—
	230	64	3	3	420	530	54.0	2 600	3 100	**NU2226**	NJ	NUP	N	—
	230	64	3	3	590	735	75.0	2 300	2 700	**NU2226E**	NJ	NUP	—	—
	280	58	4	4	620	665	65.5	2 500	2 900	**NU326**	NJ	NUP	N	NF
	280	58	4	4	685	735	72.0	2 200	2 600	**NU326E**	NJ	NUP	—	—
	280	93	4	4	930	1 130	111	2 200	2 600	**NU2326**	NJ	NUP	N	—
	280	93	4	4	1 020	1 230	121	2 000	2 300	**NU2326E**	NJ	NUP	—	—
140	210	33	2	1.1	195	250	25.7	3 200	3 800	**NU1028**	NJ	NUP	N	—
	250	42	3	3	345	400	39.5	2 700	3 100	**NU228**	NJ	NUP	N	NF
	250	42	3	3	435	515	51.0	2 400	2 800	**NU228E**	NJ	NUP	—	—
	250	68	3	3	495	635	63.5	2 400	2 800	**NU2228**	NJ	NUP	N	—
	250	68	3	3	635	835	83.0	2 100	2 500	**NU2228E**	NJ	NUP	—	—
	300	62	4	4	685	745	72.0	2 300	2 700	**NU328**	NJ	NUP	N	NF
	300	62	4	4	735	795	76.5	2 100	2 400	**NU328E**	NJ	NUP	—	—
	300	102	4	4	1 020	1 250	120	2 000	2 300	**NU2328**	NJ	NUP	N	—
	300	102	4	4	1 130	1 380	133	1 800	2 100	**NU2328E**	NJ	NUP	—	—
150	225	35	2.1	1.5	224	294	29.6	3 000	3 500	**NU1030**	NJ	NUP	N	—
	270	45	3	3	380	435	42.5	2 500	2 900	**NU230**	NJ	NUP	N	NF
	270	45	3	3	495	595	58.0	2 200	2 600	**NU230E**	NJ	NUP	—	—
	270	73	3	3	555	710	69.5	2 200	2 600	**NU2230**	NJ	NUP	N	—
	270	73	3	3	735	980	95.5	2 000	2 400	**NU2230E**	NJ	NUP	—	—
	320	65	4	4	735	805	76.0	2 100	2 500	**NU330**	NJ	NUP	N	NF
	320	65	4	4	840	920	86.5	1 900	2 300	**NU330E**	NJ	NUP	—	—
	320	108	4	4	1 130	1 400	132	1 900	2 200	**NU2330**	NJ	NUP	N	—
	320	108	4	4	1 290	1 600	150	1 700	2 000	**NU2330E**	NJ	NUP	—	—
160	240	38	2.1	1.5	263	340	34.0	2 800	3 300	**NU1032**	NJ	NUP	N	—
	290	48	3	3	475	570	54.5	2 300	2 700	**NU232**	NJ	NUP	N	NF
	290	48	3	3	555	665	63.5	2 100	2 400	**NU232E**	NJ	NUP	—	—
	290	80	3	3	700	940	90.0	2 100	2 400	**NU2232**	NJ	NUP	N	—
	290	80	3	3	895	1 190	114	1 900	2 200	**NU2232E**	NJ	NUP	—	—
	340	68	4	4	775	875	81.0	2 000	2 300	**NU332**	NJ	NUP	N	NF
	340	68	4	4	950	1 050	97.5	1 800	2 100	**NU332E**	NJ	NUP	—	—
	340	114	4	4	1 190	1 520	141	1 700	2 000	**NU2332**	NJ	NUP	N	—
	340	114	4	4	1 460	1 820	168	1 600	1 900	**NU2332E**	NJ	NUP	—	—

1) Smallest allowable dimension for chamfer dimension *r* or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.

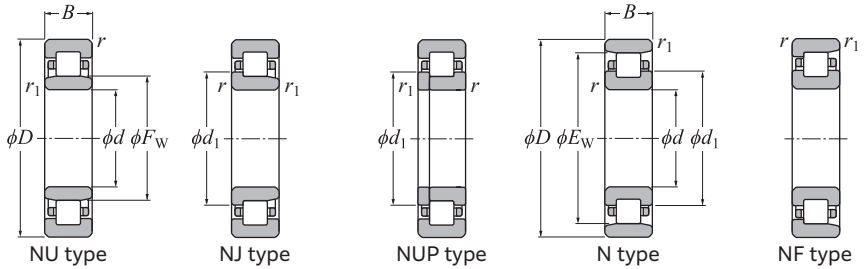


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm									Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.[3]	r_{as} Max.	r_{1as} Max.	NU type (approx.)	N type (approx.)
156	204	165.5	143	143	151	158	168	217	217	208	2.5	2.5	6.3	6.17
153.5	—	164.7	143	—	151	158	168	217	—	—	2.5	2.5	6.9	—
156	204	165.5	143	143	151	158	168	217	217	208	2.5	2.5	10.2	10
153.5	—	164.7	143	—	151	158	168	217	—	—	2.5	2.5	11.8	—
167	243	182	146	146	164	169	184	264	264	247	3	3	17.4	17
167	—	183	146	—	164	169	184	264	—	—	3	3	19.4	—
167	243	182	146	146	164	169	184	264	264	247	3	3	26.9	26.4
167	—	183	146	—	164	169	184	264	—	—	3	3	30.9	—
158	192	164.8	146.5	149	156	161	166	201	203.5	194	2	1	4.05	3.98
169	221	179.5	153	153	166	171	182	237	237	225	2.5	2.5	7.88	7.72
169	—	180.2	153	—	166	171	182	237	—	—	2.5	2.5	8.73	—
169	221	179.5	153	153	166	171	182	237	237	225	2.5	2.5	12.9	12.6
169	—	180.2	153	—	166	171	182	237	—	—	2.5	2.5	15.8	—
180	260	196	156	156	176	182	198	284	284	265	3	3	21.2	20.7
180	—	196.8	156	—	176	182	198	284	—	—	3	3	23.2	—
180	260	196	156	156	176	182	198	284	284	265	3	3	33.8	33.1
180	—	196.8	156	—	176	182	198	284	—	—	3	3	38.7	—
169.5	205.5	176.7	158	161	167	173	178	214	217	207.5	2	1.5	4.77	4.7
182	238	193	163	163	179	184	196	257	257	242	2.5	2.5	9.92	9.72
182	—	194	163	—	179	184	196	257	—	—	2.5	2.5	11	—
182	238	193	163	163	179	184	196	257	257	242	2.5	2.5	16.3	16
182	—	194	163	—	179	184	196	257	—	—	2.5	2.5	19.7	—
193	277	210	166	166	190	195	213	304	304	282	3	3	25.3	24.7
193	—	211	166	—	190	195	213	304	—	—	3	3	28.4	—
193	277	210	166	166	190	195	213	304	304	282	3	3	40.6	39.8
193	—	211	166	—	190	195	213	304	—	—	3	3	47.2	—
180	220	188	168	171	178	184	189	229	232	222	2	1.5	5.9	5.81
195	255	207	173	173	192	197	210	277	277	259	2.5	2.5	13.7	13.4
195	—	207.8	173	—	192	197	210	277	—	—	2.5	2.5	15.6	—
195	255	207	173	173	192	197	210	277	277	259	2.5	2.5	22	21.6
193	—	206.6	173	—	192	197	210	277	—	—	2.5	2.5	25.1	—
208	292	225	176	176	200	211	228	324	324	297	3	3	31.3	30.6
204	—	223.2	176	—	200	211	228	324	—	—	3	3	34	—
208	292	225	176	176	200	211	228	324	324	297	3	3	50.5	49.5
204	—	223.2	176	—	200	211	228	324	—	—	3	3	56	—

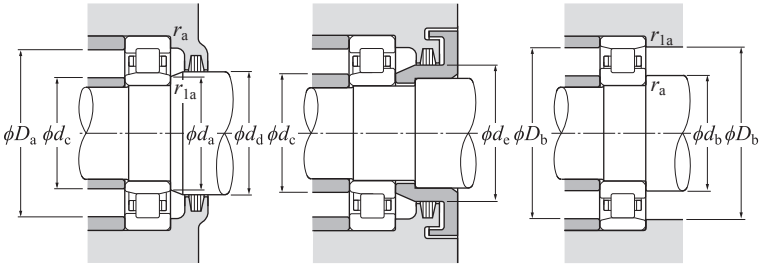
3) Does not apply to the sides of the outer ring rib of **NF** type bearings.



d 170–220 mm

Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Allowable speed 2) min^{-1}		Bearing number				
d	*D*	*B*	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	NU type	NJ type	NUP type	N type	NF type
	260	42	2.1	2.1	310	400	38.5	2 600	3 000	**NU1034**	**NJ**	**NUP**	**N**	—
	310	52	4	4	530	635	59.5	2 200	2 500	**NU234**	**NJ**	**NUP**	**N**	**NF**
	310	52	4	4	670	800	75.0	2 000	2 300	**NU234E**	**NJ**	**NUP**	—	—
170	310	86	4	4	795	1 080	101	2 000	2 300	**NU2234**	**NJ**	**NUP**	**N**	—
	310	86	4	4	1 070	1 410	132	1 800	2 100	**NU2234E**	**NJ**	**NUP**	—	—
	360	72	4	4	885	1 010	92.0	1 800	2 200	**NU334**	**NJ**	**NUP**	**N**	**NF**
	360	120	4	4	1 360	1 750	159	1 600	1 900	**NU2334**	**NJ**	**NUP**	**N**	—
	280	46	2.1	2.1	380	485	46.5	2 400	2 900	**NU1036**	**NJ**	**NUP**	**N**	—
	320	52	4	4	550	675	62.5	2 000	2 400	**NU236**	**NJ**	**NUP**	**N**	**NF**
	320	52	4	4	695	850	78.5	1 800	2 200	**NU236E**	**NJ**	**NUP**	—	—
180	320	86	4	4	825	1 140	106	1 800	2 200	**NU2236**	**NJ**	**NUP**	**N**	—
	320	86	4	4	1 120	1 510	139	1 600	1 900	**NU2236E**	**NJ**	**NUP**	—	—
	380	75	4	4	1 000	1 150	103	1 700	2 000	**NU336**	**NJ**	**NUP**	**N**	**NF**
	380	126	4	4	1 530	1 990	179	1 500	1 800	**NU2336**	**NJ**	**NUP**	**N**	—
	290	46	2.1	2.1	390	510	48.0	2 300	2 700	**NU1038**	**NJ**	**NUP**	**N**	—
	340	55	4	4	615	770	70.0	1 900	2 200	**NU238**	**NJ**	**NUP**	**N**	**NF**
	340	55	4	4	770	955	86.5	1 700	2 000	**NU238E**	**NJ**	**NUP**	—	—
190	340	92	4	4	920	1 290	117	1 700	2 000	**NU2238**	**NJ**	**NUP**	**N**	—
	340	92	4	4	1 220	1 670	152	1 500	1 800	**NU2238E**	**NJ**	**NUP**	—	—
	400	78	5	5	1 080	1 260	111	1 600	1 900	**NU338**	**NJ**	**NUP**	**N**	**NF**
	400	132	5	5	1 680	2 220	196	1 400	1 700	**NU2338**	**NJ**	**NUP**	**N**	—
	310	51	2.1	2.1	430	580	53.5	2 200	2 600	**NU1040**	**NJ**	**NUP**	**N**	—
	360	58	4	4	690	865	77.5	1 800	2 100	**NU240**	**NJ**	**NUP**	**N**	**NF**
	360	58	4	4	850	1 060	95.0	1 600	1 900	**NU240E**	**NJ**	**NUP**	—	—
200	360	98	4	4	1 020	1 440	129	1 600	1 900	**NU2240**	**NJ**	**NUP**	**N**	—
	360	98	4	4	1 350	1 870	167	1 500	1 700	**NU2240E**	**NJ**	**NUP**	—	—
	420	80	5	5	1 080	1 270	111	1 500	1 800	**NU340**	**NJ**	**NUP**	**N**	**NF**
	420	138	5	5	1 680	2 240	195	1 400	1 600	**NU2340**	**NJ**	**NUP**	**N**	—
	340	56	3	3	555	750	67.0	2 000	2 300	**NU1044**	**NJ**	**NUP**	**N**	—
	400	65	4	4	845	1 080	94.0	1 600	1 900	**NU244**	**NJ**	**NUP**	**N**	**NF**
220	400	108	4	4	1 260	1 810	157	1 500	1 700	**NU2244**	**NJ**	**NUP**	**N**	—
	460	88	5	5	1 320	1 570	133	1 400	1 600	**NU344**	**NJ**	**NUP**	**N**	**NF**
	460	145	5	5	1 970	2 620	222	1 200	1 400	**NU2344**	**NJ**	**NUP**	**N**	—

1) Smallest allowable dimension for chamfer dimension *r* or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.

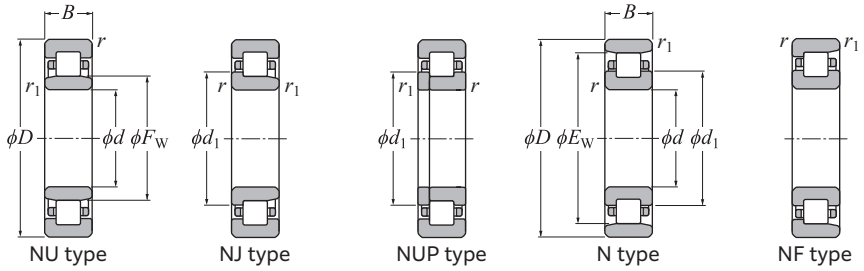


Dynamic equivalent radial load
$P_r = F_r$

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

Dimension mm			Installation-related dimensions mm									Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.3)	r_{as} Max.	r_{las} Max.	NU type (approx.)	N type (approx.)
193	237	201.8	181	181	190	197	203	249	249	239	2	2	7.88	7.76
208	272	220.5	186	186	204	211	223	294	294	277	3	3	17	16.7
207	—	221.4	186	—	204	211	223	294	—	—	3	3	19.6	—
208	272	220.5	186	186	204	211	223	294	294	277	3	3	27.2	26.7
205	—	220.2	186	—	204	211	223	294	—	—	3	3	31	—
220	310	238	186	186	216	223	241	344	344	315	3	3	37	36.1
220	310	238	186	186	216	223	241	344	344	315	3	3	59.5	58.3
205	255	215	191	191	203	209	216	269	269	257	2	2	10.3	10.1
218	282	230.5	196	196	214	221	233	304	304	287	3	3	17.7	17.3
217	—	231.4	196	—	214	221	233	304	—	—	3	3	20.4	—
218	282	230.5	196	196	214	221	233	304	304	287	3	3	28.4	27.8
215	—	230.2	196	—	214	221	233	304	—	—	3	3	31.9	—
232	328	252	196	196	227	235	255	364	364	333	3	3	44.2	43.2
232	328	252	196	196	227	235	255	364	364	333	3	3	69.5	68.1
215	265	225	201	201	213	219	226	279	279	267	2	2	10.7	10.5
231	299	244.5	206	206	227	234	247	324	324	304	3	3	21.3	20.8
230	—	245.2	206	—	227	234	247	324	—	—	3	3	24.2	—
231	299	244.5	206	206	227	234	247	324	324	304	3	3	34.4	33.7
228	—	244	206	—	227	234	247	324	—	—	3	3	39.5	—
245	345	265	210	210	240	248	268	380	380	351	4	4	49.4	48.3
245	345	265	210	210	240	248	268	380	380	351	4	4	80.5	78.9
229	281	239.4	211	211	226	233	241	299	299	283	2	2	13.9	13.7
244	316	258	216	216	240	247	261	344	344	321	3	3	25.3	24.8
243	—	259	216	—	240	247	261	344	—	—	3	3	28.1	—
244	316	258	216	216	240	247	261	344	344	321	3	3	41.3	40.5
241	—	257.8	216	—	240	247	261	344	—	—	3	3	47.8	—
260	360	280	220	220	254	263	283	400	400	366	4	4	55.8	54.5
260	360	280	220	220	254	263	283	400	400	366	4	4	92.6	90.7
250	310	262	233	233	248	254	264	327	327	313	2.5	2.5	18.2	17.9
270	350	286	236	236	266	273	289	384	384	355	3	3	37.7	37
270	350	286	236	236	266	273	289	384	384	355	3	3	59	57.8
284	396	307	240	240	279	287	307	440	440	402	4	4	73.4	71.7
284	396	307	240	240	279	287	307	440	440	402	4	4	116	114

3) Does not apply to the sides of the outer ring rib of **NF** type bearings.

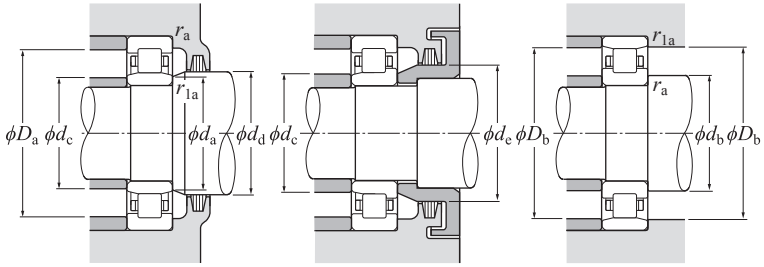


NU type NJ type NUP type N type NF type

d 240–440 mm

Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Allowable speed 2) min^{-1}		Bearing number				
d	*D*	*B*	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	NU type	NJ type	NUP type	N type	NF type
	360	56	3	3	585	820	72.0	1 800	2 100	**NU1048**	**NJ**	**NUP**	**N**	—
	440	72	4	4	1 040	1 340	113	1 500	1 700	**NU248**	**NJ**	**NUP**	**N**	**NF**
240	440	120	4	4	1 590	2 320	196	1 300	1 600	**NU2248**	**NJ**	**NUP**	**N**	—
	500	95	5	5	1 590	1 950	160	1 300	1 500	**NU348**	**NJ**	**NUP**	**N**	**NF**
	500	155	5	5	2 330	3 200	262	1 100	1 300	**NU2348**	**NJ**	**NUP**	**N**	—
	400	65	4	4	715	1 000	85.0	1 600	1 900	**NU1052**	**NJ**	**NUP**	**N**	—
	480	80	5	5	1 270	1 660	137	1 300	1 600	**NU252**	**NJ**	**NUP**	**N**	**NF**
260	480	130	5	5	1 980	2 930	241	1 200	1 400	**NU2252**	**NJ**	**NUP**	**N**	—
	540	102	6	6	1 790	2 230	180	1 200	1 400	**NU352**	**NJ**	**NUP**	**N**	**NF**
	540	165	6	6	2 600	3 600	289	1 000	1 200	**NU2352**	**NJ**	**NUP**	**N**	—
	420	65	4	4	730	1 050	88.0	1 500	1 800	**NU1056**	**NJ**	**NUP**	**N**	—
	500	80	5	5	1 320	1 760	143	1 200	1 400	**NU256**	**NJ**	**NUP**	**N**	**NF**
280	500	130	5	5	2 050	3 100	252	1 100	1 300	**NU2256**	**NJ**	**NUP**	**N**	—
	580	108	6	6	2 010	2 540	200	1 100	1 200	**NU356**	**NJ**	**NUP**	**N**	**NF**
	580	175	6	6	3 000	4 250	335	920	1 100	**NU2356**	**NJ**	**NUP**	**N**	—
	460	74	4	4	950	1 340	109	1 400	1 600	**NU1060**	**NJ**	**NUP**	**N**	—
300	540	85	5	5	1 560	2 070	164	1 100	1 300	**NU260**	**NJ**	**NUP**	**N**	**NF**
	540	140	5	5	2 420	3 650	290	1 000	1 200	**NU2260**	**NJ**	**NUP**	**N**	—
	480	74	4	4	970	1 410	113	1 300	1 500	**NU1064**	**NJ**	**NUP**	**N**	—
320	580	92	5	5	1 780	2 390	186	1 000	1 200	**NU264**	**NJ**	**NUP**	**N**	**NF**
	580	150	5	5	2 830	4 350	340	950	1 100	**NU2264**	**NJ**	**NUP**	**N**	—
340	520	82	5	5	1 160	1 670	132	1 200	1 400	**NU1068**	**NJ**	**NUP**	**N**	—
360	540	82	5	5	1 190	1 750	136	1 100	1 300	**NU1072**	**NJ**	**NUP**	**N**	—
380	560	82	5	5	1 220	1 840	141	1 100	1 200	**NU1076**	**NJ**	**NUP**	**N**	—
400	600	90	5	5	1 460	2 190	164	990	1 200	**NU1080**	**NJ**	**NUP**	**N**	—
420	620	90	5	5	1 500	2 290	170	950	1 100	**NU1084**	**NJ**	**NUP**	**N**	—
440	650	94	6	6	1 590	2 430	178	900	1 100	**NU1088**	**NJ**	**NUP**	**N**	—

1) Smallest allowable dimension for chamfer dimension *r* or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.

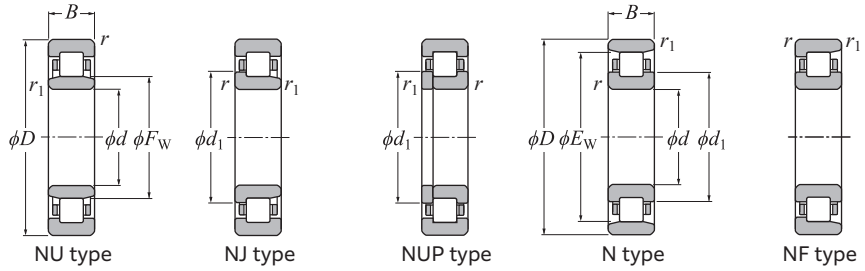


Dynamic equivalent radial load
$P_r = F_r$

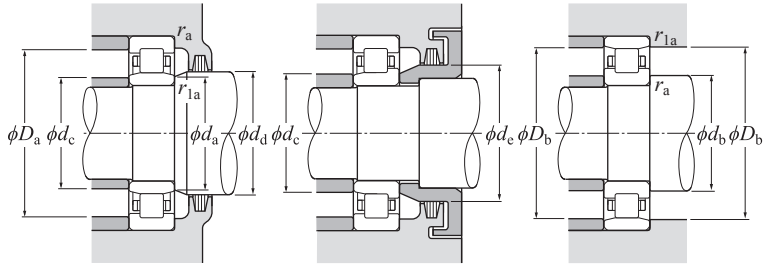
Static equivalent radial load
$P_{0r} = F_r$

Dimension mm			Installation-related dimensions mm									Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min.3)	r_{as} Max.	r_{las} Max.	NU type (approx.)	N type (approx.)
270	330	282	253	253	268	275	284	347	347	333	2.5	2.5	19.6	19.3
295	385	313	256	256	293	298	316	424	424	390	3	3	50.2	49.2
295	385	313	256	256	293	298	316	424	424	390	3	3	80	78.4
310	430	335	260	260	305	313	333	480	480	436	4	4	93.4	91.3
310	430	335	260	260	305	313	333	480	480	436	4	4	147	144
296	364	309.6	276	276	292	300	312	384	384	367	3	3	29.1	28.7
320	420	340	280	280	318	323	343	460	460	426	4	4	66.9	65.6
320	420	340	280	280	318	323	343	460	460	426	4	4	104	102
336	464	362	284	284	331	339	359	516	516	471	5	5	117	114
336	464	362	284	284	331	339	359	516	516	471	5	5	182	178
316	384	329.6	296	296	312	320	332	404	404	387	3	3	30.9	30.4
340	440	360	300	300	336	343	365	480	480	446	4	4	70.8	69.4
340	440	360	300	300	336	343	365	480	480	446	4	4	109	107
362	498	390	304	304	356	366	386	556	556	505	5	5	142	139
362	498	390	304	304	356	366	386	556	556	505	5	5	222	218
340	420	356	316	316	336	344	358	444	444	423	3	3	43.6	42.9
364	476	387	320	320	361	368	392	520	520	482	4	4	88.2	86.4
364	476	387	320	320	361	368	392	520	520	482	4	4	138	135
360	440	376	336	336	356	364	378	464	464	443	3	3	46	45.3
390	510	415	340	340	386	393	419	560	560	516	4	4	111	109
390	510	415	340	340	386	393	419	560	560	516	4	4	172	168
385	475	403	360	360	381	390	405	500	500	479	4	4	61.8	60.8
405	495	423	380	380	401	410	425	520	520	499	4	4	64.7	63.7
425	515	443	400	400	421	430	445	540	540	519	4	4	67.5	66.5
450	550	470	420	420	446	455	473	580	580	554	4	4	87.6	86.3
470	570	490	440	440	466	475	493	600	600	574	4	4	91	89.6
493	597	513.8	464	464	488	499	517	626	626	602	5	5	105	103

3) Does not apply to the sides of the outer ring rib of **NF** type bearings.



NU type NJ type NUP type N type NF type



Dynamic equivalent radial load
$P_r = F_r$

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

d 460–500 mm

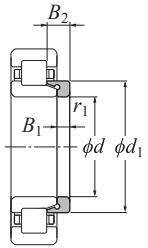
Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Allowable speed [2] min^{-1}		Bearing number				
					dynamic	static		Grease lubrication	Oil lubrication					
d	D	B	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	C_r	C_{0r}	C_u			NU type	NJ type	NUP type	N type	NF type
460	680	100	6	6	1 710	2 630	191	850	1 000	**NU1092**	**NJ**	**NUP**	**N**	—
480	700	100	6	6	1 750	2 750	197	810	960	**NU1096**	**NJ**	**NUP**	**N**	—
500	720	100	6	6	1 790	2 870	203	770	910	**NU10/500**	**NJ**	**NUP**	**N**	—

Dimension mm			Installation-related dimensions mm										Mass kg	
F_w	E_w	d_1	d_a Min.	d_b Min.	d_c Max.	d_d Min.	d_e Min.	D_a Max.	D_b Max.	D_b Min. [3]	r_{as} Max.	r_{1as} Max.	NU type (approx.)	N type (approx.)
516	624	537.6	484	484	511	522	541	656	656	629	5	5	122	120
536	644	557.6	504	504	531	542	561	676	676	649	5	5	126	124
556	664	577.6	524	524	551	562	581	696	696	669	5	5	130	128

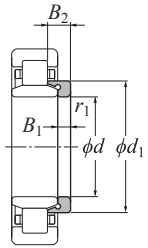
1) Smallest allowable dimension for chamfer dimension r or r_1.
2) This value is for machined cages; when pressed cages are used, 80 % of this value is acceptable.

3) Does not apply to the sides of the outer ring rib of **NF** type bearings.

L type collar ring



NH = NJ + HJ

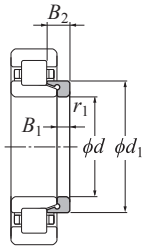


NUJ = NU + HJ

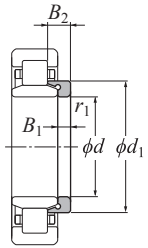
d 20–60 mm

Dimension mm					L type collar ring number	Mass kg
d	d_1	B_1	B_2	$r_{1s\,min}$ [1]		(approx.)
20	29.9	3	6.75	0.6	**HJ204**	0.012
	29.5	3	5.5	0.6	**HJ204E**	0.009
	29.9	3	7.5	0.6	**HJ2204**	0.013
	29.5	3	6.5	0.6	**HJ2204E**	0.01
	31.8	4	7.5	0.6	**HJ304**	0.017
	31.1	4	6.5	0.6	**HJ304E**	0.014
	31.8	4	8.5	0.6	**HJ2304**	0.018
	31.1	4	7.5	0.6	**HJ2304E**	0.015
25	34.8	3	7.25	0.6	**HJ205**	0.015
	34.5	3	6	0.6	**HJ205E**	0.012
	34.8	3	7.5	0.6	**HJ2205**	0.015
	34.5	3	6.5	0.6	**HJ2205E**	0.013
	39	4	8	1.1	**HJ305**	0.025
	38	4	7	1.1	**HJ305E**	0.021
	39	4	9	1.1	**HJ2305**	0.027
	38	4	8	1.1	**HJ2305E**	0.024
	43.6	6	10.5	1.5	**HJ405**	0.057
30	41.7	4	8.25	0.6	**HJ206**	0.025
	41.1	4	7	0.6	**HJ206E**	0.017
	41.7	4	8.5	0.6	**HJ2206**	0.025
	41.1	4	7.5	0.6	**HJ2206E**	0.02
	45.9	5	9.5	1.1	**HJ306**	0.039
	44.9	5	8.5	1.1	**HJ306E**	0.035
	45.9	5	11.5	1.1	**HJ2306**	0.043
	44.9	5	9.5	1.1	**HJ2306E**	0.035
	50.5	7	11.5	1.5	**HJ406**	0.08
35	47.6	4	8	0.6	**HJ207**	0.03
	48	4	7	0.6	**HJ207E**	0.027
	47.6	4	8.5	0.6	**HJ2207**	0.031
	48	4	8.5	0.6	**HJ2207E**	0.031
	50.8	6	11	1.1	**HJ307**	0.056
	51	6	9.5	1.1	**HJ307E**	0.048
	50.8	6	14	1.1	**HJ2307**	0.064
	51	6	11	1.1	**HJ2307E**	0.055
	59	8	13	1.5	**HJ407**	0.12
40	54.2	5	9	1.1	**HJ208**	0.046
	53.9	5	8.5	1.1	**HJ208E**	0.042
	54.2	5	9.5	1.1	**HJ2208**	0.047
	53.9	5	9	1.1	**HJ2208E**	0.045
	58.4	7	12.5	1.5	**HJ308**	0.083
	57.6	7	11	1.5	**HJ308E**	0.07
	58.4	7	14.5	1.5	**HJ2308**	0.09
	57.6	7	12.5	1.5	**HJ2308E**	0.08
	64.8	8	13	2	**HJ408**	0.14
45	59	5	9.5	1.1	∗**HJ209**	0.053
	58.9	5	8.5	1.1	**HJ209E**	0.047
	58.9	5	9	1.1	**HJ2209E**	0.05
	64	7	12.5	1.5	**HJ309**	0.099
	64.5	7	11.5	1.5	**HJ309E**	0.093
	64	7	15	1.5	**HJ2309**	0.109
	64.5	7	13	1.5	**HJ2309E**	0.103
	71.8	8	13.5	2	**HJ409**	0.175
50	64.6	5	10	1.1	**HJ210**	0.063
	63.9	5	9	1.1	∗**HJ210E**	0.055
	64.6	5	9.5	1.1	**HJ2210**	0.061
	71	8	14	2	**HJ310**	0.142
	71.4	8	13	2	**HJ310E**	0.134
	71	8	17	2	**HJ2310**	0.157
	71.4	8	14.5	2	**HJ2310E**	0.15
	78.8	9	14.5	2.1	**HJ410**	0.23
55	70.8	6	11	1.1	∗**HJ211**	0.084
	70.8	6	9.5	1.1	**HJ211E**	0.072
	70.8	6	10	1.1	**HJ2211E**	0.076
	77.2	9	15	2	**HJ311**	0.182
	77.7	9	14	2	**HJ311E**	0.168
	77.2	9	18.5	2	**HJ2311**	0.203
	77.7	9	15.5	2	**HJ2311E**	0.185
	85.2	10	16.5	2.1	**HJ411**	0.29
60	78.4	6	11	1.5	∗**HJ212**	0.108
	77.6	6	10	1.5	∗**HJ212E**	0.094

1) Smallest allowable dimension for chamfer dimension r. Note: 1. This L type collar ring is used with NU type cylindrical roller bearings; in duplex arrangements with NJ or NU type bearing numbers, they become NH type and NUJ type respectively. Refer to page B-98 through page B-101 for bearing dimensions, allowable speed, and mass. 2. "∗" indicates L type collar rings that can also be used with dimension series 22 bearings.



NH = NJ + HJ



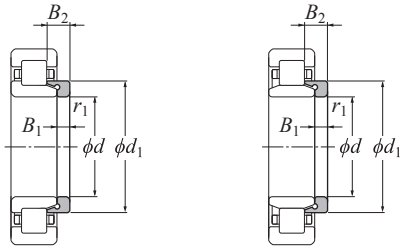
NUJ = NU + HJ

d 60–105 mm

Dimension mm					L type collar ring number	Mass kg
d	d_1	B_1	B_2	$r_{1s\,min}$ [1]		(approx.)
60	84.2	9	15.5	2.1	**HJ312**	0.22
	84.6	9	14.5	2.1	**HJ312E**	0.205
	84.2	9	19	2.1	**HJ2312**	0.245
	84.6	9	16	2.1	**HJ2312E**	0.23
	91.8	10	16.5	2.1	**HJ412**	0.34
65	84.8	6	11	1.5	**HJ213**	0.123
	84.5	6	10	1.5	**HJ213E**	0.111
	84.8	6	11.5	1.5	**HJ2213**	0.126
	84.5	6	10.5	1.5	**HJ2213E**	0.118
	91	10	17	2.1	**HJ313**	0.28
	91	10	15.5	2.1	**HJ313E**	0.25
	91	10	20	2.1	**HJ2313**	0.304
	91	10	18	2.1	**HJ2313E**	0.29
	98.5	11	18	2.1	**HJ413**	0.42
70	89.6	7	12.5	1.5	∗**HJ214**	0.15
	89.5	7	11	1.5	**HJ214E**	0.13
	89.5	7	11.5	1.5	**HJ2214E**	0.138
	98	10	17.5	2.1	**HJ314**	0.33
	98	10	15.5	2.1	**HJ314E**	0.293
	98	10	20.5	2.1	**HJ2314**	0.358
	98	10	18.5	2.1	**HJ2314E**	0.35
	110.5	12	20	3	**HJ414**	0.605
75	94	7	12.5	1.5	∗**HJ215**	0.156
	94.5	7	11	1.5	**HJ215E**	0.141
	94.5	7	11.5	1.5	**HJ2215E**	0.164
	104.2	11	18.5	2.1	**HJ315**	0.4
	104.6	11	16.5	2.1	**HJ315E**	0.35
	104.2	11	21.5	2.1	**HJ2315**	0.432
	104.6	11	19.5	2.1	**HJ2315E**	0.41
	116	13	21.5	3	**HJ415**	0.71
80	101.2	8	13.5	2	∗**HJ216**	0.207
	101.7	8	12.5	2	∗**HJ216E**	0.193
	111.8	11	19.5	2.1	**HJ316**	0.47
	111	11	17	2.1	**HJ316E**	0.405
	111.8	11	23	2.1	**HJ2316**	0.511
80	111	11	20	2.1	**HJ2316E**	0.45
	122	13	22	3	**HJ416**	0.78
85	108.2	8	14	2	∗**HJ217**	0.25
	107.7	8	12.5	2	**HJ217E**	0.21
	107.7	8	13	2	**HJ2217E**	0.216
	117.5	12	20.5	3	**HJ317**	0.56
	118.4	12	18.5	3	**HJ317E**	0.505
	117.5	12	24	3	**HJ2317**	0.606
	118.4	12	22	3	**HJ2317E**	0.55
90	114.2	9	15	2	**HJ218**	0.305
	114.6	9	14	2	**HJ218E**	0.272
	114.2	9	16	2	**HJ2218**	0.315
	114.6	9	15	2	**HJ2218E**	0.308
	125	12	21	3	**HJ318**	0.63
	124.7	12	18.5	3	**HJ318E**	0.548
	125	12	26	3	**HJ2318**	0.704
	124.7	12	22	3	**HJ2318E**	0.69
95	121	9	15.5	2.1	**HJ219**	0.352
	121	9	14	2.1	**HJ219E**	0.304
	121	9	16.5	2.1	**HJ2219**	0.363
	121	9	15.5	2.1	**HJ2219E**	0.335
	132	13	22.5	3	**HJ319**	0.76
	132.7	13	20.5	3	**HJ319E**	0.7
	132	13	26.5	3	**HJ2319**	0.826
	132.7	13	24.5	3	**HJ2319E**	0.8
100	128	10	17	2.1	**HJ220**	0.444
	128	10	15	2.1	**HJ220E**	0.38
	128	10	18	2.1	**HJ2220**	0.456
	128	10	16	2.1	**HJ2220E**	0.385
	140.5	13	22.5	3	**HJ320**	0.895
	140.3	13	20.5	3	**HJ320E**	0.8
	140.5	13	27.5	3	**HJ2320**	0.986
	140.3	13	23.5	3	**HJ2320E**	0.92
105	135	10	17.5	2.1	**HJ221**	0.505

1) Smallest allowable dimension for chamfer dimension r. Note: 1. This L type collar ring is used with NU type cylindrical roller bearings; in duplex arrangements with NJ or NU type bearing numbers, they become NH type and NUJ type respectively. Refer to page B-102 through page B-107 for bearing dimensions, allowable speed, and mass. 2. "∗" indicates L type collar rings that can also be used with dimension series 22 bearings.

L type collar ring



NH = NJ + HJ

NUJ = NU + HJ

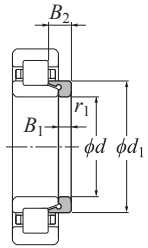
d 105–200 mm

Dimension mm					L type collar ring number	Mass kg
d	d_1	B_1	B_2	$r_{1s\ min}$[1]		(approx.)
105	147	13	22.5	3	**HJ321**	0.97
110	141.5	11	18.5	2.1	**HJ222**	0.615
	142.1	11	17	2.1	**HJ222E**	0.553
	141.5	11	20.5	2.1	**HJ2222**	0.645
	142.1	11	19.5	2.1	**HJ2222E**	0.605
	155.5	14	23	3	**HJ322**	1.17
	156.6	14	22	3	**HJ322E**	1.09
	155.5	14	28	3	**HJ2322**	1.28
	156.6	14	26.5	3	**HJ2322E**	1.25
120	153	11	19	2.1	**HJ224**	0.715
	153.9	11	17	2.1	**HJ224E**	0.634
	153	11	22	2.1	**HJ2224**	0.767
	153.9	11	20	2.1	**HJ2224E**	0.705
	168.5	14	23.5	3	**HJ324**	1.4
	169.2	14	22.5	3	**HJ324E**	1.28
	168.5	14	28	3	**HJ2324**	1.53
	169.2	14	26	3	**HJ2324E**	1.42
130	165.5	11	19	3	**HJ226**	0.84
	164.7	11	17	3	**HJ226E**	0.684
	165.5	11	25	3	**HJ2226**	0.953
	164.7	11	21	3	**HJ2226E**	0.831
	182	14	24	4	**HJ326**	1.62
	183	14	23	4	**HJ326E**	1.53
	182	14	29.5	4	**HJ2326**	1.8
	183	14	28	4	**HJ2326E**	1.75
140	179.5	11	19	3	**HJ228**	1
	180.2	11	18	3	**HJ228E**	0.929
	179.5	11	25	3	**HJ2228**	1.14
	180.2	11	23	3	**HJ2228E**	1.11
	196	15	26	4	**HJ328**	1.93
	196.8	15	25	4	**HJ328E**	1.91
	196	15	33.5	4	**HJ2328**	2.21
	196.8	15	31	4	**HJ2328E**	2.3
150	193	12	20.5	3	**HJ230**	1.24
	194	12	19.5	3	**HJ230E**	1.18
	193	12	26.5	3	**HJ2230**	1.39
	194	12	24.5	3	**HJ2230E**	1.42
150	210	15	26.5	4	**HJ330**	2.37
	211	15	25	4	**HJ330E**	2.25
	210	15	34	4	**HJ2330**	2.69
	211	15	31.5	4	**HJ2330E**	2.6
160	207	12	21	3	**HJ232**	1.48
	207.8	12	20	3	**HJ232E**	1.34
	207	12	28	3	**HJ2232**	1.69
	206.6	12	24.5	3	**HJ2232E**	1.61
	225	15	28	4	**HJ332**	2.75
	223.2	15	25	4	**HJ332E**	2.4
	225	15	37	4	**HJ2332**	3.16
	223.2	15	32	4	**HJ2332E**	2.85
170	220.5	12	22	4	**HJ234**	1.7
	221.4	12	20	4	**HJ234E**	1.51
	220.5	12	29	4	**HJ2234**	1.93
	220.2	12	24	4	**HJ2234E**	1.82
	238	16	29.5	4	**HJ334**	3.25
	238	16	38.5	4	**HJ2334**	3.71
180	230.5	12	22	4	**HJ236**	1.8
	231.4	12	20	4	**HJ236E**	1.7
	230.5	12	29	4	**HJ2236**	2.04
	230.2	12	24	4	**HJ2236E**	1.91
	252	17	30.5	4	**HJ336**	3.85
	252	17	40	4	**HJ2336**	4.42
190	244.5	13	23.5	4	**HJ238**	2.2
	245.2	13	21.5	4	**HJ238E**	1.94
	244.5	13	31.5	4	**HJ2238**	2.52
	244	13	26.5	4	**HJ2238E**	2.38
	265	18	32	5	**HJ338**	4.45
	265	18	41.5	5	**HJ2338**	5.05
200	258	14	25	4	**HJ240**	2.6

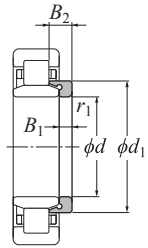
1) Smallest allowable dimension for chamfer dimension r.

Note: This L type collar ring is used with NU type cylindrical roller bearings; in duplex arrangements with NJ or NU type bearing numbers, they become NH type and NUJ type respectively. Refer to page B-106 through page B-111 for bearing dimensions, allowable speed, and mass.

Cylindrical Roller Bearings
NTN



NH = NJ + HJ



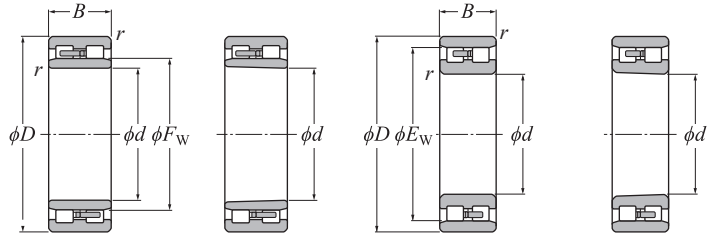
NUJ = NU + HJ

d 200–320 mm

Dimension mm					L type collar ring number	Mass kg
d	d_1	B_1	B_2	$r_{1s\ min}$[1]		(approx.)
200	259	14	23	4	**HJ240E**	2.35
	258	14	34	4	**HJ2240**	2.99
	257.8	14	28	4	**HJ2240E**	2.86
	280	18	33	5	**HJ340**	5
	280	18	44.5	5	**HJ2340**	5.76
220	286	15	27.5	4	**HJ244**	3.55
	307	20	36	5	**HJ344**	7.05
240	313	16	29.5	4	**HJ248**	4.65
	335	22	39.5	5	**HJ348**	8.2
260	340	18	33	5	**HJ252**	6.2
	362	24	43	6	**HJ352**	11.4
280	360	18	33	5	**HJ256**	7.39
	390	26	46	6	**HJ356**	13.9
300	387	20	34.5	5	**HJ260**	9.14
320	415	21	37	5	**HJ264**	11.3

1) Smallest allowable dimension for chamfer dimension r.

Note: This L type collar ring is used with NU type cylindrical roller bearings; in duplex arrangements with NJ or NU type bearing numbers, they become NH type and NUJ type respectively. Refer to page B-110 through page B-113 for bearing dimensions, allowable speed, and mass.



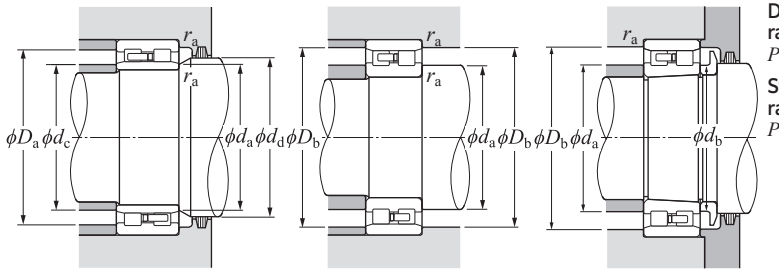
NNU type
Cylindrical bore Tapered bore

NN type
Cylindrical bore Tapered bore

d 25–110 mm

Boundary dimensions mm				Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Allowable speed min^{-1}		Bearing number 2) NNU type	
d	D	B	$r_{s\,min}$ 1)	C_r	C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore
25	47	16	0.6	28.6	30.0	3.65	14 000	17 000	—	—
30	55	19	1	34.0	37.0	4.55	12 000	15 000	—	—
35	62	20	1	42.0	47.5	5.80	11 000	13 000	—	—
40	68	21	1	48.0	55.5	6.75	9 700	11 000	—	—
45	75	23	1	57.5	68.5	8.35	8 800	10 000	—	—
50	80	23	1	59.0	72.5	8.85	8 000	9 400	—	—
55	90	26	1.1	77.0	96.5	11.8	7 300	8 600	—	—
60	95	26	1.1	78.5	102	12.4	6 700	7 900	—	—
65	100	26	1.1	83.0	111	13.6	6 200	7 300	—	—
70	110	30	1.1	105	143	17.4	5 800	6 800	—	—
75	115	30	1.1	107	149	18.2	5 400	6 300	—	—
80	125	34	1.1	128	179	21.6	5 100	5 900	—	—
85	130	34	1.1	135	194	23.1	4 800	5 600	—	—
90	140	37	1.5	158	228	26.6	4 500	5 300	—	—
95	145	37	1.5	162	238	27.4	4 300	5 000	—	—
100	140	40	1.1	145	260	30.0	4 300	5 100	**NNU4920**	**NNU4920K**
	150	37	1.5	170	256	29.2	4 000	4 800	—	—
105	145	40	1.1	147	268	30.5	4 100	4 800	**NNU4921**	**NNU4921K**
	160	41	2	220	320	36.0	3 800	4 500	—	—
110	150	40	1.1	152	284	32.0	3 900	4 600	**NNU4922**	**NNU4922K**
	170	45	2	254	375	41.5	3 600	4 300	—	—

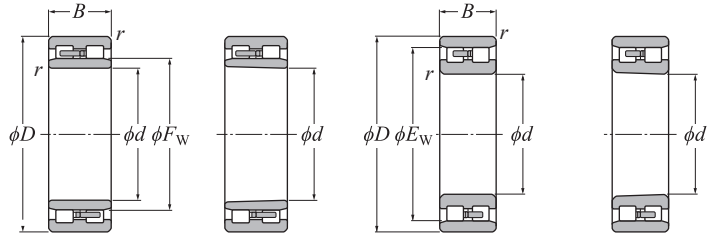
1) Smallest allowable dimension for chamfer dimension r.
2) "**K**" indicates bearings having a tapered bore with a taper ratio of 1:12.



Dynamic equivalent radial load
$P_r = F_r$

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

Bearing number 2) NN type Cylindrical bore	Bearing number 2) NN type Tapered bore	Dimension mm F_w	E_w	Installation-related dimensions mm d_a Min.	d_b Min.	d_c Max.	d_d Min.	D_a Max.	D_b Max.	D_b Min.	r_{as} Max.	Mass (approx.) kg NNU type Cylindrical bore	NNU type Tapered bore	NN type Cylindrical bore	NN type Tapered bore
NN3005	**NN3005K**	—	41.3	29	30	—	—	—	43	42	0.6	—	—	0.124	0.121
NN3006	**NN3006K**	—	48.5	35	36.5	—	—	—	50	49	1	—	—	0.199	0.193
NN3007	**NN3007K**	—	55	40	41.5	—	—	—	57	56	1	—	—	0.242	0.235
NN3008	**NN3008K**	—	61	45	47	—	—	—	63	62	1	—	—	0.312	0.303
NN3009	**NN3009K**	—	67.5	50	52	—	—	—	70	69	1	—	—	0.405	0.393
NN3010	**NN3010K**	—	72.5	55	57	—	—	—	75	74	1	—	—	0.433	0.419
NN3011	**NN3011K**	—	81	61.5	63.5	—	—	—	83.5	82	1	—	—	0.651	0.631
NN3012	**NN3012K**	—	86.1	66.5	68.5	—	—	—	88.5	87	1	—	—	0.704	0.683
NN3013	**NN3013K**	—	91	71.5	73.5	—	—	—	93.5	92	1	—	—	0.758	0.735
NN3014	**NN3014K**	—	100	76.5	79	—	—	—	103.5	101	1	—	—	1.04	1.01
NN3015	**NN3015K**	—	105	81.5	84	—	—	—	108.5	106	1	—	—	1.14	1.11
NN3016	**NN3016K**	—	113	86.5	89.5	—	—	—	118.5	114	1	—	—	1.52	1.47
NN3017	**NN3017K**	—	118	91.5	94.5	—	—	—	123.5	119	1	—	—	1.61	1.56
NN3018	**NN3018K**	—	127	98	101	—	—	—	132	129	1.5	—	—	2.07	2.01
NN3019	**NN3019K**	—	132	103	106	—	—	—	137	134	1.5	—	—	2.17	2.1
NN4920	**NN4920K**	113	129	106.5	110	111	115	133.5	133.5	131	1	1.83	1.75	1.75	1.67
NN3020	**NN3020K**	—	137	108	111	—	—	—	142	139	1.5	—	—	2.26	2.19
NN4921	**NN4921K**	118	134	111.5	115	116	120	138.5	138.5	136	1	1.91	1.82	1.82	1.73
NN3021	**NN3021K**	—	146	114	117	—	—	—	151	148	2	—	—	2.89	2.8
NN4922	**NN4922K**	123	139	116.5	120	121	125	143.5	143.5	141	1	1.99	1.9	1.9	1.81
NN3022	**NN3022K**	—	155	119	123	—	—	—	161	157	2	—	—	3.69	3.56



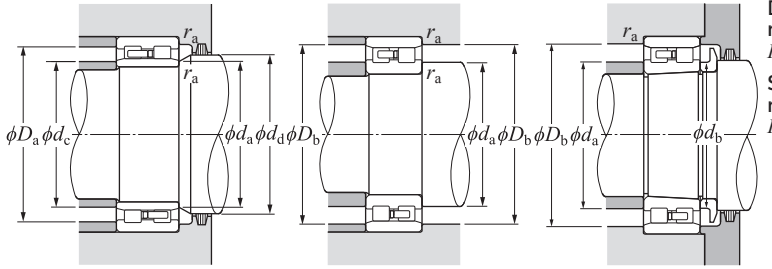
NNU type
Cylindrical bore Tapered bore

NN type
Cylindrical bore Tapered bore

d 120–280 mm

Boundary dimensions mm				Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number 2) NNU type	
d	D	B	$r_{s\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore
120	165	45	1.1	203	360	39.5	3 600	4 200	NNU4924	NNU4924K
	180	46	2	258	390	42.5	3 300	3 900	—	—
130	180	50	1.5	244	440	47.0	3 300	3 900	NNU4926	NNU4926K
	200	52	2	315	475	50.0	3 100	3 600	—	—
140	190	50	1.5	251	470	49.0	3 000	3 600	NNU4928	NNU4928K
	210	53	2	330	515	53.0	2 800	3 300	—	—
150	210	60	2	380	690	70.5	2 800	3 300	NNU4930	NNU4930K
	225	56	2.1	370	585	59.0	2 600	3 100	—	—
160	220	60	2	395	740	74.0	2 600	3 100	NNU4932	NNU4932K
	240	60	2.1	415	660	65.5	2 500	2 900	—	—
170	230	60	2	400	765	75.5	2 500	2 900	NNU4934	NNU4934K
	260	67	2.1	490	775	75.0	2 300	2 700	—	—
180	250	69	2	510	965	93.0	2 300	2 700	NNU4936	NNU4936K
	280	74	2.1	630	995	94.5	2 200	2 600	—	—
190	260	69	2	525	1 030	98.0	2 200	2 600	NNU4938	NNU4938K
	290	75	2.1	640	1 040	97.0	2 000	2 400	—	—
200	280	80	2.1	615	1 180	110	2 100	2 400	NNU4940	NNU4940K
	310	82	2.1	725	1 170	107	1 900	2 300	—	—
220	300	80	2.1	650	1 300	118	1 900	2 200	NNU4944	NNU4944K
	340	90	3	905	1 480	132	1 700	2 100	—	—
240	320	80	2.1	680	1 410	126	1 700	2 000	NNU4948	NNU4948K
	360	92	3	945	1 600	140	1 600	1 900	—	—
260	360	100	2.1	1 000	2 070	179	1 600	1 800	NNU4952	NNU4952K
	400	104	4	1 180	1 990	170	1 500	1 700	—	—
280	380	100	2.1	1 030	2 200	187	1 400	1 700	NNU4956	NNU4956K
	420	106	4	1 200	2 080	174	1 300	1 600	—	—

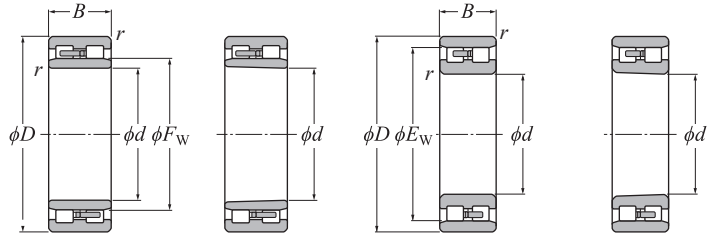
1) Smallest allowable dimension for chamfer dimension r.
2) "K" indicates bearings having a tapered bore with a taper ratio of 1:12.



Dynamic equivalent radial load
$P_r = F_r$

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

Bearing number 2) NN type Cylindrical bore	Bearing number 2) NN type Tapered bore	Dimension mm F_w	E_w	Installation-related dimensions mm d_a Min.	d_b Min.	d_c Max.	d_d Min.	D_a Max.	D_b Max.	D_b Min.	r_{as} Max.	Mass (approx.) kg NNU type Cylindrical bore	NNU type Tapered bore	NN type Cylindrical bore	NN type Tapered bore
NN4924	NN4924K	134.5	154.5	126.5	130	133	137	158.5	158.5	156.5	1	2.75	2.63	2.63	2.51
NN3024	NN3024K	—	165	129	133	—	—	—	171	167	2	—	—	3.98	3.83
NN4926	NN4926K	146	168	138	142	144	148	172	172	170	1.5	3.69	3.52	3.52	3.35
NN3026	NN3026K	—	182	139	143	—	—	—	191	183	2	—	—	5.92	5.71
NN4928	NN4928K	156	178	148	152	154	158	182	182	180	1.5	3.94	3.76	3.76	3.58
NN3028	NN3028K	—	192	149	153	—	—	—	201	194	2	—	—	6.44	6.21
NN4930	NN4930K	168.5	196.5	159	164	166	171	201	201	198.5	2	6.18	5.9	5.9	5.62
NN3030	NN3030K	—	206	161	166	—	—	—	214	208	2	—	—	7.81	7.53
NN4932	NN4932K	178.5	206.5	169	174	176	182	211	211	208.5	2	6.53	6.23	6.24	5.94
NN3032	NN3032K	—	219	171	176	—	—	—	229	221	2	—	—	8.92	8.59
NN4934	NN4934K	188.5	216.5	179	184	186	192	221	221	218.5	2	6.87	6.55	6.56	6.24
NN3034	NN3034K	—	236	181	187	—	—	—	249	238	2	—	—	12.6	12.2
NN4936	NN4936K	202	234	189	195	199	205	241	241	236	2	9.9	9.46	9.45	9.01
NN3036	NN3036K	—	255	191	197	—	—	—	269	257	2	—	—	16.6	16
NN4938	NN4938K	212	244	199	205	209	215	251	251	246	2	10.4	9.94	9.93	9.47
NN3038	NN3038K	—	265	201	207	—	—	—	279	267	2	—	—	18	17.4
NN4940	NN4940K	225	261	211	218	222	228	269	269	264	2	14.7	14	14	13.3
NN3040	NN3040K	—	282	211	218	—	—	—	299	285	2	—	—	21.6	20.8
NN4944	NN4944K	245	281	231	238	242	248	289	289	284	2	15.9	15.2	15.2	14.5
NN3044	NN3044K	—	310	233	240	—	—	—	327	313	2.5	—	—	29.3	28.2
NN4948	NN4948K	265	301	251	258	262	269	309	309	304	2	17.2	16.4	16.4	15.6
NN3048	NN3048K	—	330	253	261	—	—	—	347	333	2.5	—	—	32.8	31.6
NN4952	NN4952K	292	336	271	279	288	296	349	349	339	2	29.6	28.3	28.3	27
NN3052	NN3052K	—	364	276	285	—	—	—	384	367	3	—	—	47.4	45.8
NN4956	NN4956K	312	356	291	299	308	316	369	369	359	2	31.6	30.2	30.2	28.8
NN3056	NN3056K	—	384	296	305	—	—	—	404	387	3	—	—	51.1	49.3



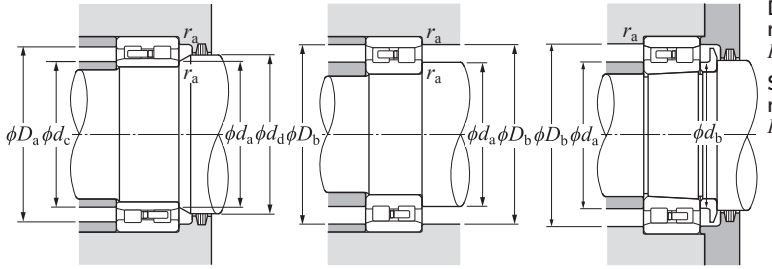
NNU type
Cylindrical bore Tapered bore

NN type
Cylindrical bore Tapered bore

d 300–500 mm

Boundary dimensions mm				Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed min^{-1}		Bearing number [2] NNU type	
d	*D*	*B*	$r_{s\,min}$ [1]	C_r	C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore
300	420	118	3	1 330	2 800	231	1 300	1 500	**NNU4960**	**NNU4960K**
	460	118	4	1 470	2 560	209	1 200	1 500	—	—
320	440	118	3	1 370	2 970	242	1 200	1 400	**NNU4964**	**NNU4964K**
	480	121	4	1 500	2 670	214	1 100	1 300	—	—
340	460	118	3	1 410	3 150	252	1 100	1 300	**NNU4968**	**NNU4968K**
	520	133	5	1 800	3 200	251	1 100	1 300	—	—
360	480	118	3	1 430	3 250	255	1 100	1 300	**NNU4972**	**NNU4972K**
	540	134	5	1 830	3 300	258	1 000	1 200	—	—
380	520	140	4	1 810	4 050	315	1 000	1 200	**NNU4976**	**NNU4976K**
	560	135	5	1 870	3 450	265	940	1 100	—	—
400	540	140	4	1 870	4 300	325	940	1 100	**NNU4980**	**NNU4980K**
	600	148	5	2 260	4 150	310	880	1 000	—	—
420	560	140	4	1 930	4 500	340	900	1 100	**NNU4984**	**NNU4984K**
	620	150	5	2 300	4 300	320	840	990	—	—
440	600	160	4	2 380	5 550	410	850	1 000	**NNU4988**	**NNU4988K**
	650	157	6	2 680	5 100	370	800	940	—	—
460	620	160	4	2 460	5 850	430	800	950	**NNU4992**	**NNU4992K**
	680	163	6	2 830	5 350	385	750	890	—	—
480	650	170	5	2 530	5 900	425	770	910	**NNU4996**	**NNU4996K**
500	670	170	5	2 670	6 400	455	730	860	**NNU49/500**	**NNU49/500K**

1) Smallest allowable dimension for chamfer dimension *r*.
2) "**K**" indicates bearings having a tapered bore with a taper ratio of 1:12.



Dynamic equivalent radial load
$P_r = F_r$

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

Bearing number [2] NN type Cylindrical bore	Bearing number [2] NN type Tapered bore	Dimension mm F_w	E_w	Installation-related dimensions mm d_a Min.	d_b Min.	d_c Max.	d_d Min.	D_a Max.	D_b Max.	D_b Min.	r_{as} Max.	Mass (approx.) kg NNU type Cylindrical bore	NNU type Tapered bore	NN type Cylindrical bore	NN type Tapered bore
NN4960	**NN4960K**	339	391	313	323	335	343	407	407	394	2.5	48.6	46.4	46.4	44.2
NN3060	**NN3060K**	—	418	316	326	—	—	—	444	421	3	—	—	70.8	68.6
NN4964	**NN4964K**	359	411	333	343	355	363	427	427	414	2.5	51.4	49.1	49	46.7
NN3064	**NN3064K**	—	438	336	346	—	—	—	464	441	3	—	—	76.2	73.5
—	—	379	—	353	363	375	383	447	—	—	2.5	54.2	51.7	—	—
NN3068	**NN3068K**	—	473	360	371	—	—	—	500	477	4	—	—	102	98.5
—	—	398	—	373	383	394	402	467	—	—	2.5	57	54.4	—	—
NN3072	**NN3072K**	—	493	380	391	—	—	—	520	497	4	—	—	107	103
—	—	425	—	396	408	420	430	504	—	—	3	84.5	80.6	—	—
NN3076	**NN3076K**	—	512	400	411	—	—	—	540	516	4	—	—	113	109
—	—	445	—	416	428	440	450	524	—	—	3	88.2	84.1	—	—
NN3080	**NN3080K**	—	547	420	432	—	—	—	580	551	4	—	—	146	141
—	—	465	—	436	448	460	470	544	—	—	3	92	87.7	—	—
NN3084	**NN3084K**	—	567	440	452	—	—	—	600	571	4	—	—	154	148
—	—	492	—	456	469	487	497	584	—	—	3	127	121	—	—
NN3088	**NN3088K**	—	596	464	477	—	—	—	626	601	5	—	—	178	172
—	—	512	—	476	489	507	517	604	—	—	3	132	126	—	—
NN3092	**NN3092K**	—	622	484	498	—	—	—	656	627	5	—	—	202	195
—	—	534	—	500	514	531	541	630	—	—	4	156	149	—	—
—	—	556	—	520	534	551	561	650	—	—	4	162	155	—	—

Tapered Roller Bearings





Single row tapered roller bearing



Double row tapered roller bearing

1. Types, design features, and characteristics

Tapered roller bearings are designed so the tapered vertex of the raceway surfaces of the inner and outer rings and rollers converge at one point on the centerline of the bearing (see **Fig. 1**).

The tapered rollers are guided by the combined force of the inner and outer raceway surfaces which keep the rollers pressed up against the large rib on the inner ring.

A large variety of these bearings, including single, double, and four row arrangements, are available in both metric and inch series. Each type and associated characteristics are shown in **Table 1**. For four-row tapered roller bearings, see section "C. Special Application Bearings".

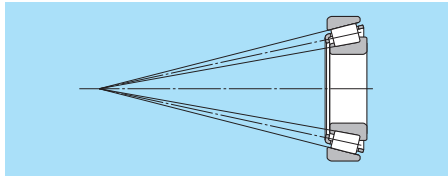
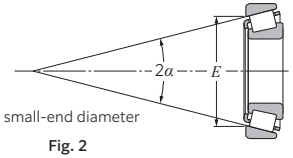


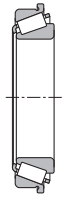
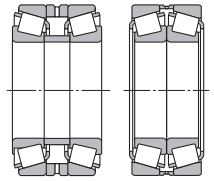
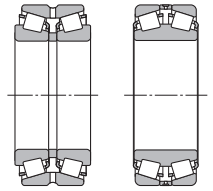
Fig. 1

Table 1 Tapered roller bearing types and characteristics

<table>
<tr><th>Type</th><th>Characteristics</th></tr>
<tr><td>Single row tapered roller bearings</td><td>
(1) There are both metric and inch series adhering to the standards shown in the following table.
Dimension series
<table>
<tr><th></th><th>Metric series</th><th>Inch series</th></tr>
<tr><td>Standard</td><td>● JIS B 1534
● JIS B 1512-3
● ISO 355</td><td>● ABMA
(includes metric J-series)</td></tr>
<tr><td>Basic number</td><td>Example, 30210
＊T2EE040</td><td>Inner ring no. / outer ring no.
("J" appears at the beginning of the basic number in the case of J-series.)</td></tr>
</table>
＊Dimension series previously not covered by 3XX are regulated under JIS B 1512-3; dimensions previously missing from 3XX will henceforth use the bearing number.
(2) In addition to the standard design, there are also medium contact angle and large contact angle types, denoted by the contact angle codes at the end of the part numbers (C and D, respectively).
(3) Subunits
Tapered roller bearings can be disassembled into parts: the inner ring, rollers, and cage (collectively known as the "CONE") and the outer ring (known as the "CUP"). These are the bearing's "subunits". Subunit dimensions are standardized under ISO or ABMA standards, and unified subunits are interchangeable within each dimensional standard. However, high precision grade bearings are generally not interchangeable, and these subunits must be used by assembling only subunits with identical manufacturing numbers.
Aside from any cautionary notes that may appear, the single row tapered roller bearings listed in the dimension tables have subunits standardized for both metric and inch systems (including J series) (see Fig. 2).
Subunit dimensions


E : Outer ring (cup) nominal small-end diameter
α : Nominal contact angle
Fig. 2
Continued to the next page
</td></tr>
</table>

Table 1 (continued)

Type	Characteristics	
Single row tapered roller bearings	(4) These bearings are constructed to have a high capacity for radial loads, axial loads, and combined loads. The larger the contact angle, the greater the axial load capacity. When a pure radial load is applied to a tapered roller bearing, an induced load in the axial direction is also generated, so these bearings are generally used in pairs. (5) Single row tapered roller bearings are separable, so both the inner and outer rings can be used with tight fits. (6) Tapered roller bearings are also manufactured with flanges attached to the outer rings. For more details, contact **NTN** Engineering (see **Fig. 3**).	 Fig. 3
Duplex tapered roller bearings	(1) When two single-row tapered roller bearings are to be used in combination, the bearing clearance and preload are adjusted by the inner ring spacer or the outer ring spacer (see **Fig. 4**). (2) A product number and a combination code are indicated on inner rings, outer rings, and spacers. Parts displaying the same number and code must be used in combination. (3) For the axial internal clearance, refer to **Table 8.14** in "8. Bearing internal clearance and preload" (A-96).	 Back-to-back (DB) Face-to-face (DF) Fig. 4
Double row tapered roller bearings	(1) Back-to-back arrangement (using double row outer rings) and face-to-face arrangement (using double row inner rings) are both available. The assemblies have been adjusted so that each type's internal clearance values are fixed. Only parts with identical manufacturing numbers can be used and they must be assembled according to their code numbers (see **Fig. 5**). (2) For the axial internal clearance, refer to **Table 8.14** in "8. Bearing internal clearance and preload" (A-96).	 Back-to-back Face-to-face Fig. 5

2. Standard cage type

In general, pressed cages (see **Fig. 6**) are used in tapered roller bearings. For large sized bearings, machined or pin type cages may also be used, while resin cages may also be used for smaller sized bearings.

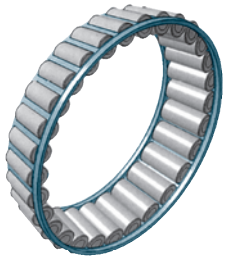


Fig. 6 Pressed cage

3. Allowable misalignment

In order to avoid edge loading and potential for premature failure, the maximum allowable misalignment based on bearing series can be found below.

The allowable misalignment of combined bearings is influenced by the load center position, so please consult **NTN** Engineering.

- Single row (standard) ····· 1/ 2 000
- Single row (ULTAGE™ series) ···· 1/ 600

4. Precautions

If bearing load is light during operation, or if the ratio of axial to radial load for duplex and double row bearings exceeds the value of e, slipping may develop between the rollers and raceway surface, sometimes resulting in smearing. The mass of rollers and cages particularly tends to be large for large tapered roller bearings. For additional details, please contact **NTN** Engineering.

In tapered roller bearings, the cage may protrude beyond the inner and/or outer ring side faces. Care should be taken when designing the housing and shaft to ensure contact with the cage does not occur.

5. Tapered roller bearings ULTAGE™ series

ULTAGE™ series tapered roller bearings are the products developed to meet the demands of "long operating life", "improved load capacity", and "higher speed" required for various types of industrial machinery.

For details, see the special catalog "**ULTAGE™ series Large Size Tapered Roller Bearings [Metric](CAT. No. 3035/E)**".

Inch Series Tapered Roller Bearings (Single Row) Index

Series number	Bearing number CONE / CUP	Page of bearing dimension table
335	336 / 332	B-167
335	339 / 332	B-163
335	344 / 332	B-165
355	350A / 354A	B-165
355	355 / 354A	B-167
355	358 / 354A	B-169
355	359A / 354A	B-169
355	359S / 352	B-169
365	365 / 362A	B-171
365	366 / 362A	B-171
365	367 / 362A	B-169
365	368 / 362A	B-171
365	368A / 362	B-171
365	368S / 362A	B-173
365	369A / 362A	B-169
365	370A / 362A	B-171
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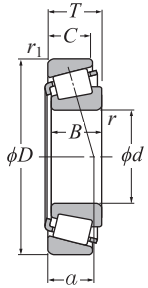
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HM804800	M804846 / M804810	B-169
HM804800	M804848 / M804810	B-171
HM804800	M804849 / M804810	B-171
LM806600	LM806649 / LM806610	B-173
HM807000	HM807040 / HM807010	B-169
HM807000	HM807044 / HM807010	B-171
HM807000	HM807046 / HM807010	B-173
HM807000	HM807048 / HM807010	B-173
HM807000	HM807049 / HM807010	B-173
HM807000	JHM807045 / JHM807012	B-171
L812100	L812148 / L812111	B-179
LM813000	JLM813049 / JLM813010	B-179
HM813800	HM813840 / HM813810	B-175
HM813800	HM813841 / HM813810	B-177
HM813800	HM813842 / HM813810	B-177
HM813800	HM813844 / HM813810	B-179
L814700	L814749 / L814710	B-181
LM814800	LM814849 / LM814810	B-183
M822000	JM822049 / JM822010	B-189
HM903200	HM903245 / HM903210	B-167
HM903200	HM903249 / HM903210	B-167
M903300	M903345 / M903310	B-167
HM907600	HM907643 / HM907614	B-173
HM911200	HM911242 / HM911210	B-173
HM911200	HM911245 / HM911210	B-177
HM911200	HM911244 / JHM911211	B-177
H913800	H913840 / H913810	B-175
H913800	H913842 / H913810	B-177
H913800	JH913848 / JH913811	B-181
H917800	H917840 / H917810	B-183
H924000	H924045 / H924010	B-189
HM926700	HM926740 / HM926710	B-189
HM926700	HM926747 / HM926710	B-189

Tapered Roller Bearings NTN

Inch Series Tapered Roller Bearings (Single Row) Index

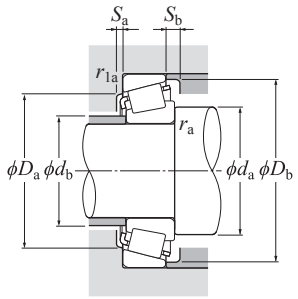
Metric series



d 15–30 mm

Boundary dimensions mm							Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number 2)
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	
15	42	14.25	13	11	1	1	25.8	20.8	—	9 900	13 000	4T-30302
17	40	13.25	12	11	1	1	22.7	20.3	—	9 900	13 000	4T-30203
	40	17.25	16	14	1	1	30.5	28.3	—	9 900	13 000	4T-32203
	40	17.25	16	14	1	1	29.1	28.2	—	9 900	13 000	○4T-32203R
	47	15.25	14	12	1	1	32.0	26.3	—	9 000	12 000	4T-30303
20	42	15	15	12	0.6	0.6	27.6	27.9	—	9 500	13 000	4T-32004X
	47	15.25	14	12	1	1	31.0	28.7	—	8 800	12 000	4T-30204
	47	19.25	18	15	1	1	40.5	39.5	—	8 800	12 000	4T-32204
	52	16.25	16	13	1.5	1.5	39.0	34.0	—	8 000	11 000	4T-30304A
	52	16.25	16	12	1.5	1.5	34.5	31.0	—	7 600	10 000	4T-30304CA
	52	22.25	21	18	1.5	1.5	51.5	48.5	—	8 000	11 000	4T-32304
22	44	15	15	11.5	0.6	0.6	30.0	31.5	—	8 900	12 000	4T-320/22X
25	47	15	15	11.5	0.6	0.6	31.0	33.5	—	7 900	11 000	4T-32005X
	47	17	17	14	0.6	0.6	36.0	40.5	—	8 000	11 000	4T-33005
	52	16.25	15	13	1	1	35.0	34.0	—	7 300	9 800	4T-30205
	52	19.25	18	16	1	1	46.5	47.0	—	7 300	9 800	4T-32205
	52	19.25	18	15	1	1	42.0	43.0	—	7 300	9 800	○4T-32205R
	52	19.25	18	15	1	1	42.5	46.5	—	7 100	9 400	4T-32205C
	52	19.25	18	15	1	1	38.0	42.0	—	7 100	9 400	○4T-32205CR
	52	22	22	18	1	1	52.5	57.5	—	7 300	9 800	4T-33205
	62	18.25	17	15	1.5	1.5	54.0	47.5	—	6 700	8 900	4T-30305
	62	18.25	17	14	1.5	1.5	46.0	41.5	—	6 400	8 500	4T-30305C
	62	18.25	17	13	1.5	1.5	45.0	43.5	—	5 900	7 800	4T-30305D
	62	25.25	24	20	1.5	1.5	68.0	64.5	—	6 700	8 900	4T-32305
28	52	16	16	12	1	1	37.0	40.5	—	7 300	9 700	4T-320/28X
	58	24	24	19	1	1	64.5	69.5	—	6 700	8 900	4T-332/28
30	55	17	17	13	1	1	41.5	46.0	—	6 900	9 200	4T-32006X
	55	20	20	16	1	1	47.0	54.0	—	6 900	9 200	4T-33006
	62	17.25	16	14	1	1	48.5	48.0	—	6 300	8 400	4T-30206
	62	21.25	20	17	1	1	60.5	64.0	—	6 300	8 400	4T-32206
	62	21.25	20	17	1	1	55.5	60.0	—	6 100	8 100	4T-32206C
	62	25	25	19.5	1	1	72.0	77.0	—	6 300	8 400	4T-33206
	72	20.75	19	16	1.5	1.5	66.5	61.0	—	5 700	7 600	4T-30306

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) Bearings with a ○ mark do not incorporate the subunit dimensions.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

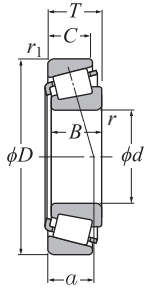
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
2FB	20.5	22	36.5	34.5	38	2	3	1	1	9.5	0.29	2.11	1.16	0.096
2DB	22.5	23	34.5	32.5	37.5	2	2	1	1	9.5	0.35	1.74	0.96	0.08
2DD	22.5	22.5	34.5	32	37.5	2	3	1	1	11.5	0.31	1.92	1.06	0.102
	22.5	22	34.5	31	37.5	2	3	1	1	11	0.35	1.74	0.96	0.105
2FB	22.5	24.5	41.5	38.5	42.5	3	3.5	1	1	10.5	0.29	2.11	1.16	0.132
3CC	24.5	25	37.5	33.5	39.5	3	3	0.6	0.6	10.5	0.37	1.6	0.88	0.097
2DB	25.5	27	41.5	38.5	44	2	3	1	1	11.5	0.35	1.74	0.96	0.124
2DD	25.5	26	41.5	37	43	2	4	1	1	12.5	0.33	1.81	1.00	0.161
2FB	28.5	28	43.5	42.5	47.5	3	3	1.5	1.5	10.5	0.30	2.00	1.10	0.172
	28.5	27.5	43.5	39.5	48	3	4	1.5	1.5	13.5	0.55	1.10	0.60	0.17
2FD	28.5	27	43.5	41	47.5	3	4	1.5	1.5	14	0.30	2.00	1.10	0.242
3CC	26.5	27	39.5	35.5	41.5	3	3.5	0.6	0.6	11	0.40	1.51	0.83	0.105
4CC	29.5	29.5	42.5	38.5	44.5	3	3.5	0.6	0.6	12	0.43	1.39	0.77	0.113
2CE	29.5	30	42.5	39	44.5	3	3	0.6	0.6	11	0.29	2.07	1.14	0.13
3CC	30.5	31	46.5	42	48.5	2	3	1	1	12.5	0.37	1.60	0.88	0.155
2CD	30.5	31	46.5	42.5	49.5	2	4	1	1	14	0.36	1.67	0.92	0.187
	30.5	30.5	46.5	41.5	49	2	4	1	1	13.5	0.37	1.60	0.88	0.185
5CD	30.5	30	46.5	38.5	50	2	4	1	1	16	0.58	1.03	0.57	0.192
	30.5	30.5	46.5	39.5	49.5	2	4	1	1	16	0.55	1.10	0.60	0.189
2DE	30.5	30.5	46.5	41	49.5	4	4	1	1	14	0.35	1.71	0.94	0.219
2FB	33.5	34	53.5	52	57.5	3	3	1.5	1.5	13	0.30	2.00	1.10	0.268
	33.5	34	53.5	48	58	3	4	1.5	1.5	16	0.55	1.10	0.60	0.264
7FB	33.5	33.5	53.5	45	59	3	5	1.5	1.5	20	0.83	0.73	0.40	0.266
2FD	33.5	33	53.5	50	57.5	3	5	1.5	1.5	16	0.30	2.00	1.10	0.377
4CC	33.5	33	46.5	43	49.5	3	4	1	1	12.5	0.43	1.39	0.77	0.146
2DE	33.5	33.5	52.5	47	55	5	5	1	1	15.5	0.34	1.77	0.97	0.293
4CC	35.5	35.5	49.5	45.5	52.5	3	4	1	1	13.5	0.43	1.39	0.77	0.172
2CE	35.5	35.5	49.5	46.5	52	3	4	1	1	13	0.29	2.06	1.13	0.201
3DB	35.5	37.5	56.5	51	58	2	3	1	1	13.5	0.37	1.60	0.88	0.236
3DC	35.5	36.5	56.5	50	58	2.5	4	1	1	15.5	0.37	1.60	0.88	0.299
5DC	35.5	36	56.5	48	59.5	2	5	1	1	18.5	0.56	1.07	0.59	0.297
2DE	35.5	36	56.5	50.5	59	5	5.5	1	1	16	0.34	1.76	0.97	0.348
2FB	38.5	40	63.5	60	65.5	3	4.5	1.5	1.5	15	0.31	1.90	1.05	0.404

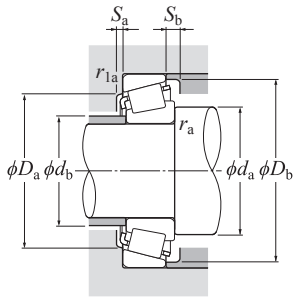
Metric series



d 30–45 mm

Boundary dimensions mm							Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number 2)
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	
	72	20.75	19	15	1.5	1.5	65.0	58.5	—	5 500	7 300	4T-30306CA
	72	20.75	19	14	1.5	1.5	53.5	51.5	—	5 000	6 700	4T-30306D
30	72	28.75	27	23	1.5	1.5	89.5	90.0	—	5 700	7 600	4T-32306
	72	28.75	27	23	1.5	1.5	88.0	94.0	—	5 500	7 300	4T-32306C
	72	28.75	27	23	1.5	1.5	77.5	88.5	—	5 500	7 300	○4T-32306CR
	58	17	17	13	1	1	41.0	46.5	—	6 600	8 700	4T-320/32X
32	65	26	26	20.5	1	1	78.5	85.0	—	6 000	8 000	4T-332/32
	75	29.75	28	23	1.5	1.5	93.5	102	—	5 200	6 900	4T-323/32C
	55	14	14	11.5	0.6	0.6	30.5	37.5	4.60	6 800	9 000	32907XU
	62	18	18	14	1	1	46.0	52.5	—	6 100	8 100	4T-32007X
	62	21	21	17	1	1	56.0	66.5	—	6 100	8 100	4T-33007
	72	18.25	17	15	1.5	1.5	61.5	61.5	—	5 500	7 400	4T-30207
	72	24.25	23	19	1.5	1.5	80.5	87.0	—	5 500	7 400	4T-32207
	72	24.25	23	19	1.5	1.5	75.5	85.5	—	5 300	7 100	4T-32207C
35	72	24.25	23	18	1.5	1.5	68.5	78.5	—	5 300	7 100	○4T-32207CR
	72	28	28	22	1.5	1.5	97.0	109	—	5 500	7 400	4T-33207
	80	22.75	21	18	2	1.5	83.0	77.0	—	5 000	6 600	4T-30307
	80	22.75	21	17	2	1.5	73.5	68.5	—	4 800	6 400	4T-30307C
	80	22.75	21	15	2	1.5	70.5	70.0	—	4 400	5 800	4T-30307D
	80	32.75	31	25	2	1.5	112	115	—	5 000	6 600	4T-32307
	80	32.75	31	25	2	1.5	103	117	—	4 800	6 400	4T-32307C
	62	15	15	12	0.6	0.6	36.0	48.0	5.85	5 900	7 800	32908XU
	68	19	19	14.5	1	1	55.5	65.5	—	5 300	7 100	4T-32008X
	68	22	22	18	1	1	66.0	82.5	—	5 300	7 100	4T-33008
	75	26	26	20.5	1.5	1.5	88.0	103	—	5 200	6 900	4T-33108
	80	19.75	18	16	1.5	1.5	68.0	67.0	—	4 900	6 600	4T-30208
	80	24.75	23	19	1.5	1.5	88.0	93.5	—	4 900	6 600	4T-32208
40	80	32	32	25	1.5	1.5	115	132	—	4 900	6 600	4T-33208
	85	33	32.5	28	2.5	2	131	144	—	4 600	6 200	4T-T2EE040
	90	25.25	23	20	2	1.5	101	102	—	4 400	5 900	4T-30308
	90	25.25	23	19	2	1.5	92.0	87.0	—	4 200	5 600	4T-30308C
	90	25.25	23	17	2	1.5	85.5	85.5	—	3 900	5 200	4T-30308D
	90	35.25	33	27	2	1.5	136	150	18.3	4 400	5 900	32308U
	90	35.25	33	27	2	1.5	122	140	—	4 200	5 600	4T-32308C
45	68	15	15	12	0.6	0.6	37.5	51.5	6.3	5 300	7 000	32909XU

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) Bearings with a ○ mark do not incorporate the subunit dimensions.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

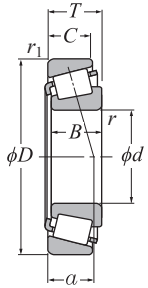
Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

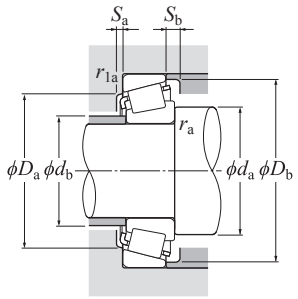
ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
	38.5	39.5	63.5	58	67	3	5.5	1.5	1.5	17.5	0.47	1.27	0.70	0.399
7FB	38.5	39.5	63.5	53.5	68	3	6.5	1.5	1.5	23.5	0.83	0.73	0.40	0.394
2FD	38.5	39	63.5	57.5	66.5	3	5.5	1.5	1.5	18.5	0.31	1.90	1.05	0.577
5FD	38.5	38	63.5	52	69	2	5.5	1.5	1.5	23	0.55	1.10	0.60	0.591
	38.5	38	63.5	49.5	67.5	2	5.5	1.5	1.5	23	0.61	0.99	0.54	0.594
4CC	37.5	37.5	52.5	47.5	55.5	3	4	1	1	14.5	0.45	1.32	0.73	0.188
2DE	37.5	38	59.5	53	62	5	5.5	1	1	17	0.35	1.73	0.95	0.394
5FD	40.5	40	66.5	55	71.5	3	6.5	1.5	1.5	23	0.55	1.10	0.60	0.652
2BD	39.5	40	50.5	48	52.5	2.5	2.5	0.6	0.6	10.5	0.29	2.06	1.13	0.121
4CC	40.5	40.5	56.5	51.5	59.5	4	4	1	1	15.5	0.45	1.32	0.73	0.223
2CE	40.5	40.5	56.5	52	59	3	4	1	1	14	0.31	1.97	1.08	0.263
3DB	43.5	43.5	63.5	60.5	67.5	3	3	1.5	1.5	15	0.37	1.60	0.88	0.341
3DC	43.5	42.5	63.5	58.5	67.5	3	5	1.5	1.5	17.5	0.37	1.60	0.88	0.455
5DC	43.5	41.5	63.5	54.5	68.5	3	6	1.5	1.5	21.5	0.58	1.03	0.57	0.461
	43.5	42.5	63.5	55.5	68	3	6	1.5	1.5	20.5	0.55	1.10	0.60	0.462
2DE	43.5	42	63.5	58	68.5	5	6	1.5	1.5	18.5	0.35	1.70	0.93	0.539
2FB	45	45.5	71.5	67.5	75	3	4.5	2	1.5	17	0.31	1.90	1.05	0.535
	45	44	71.5	63.5	75.5	3	5.5	2	1.5	20.5	0.55	1.10	0.60	0.517
7FB	45	44.5	71.5	60.5	77	3	7.5	2	1.5	26	0.83	0.73	0.40	0.527
2FE	45	43.5	71.5	65	75	3	7.5	2	1.5	20.5	0.31	1.90	1.05	0.782
5FE	45	43.5	71.5	59	76	3	7.5	2	1.5	25	0.55	1.10	0.60	0.804
2BC	44.5	45.5	57.5	54	58.5	3	3	0.6	0.6	11.5	0.29	2.07	1.14	0.161
3CD	45.5	45.5	62.5	58	65	4	4.5	1	1	15	0.38	1.58	0.87	0.272
2BE	45.5	46	62.5	58.5	65	2.5	4	1	1	15	0.28	2.12	1.17	0.32
2CE	48.5	47	66.5	62.5	71.5	4	5.5	1.5	1.5	18	0.36	1.69	0.93	0.498
3DB	48.5	48.5	71.5	67.5	74.5	3	3.5	1.5	1.5	16.5	0.37	1.60	0.88	0.431
3DC	48.5	48.5	71.5	66.5	75	3	5.5	1.5	1.5	19	0.37	1.60	0.88	0.547
2DE	48.5	47	71.5	64.5	76.5	5	7	1.5	1.5	21	0.36	1.68	0.92	0.738
2EE	52	47.5	75	68	81	5	5	2	2	22.5	0.34	1.74	0.96	0.905
2FB	50	52.5	81.5	74.5	83.5	3	5	2	1.5	19.5	0.35	1.74	0.96	0.765
	50	50	81.5	72	85.5	3.5	6	2	1.5	23	0.55	1.10	0.60	0.726
7FB	50	51	81.5	68.5	86	3	8	2	1.5	29.5	0.83	0.73	0.40	0.727
2FD	50	49.5	81.5	71	83.5	3	8	2	1.5	23	0.35	1.74	0.96	1.08
5FD	50	49	81.5	65.5	84.5	3	8	2	1.5	27.5	0.55	1.10	0.60	1.1
2BC	49.5	51	63.5	59.5	64.5	3	3	0.6	0.6	12	0.32	1.88	1.04	0.187



d 45–55 mm

d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	Basic load rating dynamic C_r kN	Basic load rating static C_{0r} kN	Fatigue load limit C_u kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number 2)
45	75	20	20	15.5	1	1	64.0	76.5	—	4 800	6 400	4T-32009X
	75	24	24	19	1	1	73.5	93.5	—	4 800	6 400	4T-33009
	80	26	26	20.5	1.5	1.5	94.0	115	—	4 700	6 200	4T-33109
	85	20.75	19	16	1.5	1.5	75.0	78.5	—	4 400	5 900	4T-30209
	85	24.75	23	19	1.5	1.5	91.0	100	—	4 400	5 900	4T-32209
	85	32	32	25	1.5	1.5	119	141	—	4 400	5 900	4T-33209
	95	29	26.5	20	2.5	2.5	99.5	108	—	4 100	5 500	4T-T7FC045
	100	27.25	25	22	2	1.5	123	126	—	4 000	5 300	4T-30309
	100	27.25	25	18	2	1.5	106	109	—	3 500	4 600	4T-30309D
	100	38.25	36	30	2	1.5	170	191	23.3	4 000	5 300	32309U
	100	38.25	36	30	2.5	0.6	145	175	21.4	3 800	5 100	32309CU
50	72	15	15	12	0.6	0.6	39.5	57.0	6.95	4 700	6 300	32910XU
	72	15	14	12	0.6	0.6	35.0	50.5	6.15	4 700	6 300	○32910
	80	20	20	15.5	1	1	69.5	88.0	—	4 400	5 800	4T-32010X
	80	24	24	19	1	1	77.5	103	—	4 400	5 800	4T-33010
	85	26	26	20	1.5	1.5	96.0	121	—	4 200	5 600	4T-33110
	90	21.75	20	17	1.5	1.5	85.5	93.0	—	4 000	5 300	4T-30210
	90	24.75	23	19	1.5	1.5	97.0	109	—	4 000	5 300	4T-32210
	90	32	32	24.5	1.5	1.5	127	158	—	4 000	5 300	4T-33210
	100	36	35	30	2.5	2.5	167	190	—	3 800	5 100	4T-T2ED050
	105	32	29	22	3	3	119	132	—	3 400	4 500	4T-T7FC050
	110	29.25	27	23	2.5	2	147	152	—	3 600	4 800	4T-30310
	110	29.25	27	19	2.5	2	126	130	—	3 200	4 200	4T-30310D
	110	42.25	40	33	2.5	2	204	232	28.3	3 600	4 800	32310U
	110	42.25	40	33	2.5	2.5	178	220	—	3 500	4 600	4T-32310C
55	80	17	17	14	1	1	49.5	73.5	8.95	4 300	5 700	32911XU
	90	23	23	17.5	1.5	1.5	89.0	118	—	4 000	5 400	4T-32011X
	90	27	27	21	1.5	1.5	102	138	—	4 000	5 400	4T-33011
	95	30	30	23	1.5	1.5	123	155	—	3 900	5 200	4T-33111
	100	22.75	21	18	2	1.5	103	111	—	3 600	4 900	4T-30211
	100	26.75	25	21	2	1.5	120	134	—	3 600	4 900	4T-32211
	100	35	35	27	2	1.5	153	188	—	3 600	4 900	4T-33211
	115	34	31	23.5	3	3	137	156	—	3 300	4 400	4T-T7FC055
	120	31.5	29	25	2.5	2	172	179	—	3 300	4 400	4T-30311
	120	31.5	29	21	2.5	2	146	154	—	2 900	3 800	4T-30311D
	120	45.5	43	35	2.5	2	238	275	33.5	3 300	4 400	32311U
	120	45.5	43	35	2.5	2.5	204	252	30.5	3 100	4 200	32311CU

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) Bearings with a ○ mark do not incorporate the subunit dimensions.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

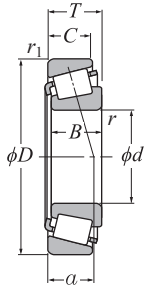
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	Load center mm a	Constant e	Axial load factors Y_2	Y_0	Mass kg (approx.)
3CC	50.5	51	69.5	64	72.5	4	4.5	1	1	16.5	0.39	1.53	0.84	0.341
2CE	50.5	51.5	69.5	64	71.5	4	5	1	1	16	0.29	2.04	1.12	0.405
3CE	53.5	51.5	71.5	67.5	76.5	4	5.5	1.5	1.5	19.5	0.38	1.57	0.86	0.544
3DB	53.5	53.5	76.5	72	80	3	4.5	1.5	1.5	18	0.40	1.48	0.81	0.493
3DC	53.5	53.5	76.5	71	81	3	5.5	1.5	1.5	20	0.40	1.48	0.81	0.604
3DE	53.5	52	76.5	69	82	5	7	1.5	1.5	22	0.39	1.56	0.86	0.795
7FC	57	53	83	69	91	3	9	2	2	33	0.87	0.69	0.38	0.907
2FB	55	58.5	91.5	84	93.5	3	5	2	1.5	21	0.35	1.74	0.96	1.01
7FB	55	56.5	91.5	76	96.5	3	9	2	1.5	32.5	0.83	0.73	0.40	0.966
2FD	55	56.5	91.5	80.5	93.5	3	8	2	1.5	25.5	0.35	1.74	0.96	1.45
5FD	55	55.5	91.5	73.5	95	4	9	2.5	0.6	30	0.55	1.10	0.60	1.47
2BC	54.5	55	67.5	63.5	69	3	3	0.6	0.6	13.5	0.34	1.76	0.97	0.192
	54.5	56.5	67.5	63.5	69.5	3	3	0.6	0.6	14.5	0.36	1.67	0.92	0.193
3CC	55.5	55.5	74.5	68.5	77.5	4	4.5	1	1	17.5	0.42	1.42	0.78	0.373
2CE	55.5	56	74.5	69	76.5	4	5	1	1	17.5	0.32	1.90	1.04	0.44
3CE	58.5	56.5	76.5	71	81.5	4	6	1.5	1.5	20.5	0.41	1.46	0.80	0.583
3DB	58.5	58	81.5	76.5	85.5	3	4.5	1.5	1.5	19.5	0.42	1.43	0.79	0.56
3DC	58.5	57.5	81.5	76	86	3	5.5	1.5	1.5	21	0.42	1.43	0.79	0.639
3DE	58.5	56.5	81.5	73.5	87	5	7.5	1.5	1.5	23.5	0.41	1.45	0.80	0.862
2ED	62	58	88	82	94.5	6	6	2	2	25.5	0.34	1.75	0.96	1.3
7FC	64	59	91	82	94.5	4	10	2.5	2.5	36.5	0.87	0.69	0.38	1.22
2FB	62	64.5	100	92.5	103	3	6	2	2	23	0.35	1.74	0.96	1.31
7FB	62	61.5	100	83.5	104.5	3	10	2	2	35	0.83	0.73	0.40	1.25
2FD	62	61.5	100	88	102.5	3	9	2	2	28.5	0.35	1.74	0.96	1.92
5FD	62	61.5	100	80.5	104	3	9	2	2.5	33.5	0.55	1.1	0.60	1.97
2BC	60.5	61	74.5	70.5	76.5	3	3	1	1	14.5	0.31	1.94	1.07	0.274
3CC	63.5	63	81.5	77.5	87	4	5.5	1.5	1.5	20	0.41	1.48	0.81	0.56
2CE	63.5	63	81.5	78	86	5	6	1.5	1.5	19.5	0.31	1.92	1.06	0.654
3CE	63.5	62.5	86.5	80	91	5	7	1.5	1.5	22	0.37	1.60	0.88	0.858
3DB	65	64	91.5	86	95.5	4	4.5	2	1.5	21	0.40	1.48	0.81	0.725
3DC	65	63	91.5	85	96	4	5.5	2	1.5	22.5	0.40	1.48	0.81	0.873
3DE	65	62.5	91.5	82	96.5	6	8	2	1.5	25.5	0.40	1.50	0.83	1.17
7FC	69	65.5	101	83.5	110	4	10.5	2.5	2.5	43.5	0.87	0.69	0.38	1.57
2FB	67	70.5	110	101	112	4	6.5	2	2	24.5	0.35	1.74	0.96	1.65
7FB	67	67	110	91.5	113.5	4	10.5	2	2	38	0.83	0.73	0.40	1.58
2FD	67	67.5	110	96.5	111.5	4	10.5	2	2	30.5	0.35	1.74	0.96	2.44
5FD	67	67	110	88.5	113.5	4	10	2	2.5	36.5	0.55	1.10	0.60	2.47

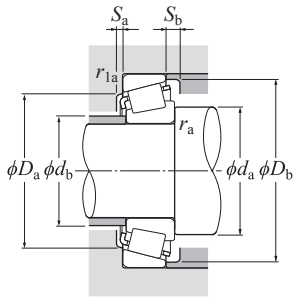
Metric series



d 60–75 mm

Boundary dimensions mm							Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number 2)
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	
60	85	17	17	14	1	1	56.5	83.0	10.1	4 000	5 300	○32912XA
	95	23	23	17.5	1.5	1.5	91.0	123	—	3 700	4 900	4T-32012X
	95	27	27	21	1.5	1.5	104	145	—	3 700	4 900	4T-33012
	100	30	30	23	1.5	1.5	126	164	—	3 600	4 700	4T-33112
	110	23.75	22	19	2	1.5	116	125	—	3 400	4 500	4T-30212
	110	29.75	28	24	2	1.5	144	164	20.1	3 400	4 500	32212U
	110	38	38	29	2	1.5	179	223	27.1	3 400	4 500	33212U
	115	40	39	33	2.5	2.5	209	249	—	3 200	4 300	4T-T2EE060
	125	37	33.5	26	3	3	161	186	—	2 800	3 700	4T-T7FC060
	130	33.5	31	26	3	2.5	199	210	25.6	3 000	4 000	30312U
	130	33.5	31	22	3	2.5	167	176	—	2 700	3 600	4T-30312D
	130	48.5	46	37	3	2.5	271	315	38.5	3 000	4 000	32312U
	130	48.5	46	37	3	2.5	237	296	—	2 900	3 900	4T-32312C
65	90	17	17	14	1	1	53.5	85.0	10.4	3 700	4 900	32913XU
	100	23	23	17.5	1.5	1.5	92.0	128	—	3 400	4 600	4T-32013X
	100	27	27	21	1.5	1.5	108	156	—	3 400	4 600	4T-33013
	110	34	34	26.5	1.5	1.5	160	211	—	3 300	4 400	4T-33113
	120	24.75	23	20	2	1.5	136	148	—	3 100	4 200	4T-30213
	120	32.75	31	27	2	1.5	176	206	25.1	3 100	4 200	32213U
	120	41	41	32	2	1.5	216	265	32.5	3 100	4 200	33213U
	140	36	33	28	3	2.5	225	238	28.7	2 800	3 700	30313U
	140	36	33	23	3	2.5	192	204	—	2 500	3 300	4T-30313D
	140	51	48	39	3	2.5	305	350	42.5	2 800	3 700	32313U
70	100	20	20	16	1	1	76.0	110	13.4	3 400	4 600	32914XU
	110	25	25	19	1.5	1.5	116	160	—	3 200	4 200	4T-32014X
	110	31	31	25.5	1.5	1.5	140	204	—	3 200	4 200	4T-33014
	120	37	37	29	2.5	0.6	190	251	30.5	3 100	4 100	33114U
	125	26.25	24	21	2	1.5	146	162	—	2 900	3 900	4T-30214
	125	33.25	31	27	2	1.5	184	220	26.8	2 900	3 900	32214U
	125	41	41	32	2	1.5	223	282	34.5	2 900	3 900	33214U
	140	39	35.5	27	3	3	191	231	—	2 400	3 200	4T-T7FC070
	150	38	35	30	3	2.5	255	272	32.0	2 600	3 500	30314U
	150	38	35	25	3	2.5	214	229	—	2 300	3 000	4T-30314D
	150	54	51	42	3	2.5	345	405	48.0	2 600	3 500	32314U
	150	54	51	42	3	2.5	300	380	45.0	2 500	3 300	32314CU
75	105	20	20	16	1	1	77.0	114	13.9	3 200	4 300	32915XU

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) Bearings with a ○ mark do not incorporate the subunit dimensions.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

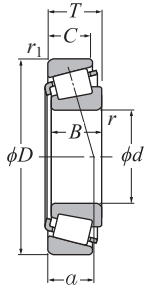
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
	65.5	66	79.5	76.5	82.5	3	3	1	1	15.5	0.33	1.80	0.99	0.281
4CC	68.5	67.5	86.5	81.5	91.5	4	5.5	1.5	1.5	21	0.43	1.39	0.77	0.596
2CE	68.5	67	86.5	82	90	5	6	1.5	1.5	20.5	0.33	1.83	1.01	0.693
3CE	68.5	67	91.5	84.5	96.5	5	7	1.5	1.5	23.5	0.40	1.51	0.83	0.913
3EB	70	69.5	101.5	94	103.5	4	4.5	2	1.5	22	0.40	1.48	0.81	0.929
3EC	70	68.5	101.5	92	105	4	5.5	2	1.5	25	0.40	1.48	0.81	1.18
3EE	70	68.5	101.5	90	105.5	6	9	2	1.5	27.5	0.40	1.48	0.82	1.53
2EE	72	69.5	103	95	109	6	7	2	2	28.5	0.33	1.80	0.99	1.86
7FC	74	71.5	111	92	120	4	11	2.5	2.5	42	0.82	0.73	0.40	2
2FB	74	77	118	109.5	121.5	4	7.5	2.5	2	26.5	0.35	1.74	0.96	2.05
7FB	74	73	118	99	124	4	11.5	2.5	2	40.5	0.83	0.73	0.40	1.95
2FD	74	73.5	118	106	121.5	4	11.5	2.5	2	32	0.35	1.74	0.96	3.01
5FD	74	73	118	96.5	122	5	11	2.5	2	39	0.55	1.10	0.60	3.07
2BC	70.5	70.5	84.5	80	86	3	3	1	1	16.5	0.35	1.70	0.93	0.315
4CC	73.5	72.5	91.5	86	97	4	5.5	1.5	1.5	22.5	0.46	1.31	0.72	0.631
2CE	73.5	72	91.5	87	95.5	5	6	1.5	1.5	21.5	0.35	1.72	0.95	0.742
3DE	73.5	73	101.5	92.5	106.5	6	7.5	1.5	1.5	26	0.39	1.55	0.85	1.27
3EB	75	77	111.5	103	114.5	4	4.5	2	1.5	23.5	0.40	1.48	0.81	1.18
3EC	75	75.5	111.5	101.5	115.5	4	5.5	2	1.5	27	0.40	1.48	0.81	1.57
3EE	75	74	111.5	99	115.5	7	9	2	1.5	29.5	0.39	1.54	0.85	2
2GB	79	83	128	119	131.5	4	8	2.5	2	28.5	0.35	1.74	0.96	2.54
7GB	79	79	128	107.5	133	4	13	2.5	2	44	0.83	0.73	0.40	2.41
2GD	79	79.5	128	115	131.5	4	12	2.5	2	34.5	0.35	1.74	0.96	3.63
2BC	75.5	76.5	94.5	90	96.5	4	4	1	1	18	0.32	1.90	1.05	0.475
4CC	78.5	78	101.5	94.5	105.5	5	6	1.5	1.5	24	0.43	1.38	0.76	0.863
2CE	78.5	79	101.5	96.5	105.5	5	5.5	1.5	1.5	22.5	0.28	2.11	1.16	1.07
3DE	80	79	111.5	101.5	115.5	6	8	2.5	0.6	28	0.38	1.58	0.87	1.68
3EB	80	81	116.5	107.5	119	4	5	2	1.5	25.5	0.42	1.43	0.79	1.3
3EC	80	79.5	116.5	105.5	120.5	4	6	2	1.5	28.5	0.42	1.43	0.79	1.68
3EE	80	78.5	116.5	104	121.5	7	9	2	1.5	31	0.41	1.47	0.81	2.12
7FC	84	81.5	126	104.5	135	5	12	2.5	2.5	47.5	0.87	0.69	0.38	2.62
2GB	84	88.5	138	128	141	4	8	2.5	2	30	0.35	1.74	0.96	3.05
7GB	84	84.5	138	115.5	142.5	4	13	2.5	2	47	0.83	0.73	0.40	2.92
2GD	84	85	138	122.5	141	4	12	2.5	2	36.5	0.35	1.74	0.96	4.44
5GD	84	85	138	112.5	143	5	12	2.5	2	44	0.55	1.10	0.60	4.53
2BC	80.5	81	99.5	94	101	4	4	1	1	19	0.33	1.80	0.99	0.508

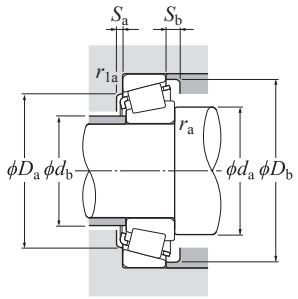
Metric series



d 75–90 mm

Boundary dimensions mm							Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number
d	D	T	B	C	$r_{s\,min}$ [1]	$r_{ls\,min}$ [1]	C_r	C_{0r}	C_u			
75	115	25	25	19	1.5	1.5	118	167	20.3	3 000	4 000	**32015XU**
	115	31	31	25.5	1.5	1.5	123	186	22.7	3 000	4 000	**33015U**
	130	27.25	25	22	2	1.5	154	175	—	2 700	3 600	**4T-30215**
	130	33.25	31	27	2	1.5	186	224	27.1	2 700	3 600	**32215U**
	130	41	41	31	2	1.5	231	298	36.0	2 700	3 600	**33215U**
	160	40	37	31	3	2.5	283	305	35.0	2 400	3 200	**30315U**
	160	40	37	26	3	2.5	238	256	29.8	2 100	2 800	**30315DU**
	160	58	55	45	3	2.5	395	470	54.5	2 400	3 200	**32315U**
	160	58	55	45	3	2.5	365	480	56.0	2 300	3 100	**32315CU**
80	110	20	20	16	1	1	79.5	121	14.8	3 000	4 000	**32916XU**
	125	29	29	22	1.5	1.5	154	216	26.1	2 800	3 700	**32016XU**
	125	36	36	29.5	1.5	1.5	192	284	34.5	2 800	3 700	**33016U**
	130	37	37	29	2.5	0.6	199	276	33.0	2 700	3 600	**33116U**
	140	28.25	26	22	2.5	2	177	200	23.7	2 500	3 400	**30216U**
	140	35.25	33	28	2.5	2	221	265	31.5	2 500	3 400	**32216U**
	140	46	46	35	2.5	2	278	365	43.5	2 500	3 400	**33216U**
	160	45	41	31	3	2	238	297	—	2 400	3 200	**4T-T7FC080**
	170	42.5	39	33	3	2.5	325	350	39.5	2 300	3 000	**30316U**
	170	42.5	39	27	3	2.5	262	283	32.5	2 000	2 700	**30316DU**
	170	61.5	58	48	3	2.5	440	525	60.0	2 300	3 000	**32316U**
	170	61.5	58	48	3	2.5	390	505	58.0	2 200	2 900	**32316CU**
85	120	23	23	18	1.5	1.5	104	157	19.1	2 800	3 800	**32917XU**
	130	29	29	22	1.5	1.5	157	224	26.7	2 600	3 500	**32017XU**
	130	36	36	29.5	1.5	1.5	195	296	35.5	2 600	3 500	**33017U**
	140	41	41	32	2.5	2.5	234	330	39.0	2 500	3 400	**33117U**
	150	30.5	28	24	2.5	2	203	232	27.0	2 400	3 200	**30217U**
	150	38.5	36	30	2.5	2	249	300	35.0	2 400	3 200	**32217U**
	150	49	49	37	2.5	2	315	420	49.0	2 400	3 200	**33217U**
	180	44.5	41	34	4	3	335	365	40.5	2 100	2 900	**30317U**
	180	44.5	41	28	4	3	274	293	33.0	1 900	2 500	**30317DU**
	180	63.5	60	49	4	3	445	525	59.0	2 100	2 900	**32317U**
	180	63.5	60	49	4	3	435	575	64.5	2 100	2 700	**32317CU**
90	125	23	23	18	1.5	1.5	108	168	20.0	2 700	3 600	**32918XU**
	140	32	32	24	2	1.5	187	270	31.5	2 500	3 300	**32018XU**
	140	39	39	32.5	2	1.5	238	360	42.0	2 500	3 300	**33018U**
	150	45	45	35	2.5	2.5	280	400	46.0	2 400	3 200	**33118U**

1) Smallest allowable dimension for chamfer dimension r or r_1.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

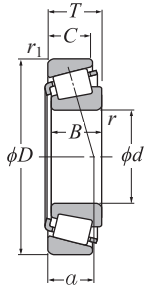
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4CC	83.5	83	106.5	99.5	111	5	6	1.5	1.5	25.5	0.46	1.31	0.72	0.912
2CE	83.5	85	106.5	101	110.5	6	5.5	1.5	1.5	23	0.30	2.01	1.11	1.11
4DB	85	85.5	121.5	112.5	124.5	4	5	2	1.5	27	0.44	1.38	0.76	1.4
4DC	85	84.5	121.5	111	126	4	6	2	1.5	30	0.44	1.38	0.76	1.74
3EE	85	83	121.5	107.5	125	7	10	2	1.5	32	0.43	1.40	0.77	2.23
2GB	89	95	148	137	150.5	4	9	2.5	2	32	0.35	1.74	0.96	3.61
7GB	89	91	148	124	152.5	6	14	2.5	2	50	0.83	0.73	0.40	3.46
2GD	89	91	148	131	150.5	4	13	2.5	2	39	0.35	1.74	0.96	5.4
5GD	89	90	148	119.5	152	6	15	2.5	2	47	0.55	1.10	0.60	5.65
2BC	85.5	86	104.5	99	106.5	4	4	1	1	20	0.35	1.71	0.94	0.54
3CC	88.5	89	116.5	108.5	120.5	6	7	1.5	1.5	27	0.42	1.42	0.78	1.28
2CE	88.5	88.5	116.5	108.5	119.5	6	6.5	1.5	1.5	25	0.28	2.16	1.19	1.61
3DE	90	88.5	121.5	110.5	126	6	15	2.5	2	30.5	0.42	1.44	0.79	1.87
3EB	92	91	130	121	133	4	6	2	2	27.5	0.42	1.43	0.79	1.71
3EC	92	90	130	119.5	134.5	4	7	2	2	31	0.42	1.43	0.79	2.17
3EE	92	89	130	116	135.5	7	11	2	2	35	0.43	1.41	0.78	2.94
7FC	94	94	146	119	153.5	6	15	2	2.5	55	0.87	0.69	0.38	3.92
2GB	94	101.5	158	145	160	4	9.5	2.5	2	34	0.35	1.74	0.96	4.41
7GB	94	97	158	131	160.5	6	15.5	2.5	2	53.5	0.83	0.73	0.40	4.17
2GD	94	97	158	138.5	161.5	4	13.5	2.5	2	41.5	0.35	1.74	0.96	6.48
5GD	94	96	158	127.5	162	4	13.5	2.5	2	50.5	0.55	1.10	0.60	6.61
2BC	93.5	92	111.5	107.5	115.5	4	5	1.5	1.5	21	0.33	1.83	1.01	0.773
4CC	93.5	93.5	121.5	113	126	6	7	1.5	1.5	28.5	0.44	1.36	0.75	1.34
2CE	93.5	94	121.5	114	125.5	6	6.5	1.5	1.5	26	0.29	2.06	1.13	1.69
3DE	97	95	130	118	135.5	7	9	2	2	33	0.41	1.48	0.81	2.44
3EB	97	96.5	140	128.5	141.5	5	6.5	2	2	30	0.42	1.43	0.79	2.13
3EC	97	96	140	127	143.5	5	8.5	2	2	33.5	0.42	1.43	0.79	2.75
3EE	97	95	140	124	144.5	7	12	2	2	37.5	0.42	1.43	0.79	3.61
2GB	103	106.5	166	153.5	168	5	10.5	3	2.5	35.5	0.35	1.74	0.96	5.01
7GB	103	102.5	166	140.5	170	6	16.5	3	2.5	56	0.83	0.73	0.40	4.74
2GD	103	103.5	166	147	169	5	14.5	3	2.5	43	0.35	1.74	0.96	7.22
5GD	103	102	166	135.5	170	7	13	2	2.5	53	0.55	1.10	0.60	7.71
2BC	98.5	97	116.5	112.5	120.5	4	5	1.5	1.5	22	0.34	1.75	0.96	0.815
3CC	100	100	131.5	121	134.5	6	8	2	1.5	30	0.42	1.42	0.78	1.78
2CE	100	100.5	131.5	123.5	135	7	6.5	2	1.5	28	0.27	2.23	1.23	2.22
3DE	102	101	140	127.5	145.5	7	10	2	2	35.5	0.40	1.51	0.83	3.1

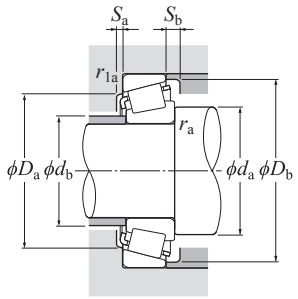
Metric series



d 90–110 mm

Boundary dimensions mm							Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number 2)
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	C_r	C_{0r}	C_u			
90	160	32.5	30	26	2.5	2	230	267	30.5	2 200	3 000	30218U
	160	42.5	40	34	2.5	2	291	360	41.0	2 200	3 000	32218U
	160	55	55	42	2.5	2.5	360	490	56.0	2 300	3 000	33218U
	190	46.5	43	36	4	3	375	405	44.5	2 000	2 700	30318U
	190	46.5	43	30	4	3	300	320	35.5	1 800	2 400	30318DU
	190	67.5	64	53	4	3	500	595	65.5	2 000	2 700	32318U
95	130	23	23	18	1.5	1.5	112	178	21.0	2 500	3 400	32919XU
	145	32	32	24	2	1.5	190	280	32.5	2 300	3 100	32019XU
	145	39	39	32.5	2	1.5	243	375	43.0	2 300	3 100	33019U
	170	34.5	32	27	3	2.5	250	290	32.5	2 100	2 800	30219U
	170	45.5	43	37	3	2.5	330	415	47.0	2 100	2 800	32219U
	200	49.5	45	38	4	3	405	445	48.5	1 900	2 500	30319U
	200	49.5	45	32	4	3	330	355	38.5	1 700	2 200	30319DU
	200	71.5	67	55	4	3	560	670	73.0	1 900	2 500	32319U
100	140	25	25	20	1.5	1.5	134	206	23.8	2 400	3 200	32920XU
	140	25	24	20	1.5	1.5	108	162	18.6	2 400	3 200	○32920
	145	24	22.5	17.5	3	3	119	153	—	1 800	2 400	4T-T4CB100
	150	32	32	24	2	1.5	188	281	32.0	2 200	3 000	32020XU
	150	39	39	32.5	2	1.5	248	390	44.5	2 200	3 000	33020U
	180	37	34	29	3	2.5	286	335	37.0	2 000	2 700	30220U
	180	49	46	39	3	2.5	365	465	51.0	2 000	2 700	32220U
	180	63	63	48	3	2.5	465	650	71.5	2 000	2 700	33220U
	215	51.5	47	39	4	3	455	500	53.0	1 800	2 400	30320U
	215	56.5	51	35	4	3	395	435	46.0	1 800	2 400	31320XU
	215	77.5	73	60	4	3	635	770	82.0	1 800	2 400	32320U
105	145	25	25	20	1.5	1.5	139	219	25.0	2 300	3 000	○32921XA
	160	35	35	26	2.5	2	223	335	37.5	2 100	2 800	32021XU
	160	43	43	34	2.5	2	272	420	47.0	2 100	2 800	33021U
	190	39	36	30	3	2.5	320	380	41.0	1 900	2 500	30221U
	190	53	50	43	3	2.5	420	540	59.0	1 900	2 500	32221U
	225	53.5	49	41	4	3	485	535	56.0	1 700	2 300	30321U
	225	58	53	36	4	3	420	470	49.0	1 700	2 300	31321XU
	225	81.5	77	63	4	3	680	825	87.0	1 700	2 300	32321U
110	150	25	25	20	1.5	1.5	141	226	25.5	2 200	2 900	○32922XA
	170	38	38	29	2.5	2	261	390	43.0	2 000	2 700	32022XU

1) Smallest allowable dimension for chamfer dimension r or r_1.
2) Bearings with a ○ mark do not incorporate the subunit dimensions.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

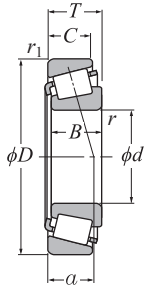
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
3FB	102	103	150	137	151	5	6.5	2	2	32	0.42	1.43	0.79	2.66
3FC	102	101.5	150	134.5	153.5	5	8.5	2	2	36	0.42	1.43	0.79	3.49
3FE	102	101.5	150	131.5	154.5	9	13	2	2.5	41	0.42	1.43	0.78	4.62
2GB	108	112.5	176	162	177.5	5	10.5	3	2.5	37.5	0.35	1.74	0.96	5.83
7GB	108	108.5	176	148.5	180.5	6	16.5	3	2.5	59	0.83	0.73	0.40	5.58
2GD	108	108.5	176	154.5	179	5	14.5	3	2.5	45.5	0.35	1.74	0.96	8.66
2BC	103.5	102	121.5	117	125.5	4	5	1.5	1.5	23.5	0.36	1.68	0.92	0.851
4CC	105	105	136.5	126	140	6	8	2	1.5	31.5	0.44	1.36	0.75	1.85
2CE	105	104.5	136.5	127.5	139.5	7	6.5	2	1.5	28.5	0.28	2.16	1.19	2.3
3FB	109	109.5	158	146.5	160.5	5	7.5	2.5	2	34	0.42	1.43	0.79	3.12
3FC	109	107.5	158	142.5	163	5	8.5	2.5	2	39	0.42	1.43	0.79	4.29
2GB	113	118	186	168	185.5	5	11.5	3	2.5	40	0.35	1.74	0.96	6.69
7GB	113	113.5	186	154.5	189	6	17.5	3	2.5	62.5	0.83	0.73	0.40	6.35
2GD	113	114.5	186	163.5	187.5	5	16.5	3	2.5	49	0.35	1.74	0.96	10.1
2CC	108.5	109	131.5	127.5	135.5	4	5	1.5	1.5	24.5	0.33	1.82	1.00	1.12
	108.5	110	131.5	127	135	4	5	1.5	1.5	25	0.35	1.73	0.95	1.08
4CB	114	108.5	131	130	140.5	4	6.5	2.5	2.5	30	0.47	1.27	0.70	1.14
4CC	110	109.5	141.5	130.5	145	6	8	2	1.5	32.5	0.46	1.31	0.72	1.91
2CE	110	108.5	141.5	132.5	144.5	7	6.5	2	1.5	29.5	0.29	2.09	1.15	2.4
3FB	114	115.5	168	154.5	169.5	5	8	2.5	2	36	0.42	1.43	0.79	3.76
3FC	114	113.5	168	151	172	5	10	2.5	2	41.5	0.42	1.43	0.79	5.11
3FE	114	113	168	147	173	10	15	2.5	2	45.5	0.40	1.48	0.82	6.76
2GB	118	126	201	181.5	199.5	5	12.5	3	2.5	41.5	0.35	1.74	0.96	8.3
7GB	118	122.5	201	165.5	203	7	21.5	3	2.5	69	0.83	0.73	0.40	8.7
2GD	118	122.5	201	174.5	201.5	5	17.5	3	2.5	53	0.35	1.74	0.96	12.8
	113.5	113.5	136.5	131.5	140.5	5	5	1.5	1.5	25	0.34	1.76	0.97	1.2
4DC	117	115.5	150	138.5	153.5	6	9	2	2	34.5	0.44	1.35	0.74	2.44
2DE	117	116	150	141.5	153.5	7	9	2	2	31	0.28	2.12	1.17	3
3FB	119	121.5	178	163	178.5	6	9	2.5	2	38	0.42	1.43	0.79	4.45
3FC	119	119	178	158.5	181.5	6	10	2.5	2	44	0.42	1.43	0.79	6.23
2GB	123	132	211	190	208.5	6	12.5	3	2.5	43.5	0.35	1.74	0.96	9.37
7GB	123	128.5	211	173.5	213.5	7	22	3	2.5	71.5	0.83	0.73	0.40	9.65
2GD	123	129	211	182.5	210.5	6	18.5	3	2.5	55	0.35	1.74	0.96	14.7
	118.5	118.5	141.5	136.5	146	5	5	1.5	1.5	26.5	0.36	1.69	0.93	1.24
4DC	122	122	160	147.5	164	7	9	2	2	36.5	0.43	1.39	0.77	3.07

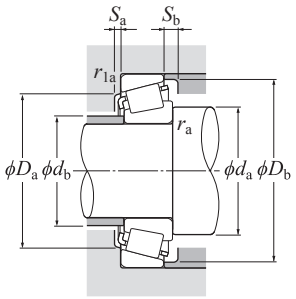
Metric series



d 110–140 mm

Boundary dimensions mm							Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number 2)3)
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	
	170	47	47	37	2.5	2	320	500	55.5	2 000	2 700	33022U
	180	56	56	43	2.5	2.5	400	610	66.5	1 900	2 600	33122UE1
	200	41	38	32	3	2.5	360	435	46.5	1 800	2 400	30222U
110	200	56	53	46	3	2.5	465	605	65.0	1 800	2 400	32222U
	240	54.5	50	42	4	3	530	585	60.0	1 600	2 200	30322U
	240	63	57	38	4	3	480	535	55.0	1 600	2 200	31322XU
	240	84.5	80	65	4	3	785	970	99.5	1 600	2 200	32322U
	165	29	29	23	1.5	1.5	180	294	32.0	2 000	2 600	32924XU
	165	29	27	23	1.5	1.5	131	205	22.5	2 000	2 600	○32924
	170	27	25	19.5	3	2	171	235	–	1 900	2 600	4T-T4CB120
	180	38	38	29	2.5	2	272	420	45.5	1 800	2 500	32024XU
	180	48	48	38	2.5	2.5	325	520	56.5	1 800	2 500	33024U
120	200	62	62	48	2.5	2.5	510	760	80.5	1 800	2 300	33124U
	215	43.5	40	34	3	2.5	385	470	49.0	1 700	2 200	30224U
	215	61.5	58	50	3	2.5	510	680	71.5	1 700	2 200	32224U
	260	59.5	55	46	4	3	620	695	69.5	1 500	2 000	30324U
	260	68	62	42	4	3	570	655	66.0	1 500	2 000	31324XU
	260	90.5	86	69	4	3	905	1 130	114	1 500	2 000	32324U
	180	32	32	25	2	1.5	215	350	37.5	1 800	2 400	32926XU
	180	32	30	26	2	2	157	252	26.9	1 800	2 400	○32926
	200	45	45	34	2.5	2	350	545	57.0	1 700	2 200	32026XU
	200	55	55	43	2.5	2.5	415	660	69.5	1 700	2 300	33026U
130	230	43.75	40	34	4	3	415	505	51.5	1 500	2 000	30226U
	230	67.75	64	54	4	3	585	815	83.5	1 500	2 000	32226U
	280	63.75	58	49	5	4	830	830	81.0	1 400	2 000	∗30326UUTG
	280	72	66	44	5	4	670	780	77.0	1 400	1 800	31326XU
	280	98.75	93	78	4	4	1 140	1 240	122	1 400	2 000	∗32326UTG
	190	32	32	25	2	1.5	221	375	39.0	1 700	2 200	32928XU
	195	29	27	21	3	3	208	299	–	1 700	2 200	4T-T4CB140
	210	45	45	34	2.5	2	365	580	60.0	1 600	2 100	32028XU
	210	56	56	44	2.5	2	435	715	74.0	1 600	2 100	33028U
140	250	45.75	42	36	4	3	465	570	57.0	1 400	1 900	30228U
	250	71.75	68	58	4	3	675	920	92.0	1 400	1 900	32228U
	300	67.75	62	53	5	4	945	950	91.5	1 300	1 800	∗30328UUTG
	300	77	70	47	5	4	760	905	87.0	1 300	1 700	31328XU
	300	107.75	102	85	4	4	1 270	1 370	132	1 300	1 800	∗32328UTG

1) Smallest allowable dimension for chamfer dimension r or r_1. 2) Bearings with a ○ mark do not incorporate the subunit dimensions.
3) Bearing numbers marked "∗" designate ULTAGE™ series bearings.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

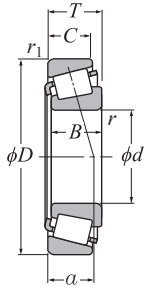
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
2DE	122	121	160	148	162	7	10	2	2	33.5	0.29	2.09	1.15	3.84
3FE	122	121.5	170	150.5	174	9	13	2	2.5	44	0.42	1.43	0.79	5.52
3FB	124	128	188	170.5	188.5	6	9	2.5	2	40	0.42	1.43	0.79	5.19
3FC	124	125.5	188	167	192	6	10	2.5	2	47	0.42	1.43	0.79	7.44
2GB	128	141	226	203	222	6	12.5	3	2.5	45.5	0.35	1.74	0.96	11.1
7GB	128	137	226	184	225.5	7	25	3	2.5	76	0.83	0.73	0.40	11.9
2GD	128	136.5	226	195	224	6	19.5	3	2.5	57.5	0.35	1.74	0.96	17.6
2CC	128.5	129.5	156.5	150	160	6	6	1.5	1.5	29.5	0.35	1.72	0.95	1.76
	128.5	129.5	156.5	147.5	159.5	6	6	1.5	1.5	31	0.37	1.60	0.88	1.65
4CB	134	128.5	156	153	165	7	7.5	2.5	2.5	35	0.47	1.27	0.70	1.69
4DC	132	131	170	156	174.5	7	9	2	2	39	0.46	1.31	0.72	3.29
2DE	132	130	170	157	172	6	10	2	2.5	36	0.31	1.97	1.08	4.14
3FE	132	132.5	190	168	193	9	14	2	2.5	48	0.40	1.51	0.83	7.67
4FB	134	139.5	203	184.5	203	6	9.5	2.5	2	44	0.44	1.38	0.76	6.32
4FD	134	135.5	203	178	206	6	11.5	2.5	2	51.5	0.44	1.38	0.76	9.08
2GB	138	153	246	218	239	6	13.5	3	2.5	49	0.35	1.74	0.96	14.1
7GB	138	147	246	200	245	9	26	3	2.5	82.5	0.83	0.73	0.40	15.2
2GD	138	146.5	246	210	240.5	6	21.5	3	2.5	61.5	0.35	1.74	0.96	22.1
2CC	140	140.5	171.5	163	174	6	7	2	1.5	31.5	0.34	1.77	0.97	2.41
	140	141.5	170	161.5	174	6	6	2	2	34	0.37	1.60	0.88	2.24
4EC	142	144	190	173.5	193.5	8	11	2	2	43.5	0.43	1.38	0.76	5
2FE	142	143	190	173.5	193	8	12	2	2.5	42.5	0.34	1.76	0.97	6.09
4FB	148	151	216	199.5	218	7	9.5	3	2.5	45.5	0.44	1.38	0.76	7.05
4FD	148	147	216	190	220.5	7	13.5	3	2.5	57	0.44	1.38	0.76	11.3
2GB	152	165.5	262	235	257.5	8	14.5	4	3	53.5	0.35	1.74	0.96	17.4
7GB	152	154	262	214.5	263	9	28	4	3	87.5	0.83	0.73	0.40	19
	148	159	262	230	264	2.4	20	3	3	67.5	0.35	1.73	0.95	27.4
2CC	150	150	181.5	172.5	184	6	6	2	1.5	34	0.36	1.67	0.92	2.5
4CB	154	149	181	176	190	5	8	2.5	2.5	40.5	0.50	1.19	0.66	2.35
4DC	152	153	200	182.5	203	8	11	2	2	46	0.46	1.31	0.72	5.32
2DE	152	152	200	182.5	203	7	12	2	2	45.5	0.36	1.67	0.92	6.59
4FB	158	163	236	214	235	7	9.5	3	2.5	48.5	0.44	1.38	0.76	8.73
4FD	158	158.5	236	207	239.5	9	13.5	3	2.5	61	0.44	1.38	0.76	14.2
2GB	162	175.5	282	252	275.5	9	14.5	4	3	56.5	0.35	1.74	0.96	21.1
7GB	162	162.5	282	232	282.5	9	30	4	3	94	0.83	0.73	0.40	22.9
	158	168.5	282	244	281	1.5	20	3	3	74.5	0.35	1.73	0.95	33.5

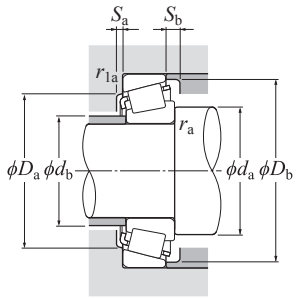
Metric series



d 150–200 mm

Boundary dimensions mm							Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number [2)3)]
d	D	T	B	C	$r_{s\,min}$ [1)]	$r_{ls\,min}$ [1)]	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	
150	210	38	38	30	2.5	2	297	490	50.0	1 600	2 100	32930XU
	225	48	48	36	3	2.5	410	655	66.0	1 400	1 900	32030XU
	270	49	45	38	4	3	500	605	59.0	1 300	1 700	30230U
	270	77	73	60	4	3	775	1 070	105	1 300	1 700	32230U
	320	72	65	55	5	4	1 060	1 070	101	1 200	1 700	∗30330UUTG
	320	82	75	50	5	4	860	1 030	97.5	1 200	1 600	31330XU
	320	114	108	90	4	4	1 490	1 750	166	1 200	1 700	∗32330UTG
160	220	38	38	30	2.5	2	305	520	52.5	1 500	1 900	32932XU
	240	51	51	38	3	2.5	485	790	78.5	1 400	1 800	32032XU
	290	52	48	40	4	3	675	720	68.5	1 200	1 700	∗30232UUTG
	290	84	80	67	4	3	1 140	1 420	136	1 200	1 700	∗32232UUTG
	340	75	68	58	5	4	1 170	1 200	110	1 100	1 600	∗30332UUTG
	340	121	114	95	4	4	1 580	1 840	170	1 100	1 600	∗32332UTG
170	230	38	38	30	2.5	2	315	560	55.0	1 400	1 800	32934XU
	260	57	57	43	3	2.5	555	895	86.5	1 300	1 700	32034XU
	310	57	52	43	5	4	780	845	79.5	1 100	1 600	∗30234UUTG
	310	91	86	71	5	4	1 280	1 600	150	1 100	1 600	∗32234UUTG
	360	80	72	62	5	4	1 290	1 320	120	1 000	1 500	∗30334UUTG
	360	127	120	100	4	4	1 680	1 940	177	1 000	1 500	∗32334UTG
180	250	45	45	34	2.5	2	390	700	68.0	1 300	1 700	32936XU
	280	64	64	48	3	2.5	825	1 170	111	1 200	1 700	∗32036XUUTG
	320	57	52	43	5	4	805	890	82.5	1 100	1 500	∗30236UUTG
	320	91	86	71	5	4	1 320	1 690	157	1 100	1 500	∗32236UUTG
	380	83	75	64	4	4	1 170	1 190	107	960	1 400	∗30336UTG
	380	134	126	106	4	4	1 850	2 150	192	960	1 400	∗32336UTG
190	260	45	45	34	2.5	2	390	710	68.0	1 200	1 600	32938XU
	260	45	42	36	2.5	2.5	310	525	50.5	1 200	1 600	○32938
	290	64	64	48	3	2.5	840	1 210	113	1 100	1 600	∗32038XUUTG
	340	60	55	46	5	4	920	1 000	91.5	1 000	1 400	∗30238UUTG
	340	97	92	75	5	4	1 480	1 850	169	1 000	1 400	∗32238UUTG
	400	86	78	65	5	5	1 200	1 200	106	900	1 300	∗30338UTG
	400	140	132	109	5	5	2 040	2 390	211	900	1 300	∗32338UTG
200	280	51	51	39	3	2.5	620	895	84.0	1 100	1 600	∗32940XUUTG
	310	70	70	53	3	2.5	1 030	1 470	135	1 100	1 500	∗32040XUUTG

1) Smallest allowable dimension for chamfer dimension r or r_1. 2) Bearings with a ○ mark do not incorporate the subunit dimensions.
3) Bearing numbers marked "∗" designate ULTAGE™ series bearings.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

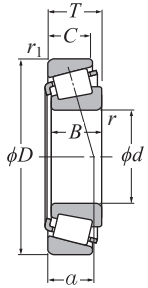
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
2DC	162	162	200	189.5	202	7	8	2	2	36.5	0.33	1.83	1.01	3.93
4EC	164	164	213	195	217.5	8	12	2.5	2	49.5	0.46	1.31	0.72	6.45
4GB	168	175	256	230	251.5	7	11	3	2.5	51.5	0.44	1.38	0.76	11
4GD	168	169	256	222	256	8	17	3	2.5	64.5	0.44	1.38	0.76	18
2GB	172	188.5	302	270	294	8	17	4	3	61	0.35	1.74	0.96	25.4
7GB	172	173.5	302	248	302	9	32	4	3	100.5	0.83	0.73	0.40	27.7
	168	182.5	302	254	298	4.3	24	3	3	80	0.37	1.60	0.88	42.1
2DC	172	172	210	199	213	7	8	2	2	38.5	0.35	1.73	0.95	4.14
4EC	174	174.5	228	208	231.5	8	13	2.5	2	52.5	0.46	1.31	0.72	7.86
4GB	178	188.5	276	248	271	8	12	3	2.5	55.5	0.44	1.38	0.76	13.4
4GD	178	181	276	238	277	10	17	3	2.5	70	0.44	1.38	0.76	23.9
2GB	182	200.5	322	286.5	312.5	10	17	4	3	64	0.35	1.74	0.96	29.8
	178	196.5	322	272	318.5	2.3	26	3	3	85	0.37	1.60	0.88	48.9
3DC	182	181	220	208	223.5	7	8	2	2	42.5	0.38	1.56	0.86	4.4
4EC	184	187	248	224.5	250	10	14	2.5	2	56	0.44	1.35	0.74	10.6
4GB	192	202	292	265.5	290.5	8	14	4	3	60.5	0.44	1.38	0.76	16.9
4GD	192	194	292	255	297	10	20	4	3	75	0.44	1.38	0.76	29.2
2GB	192	212.5	342	305	332.5	10	18	4	3	68	0.35	1.74	0.96	35.2
	188	208	342	287	336	1.5	27	3	3	89.5	0.37	1.60	0.88	56.5
4DC	192	192	240	219.5	241.5	8	11	2	2	54	0.48	1.25	0.69	6.55
3FD	194	199	268	243	269	10	16	2.5	2	59.5	0.42	1.42	0.78	14.5
4GB	202	210.5	302	274	299.5	9	14	4	3	63	0.45	1.33	0.73	17.8
4GD	202	202	302	263	305.5	10	20	4	3	77.5	0.45	1.33	0.73	30.4
	198	227.5	362	314	345	1.5	19	3	3	72.5	0.37	1.60	0.88	38.9
	198	219	362	305	357	2.4	28	3	3	95	0.37	1.60	0.88	67.7
4DC	202	201.5	250	230	251	8	11	2	2	55	0.48	1.26	0.69	6.82
	202	205	248	233	250.5	8	9	2	2	48.5	0.37	1.60	0.88	6.27
4FD	204	206.5	278	252	281	10	16	2.5	2	62.5	0.44	1.36	0.75	15
4GB	212	223	322	293	320.5	9	14	4	3	64	0.44	1.38	0.76	21.5
4GD	212	214	322	283	325.5	11	22	4	3	87.5	0.44	1.38	0.76	36.1
	212	241	378	335	366.5	2.3	21	4	4	74.5	0.37	1.60	0.88	43.6
	212	233	378	320	373.5	1.5	31	4	4	100	0.37	1.60	0.88	77
3EC	214	213.5	268	251.5	272	9	12	2.5	2	53.5	0.39	1.52	0.84	9.28
4FD	214	218.5	298	269	298.5	11	17	2.5	2	66.5	0.43	1.39	0.77	19.2

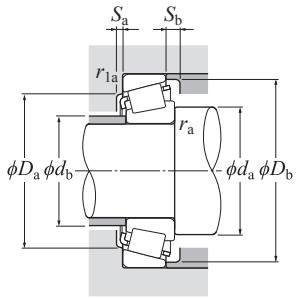
Metric series



d 200–320 mm

d	D	T	B	C	$r_{s\,min}$ [1]	$r_{ls\,min}$ [1]	Basic load rating dynamic C_r kN	Basic load rating static C_{0r} kN	Fatigue load limit C_u kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number [2][3]
200	360	64	58	48	5	4	1 010	1 110	99.0	950	1 300	∗30240UUTG
	360	104	98	82	5	4	1 690	2 130	191	950	1 300	∗32240UUTG
	420	89	80	67	5	5	1 340	1 370	119	850	1 200	∗30340UTG
	420	146	138	115	5	5	2 240	2 650	230	850	1 200	∗32340UTG
220	300	51	51	39	3	2.5	615	950	87.0	1 000	1 500	∗32944XUUTG
	300	51	48	41	2.5	2.5	385	670	61.0	1 000	1 400	○32944E1
	340	76	76	57	4	3	1 180	1 690	152	960	1 400	∗32044XUUTG
	400	72	65	54	4	4	1 050	1 220	106	840	1 200	∗30244UTG
	400	114	108	90	4	4	1 780	2 410	209	840	1 200	∗32244UTG
	460	97	88	73	5	5	1 620	1 690	142	770	1 100	∗30344UTG
	460	154	145	122	5	5	2 590	3 050	259	770	1 100	∗32344UTG
240	320	51	51	39	3	2.5	625	1 000	90.0	940	1 300	∗32948XUUTG
	360	76	76	57	4	3	1 190	1 760	154	870	1 200	∗32048XUUTG
	440	79	72	60	4	4	1 250	1 480	125	760	1 100	∗30248UTG
	440	127	120	100	4	4	2 180	2 750	232	760	1 100	∗32248UTG
	500	105	95	80	5	5	1 900	2 000	165	690	990	∗30348UTG
260	360	63.5	63.5	48	3	2.5	905	1 430	124	860	1 200	∗32952XUUTG
	400	87	87	65	5	4	1 540	2 270	193	800	1 100	∗32052XUUTG
	480	89	80	67	5	5	1 500	1 810	149	690	990	∗30252UTG
	480	137	130	106	5	5	2 410	3 350	275	690	990	∗32252UTG
280	380	63.5	63.5	48	3	2.5	930	1 520	129	790	1 100	∗32956XUUTG
	420	87	87	65	5	4	1 570	2 350	197	740	1 000	∗32056XUUTG
	500	89	80	67	5	5	1 590	1 910	155	630	900	∗30256UTG
	500	137	130	106	5	5	2 530	3 500	283	630	900	∗32256UTG
300	420	76	76	57	4	3	1 290	2 090	173	720	1 000	∗32960XUUTG
	460	100	100	74	5	4	1 920	2 830	232	680	960	∗32060XUUTG
	540	96	85	71	5	5	1 820	2 220	176	580	830	∗30260UTG
	540	149	140	115	5	5	2 950	4 100	325	580	830	∗32260UTG
320	440	76	76	57	4	3	1 300	2 150	176	670	960	∗32964XUUTG
	440	76	72	63	3	3	955	1 880	153	670	900	○32964E1
	480	100	100	74	5	4	1 940	2 940	237	630	900	∗32064XUUTG
	580	104	92	75	5	5	2 130	2 580	201	540	770	∗30264UTG
	580	159	150	125	5	5	3 350	4 650	360	540	770	∗32264UTG

1) Smallest allowable dimension for chamfer dimension r or r_1. 2) Bearings with a ○ mark do not incorporate the subunit dimensions.
3) Bearing numbers marked "∗" designate ULTAGE™ series bearings.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

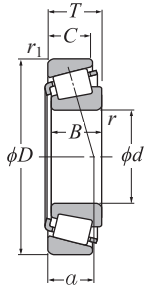
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	d_a Min.	d_b Max.	D_a Max.	D_a Min.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	Load center mm a	Constant e	Axial load factors Y_2	Axial load factors Y_0	Mass kg (approx.)
4GB	222	235	342	311	338	10	16	4	3	70	0.44	1.38	0.76	25.2
3GD	222	224.5	342	299	342.5	11	22	4	3	85	0.41	1.48	0.81	43.8
	222	251	398	350	382.5	5.3	22	4	4	77	0.37	1.60	0.88	51.5
	222	242	398	335	391.5	3.2	31	4	4	105	0.37	1.60	0.88	89.6
3EC	234	233.5	288	269.5	291	10	12	2.5	2	59.5	0.43	1.41	0.78	9.98
	232	238	288	270	291	10	10	2	2	57	0.39	1.55	0.85	9.47
4FD	238	239.5	326	293.5	326	12	19	3	2.5	72.5	0.43	1.39	0.77	24.9
	238	262.5	382	334	368	3.4	18	3	3	82	0.49	1.23	0.68	34.8
	238	249	382	323	380.5	4.4	24	3	3	102	0.49	1.23	0.68	59.8
	242	270	438	383	418.5	4.2	24	4	4	86.5	0.37	1.60	0.88	66.6
	242	262.5	438	371	431	1.5	32	4	4	112	0.37	1.60	0.88	110
4EC	254	252.5	308	289	312.5	10	12	2.5	2	65.5	0.46	1.31	0.72	10.9
4FD	258	258.5	346	311.5	347	12	19	3	2.5	78	0.46	1.31	0.72	26.5
	258	284.5	422	368	406	3.9	19	3	3	91	0.49	1.23	0.68	47.7
	258	270.5	422	365	421.5	4.1	27	3	3	107	0.43	1.39	0.77	78.9
	262	294.5	478	417	456	8.1	25	4	4	94	0.37	1.60	0.88	88.3
3EC	274	278	348	323	348.5	11	15	2.5	2	69.5	0.41	1.48	0.81	18.7
4FC	282	283.5	382	346	383	14	22	4	3	85.5	0.43	1.38	0.76	39
	282	307	458	396	438.5	4.2	22	4	4	99.5	0.49	1.23	0.68	63.4
	282	297	458	385	453	2.9	31	4	4	121.5	0.49	1.23	0.68	100
4EC	294	297	368	341.5	369.5	11	15	2.5	2	75	0.43	1.39	0.76	19.9
4FC	302	301	402	363	403	14	22	4	3	90.5	0.46	1.31	0.72	40.5
	302	324.5	478	422	464.5	5.9	22	4	4	102	0.49	1.23	0.68	66.5
	302	312	478	405	473	6.4	31	4	4	123.5	0.49	1.23	0.68	110
3FD	318	322	406	377.5	406.5	13	19	3	2.5	80	0.39	1.52	0.84	31.4
4GD	322	324.5	442	398.5	441.5	15	26	4	3	98	0.43	1.38	0.76	57.2
	322	349.5	518	453	498	4.9	25	4	4	111	0.49	1.23	0.68	83.5
	322	339	518	438	511.5	2.6	34	4	4	135.5	0.49	1.23	0.68	140
3FD	338	341	426	395.5	427	13	19	3	2.5	85	0.42	1.44	0.79	32.8
	334	345.5	426	392	424.5	13	13	3	2.5	85	0.39	1.55	0.85	33.2
4GD	342	344.5	462	418.5	463	15	26	4	3	104	0.46	1.31	0.72	60.2
	342	372	558	485	531.5	4.7	29	4	4	118.5	0.47	1.27	0.70	100
	342	363	558	473	551	3.9	34	4	4	142	0.47	1.27	0.70	170

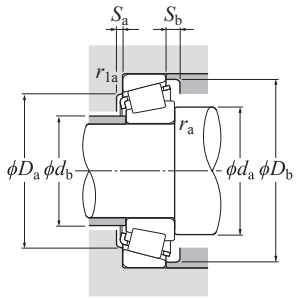
Metric series



d 340–440 mm

Boundary dimensions mm							Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number [2)3)]
d	D	T	B	C	$r_{s\,min}$ [1)]	$r_{ls\,min}$ [1)]	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	
340	460	76	76	57	4	3	1 340	2 270	183	630	900	∗32968XUUTG
	460	76	72	63	3	3	1 010	1 980	159	630	900	○32968E1
	520	112	106	90	5	5	2 120	3 150	249	590	840	∗32068UTG
360	480	76	76	57	4	3	1 350	2 330	185	590	840	∗32972XUUTG
	540	112	106	90	5	5	2 230	3 300	258	550	780	∗32072UTG
380	520	87	82	72	4	4	1 460	2 500	194	550	790	∗32976UTG
	560	112	106	90	5	5	2 460	3 800	292	520	740	∗32076UTG
400	540	87	82	71	4	4	1 530	2 710	207	520	740	∗32980UTG
	600	125	118	100	5	5	2 790	4 250	320	490	700	∗32080UTG
420	560	87	82	71	4	4	1 570	2 840	215	490	700	∗32984UTG
	620	125	118	100	6	5	2 920	4 550	340	460	660	∗32084UTG
440	600	100	95	82	4	4	2 060	3 450	258	470	670	∗32988UTG
	650	130	122	104	6	6	3 250	5 000	365	440	620	∗32088UTG

1) Smallest allowable dimension for chamfer dimension r or r_1. 2) Bearings with a ○ mark do not incorporate the subunit dimensions.
3) Bearing numbers marked "∗" designate **ULTAGE™ series** bearings.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

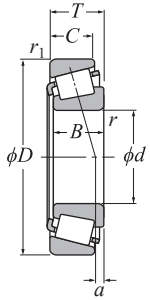
$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

ISO Dimension series	Installation-related dimensions mm									Load center mm	Constant	Axial load factors		Mass kg
	d_a Min.	d_b Max.	D_a Max.	D_b Min.	S_a Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4FD	358	360	446	414	447.5	13	19	3	2.5	90.5	0.44	1.37	0.75	34.5
	354	364	446	413	445.5	13	13	3	2.5	87	0.39	1.55	0.85	34
	362	368.5	498	452	496	3.5	22	4	4	103.5	0.37	1.60	0.88	78.5
4FD	378	379.5	466	431.5	467.5	13	19	3	2.5	96.5	0.46	1.31	0.72	36.3
	382	388	518	476	520	5.5	22	4	4	106	0.37	1.60	0.88	83
	398	404.5	502	464.5	503	4	15	3	3	101	0.40	1.49	0.82	51.3
	402	406.5	538	495	539	6.5	22	4	4	109.5	0.37	1.60	0.88	89.1
	418	422.5	522	482	521.5	4	16	3	3	106	0.42	1.43	0.79	54
	422	428.5	578	526	575	5	25	4	4	119	0.37	1.60	0.88	110
	438	442	542	501.5	543	3.5	16	3	3	111.5	0.44	1.37	0.76	56.2
	448	449.5	598	549	598	6.5	25	4	4	120	0.37	1.60	0.88	120
	458	465.5	582	543	580.5	3.5	18	3	3	106	0.35	1.70	0.93	76
	468	469.5	622	576.5	627.5	5	26	5	5	127	0.37	1.60	0.88	140

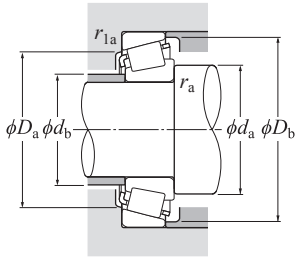
Inch series



d 12.700–22.225 mm

Boundary dimensions					Basic load rating		Allowable speed	
		mm			dynamic kN	static	min^{-1}	
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
12.700	34.988	10.998	10.988	8.730	13.7	11.6	12 000	16 000
14.989	34.988	10.998	10.988	8.730	13.7	11.6	12 000	16 000
15.875	41.275	14.288	14.681	11.112	22.6	18.7	10 000	13 000
	42.862	14.288	14.288	9.525	19.5	17.5	8 700	12 000
	42.862	16.670	16.670	13.495	29.6	26.0	9 800	13 000
	47.000	14.381	14.381	11.112	26.6	24.2	8 600	11 000
	49.225	19.845	21.539	14.288	42.5	39.0	8 500	11 000
16.993	47.000	14.381	14.381	11.112	26.6	24.2	8 600	11 000
17.462	39.878	13.843	14.605	10.668	26.4	24.2	10 000	13 000
19.050	39.992	12.014	11.153	9.525	14.2	12.8	10 000	13 000
	45.237	15.494	16.637	12.065	31.5	28.6	8 900	12 000
	47.000	14.381	14.381	11.112	26.6	24.2	8 600	11 000
	49.225	18.034	19.050	14.288	42.5	39.0	8 500	11 000
	49.225	19.845	21.539	14.288	42.5	39.0	8 500	11 000
	49.225	21.209	19.050	17.462	42.5	39.0	8 500	11 000
	53.975	22.225	21.839	15.875	44.5	39.0	8 000	11 000
	56.896	19.368	19.837	15.875	47.5	46.5	7 200	9 600
19.987	47.000	14.381	14.381	11.112	26.6	24.2	8 600	11 000
20.000	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
20.625	49.225	19.845	21.539	14.288	42.5	39.0	8 500	11 000
20.638	49.225	19.845	19.845	15.875	41.5	39.0	8 200	11 000
21.430	50.005	17.526	18.288	13.970	42.0	39.0	8 000	11 000
21.986	45.974	15.494	16.637	12.065	33.0	34.0	8 400	11 000
22.225	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
	50.005	17.526	18.288	13.970	42.0	39.0	8 000	11 000
	52.388	19.368	20.168	14.288	45.0	43.0	7 600	10 000
	53.975	19.368	20.168	14.288	45.0	43.0	7 600	10 000

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

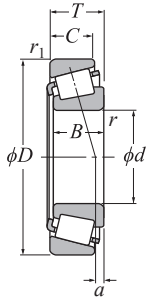
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1]	Installation-related dimensions						Load center	Constant	Axial load factors		Mass
	mm						mm				kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-A4050/A4138	18.5	17	29	32	1.3	1.3	2.5	0.45	1.32	0.73	0.053
4T-A4059†/A4138	19.5	19	29	32	0.8	1.3	2.5	0.45	1.32	0.73	0.049
4T-03062/03162	21.5	20	34	37.5	1.3	2	5.4	0.31	1.93	1.06	0.093
4T-11590/11520	24.5	22.5	34.5	39.5	1.5	1.5	1.2	0.70	0.85	0.47	0.103
4T-17580/17520	23	21	36.5	39	1.5	1.5	5.8	0.33	1.81	1.00	0.123
4T-05062/05185	23.5	21	40.5	42.5	1.5	1.3	4.2	0.36	1.68	0.92	0.131
4T-09062/09195	22	21.5	42	44.5	0.8	1.3	9.4	0.27	2.26	1.24	0.203
4T-05066/05185	24.5	22	40.5	42.5	1.5	1.3	4.2	0.36	1.68	0.92	0.13
4T-LM11749/LM11710	24	22	34	37	1.3	1.3	5.3	0.29	2.10	1.15	0.084
4T-A6075/A6157	24	23	34	37	1	1.3	1.5	0.53	1.14	0.63	0.065
4T-LM11949/LM11910	25	23.5	39.5	41.5	1.3	1.3	5.6	0.30	2.00	1.10	0.123
4T-05075/05185	25	23.5	40.5	42.5	1.3	1.3	4.2	0.36	1.68	0.92	0.121
4T-09067/09195	25.5	24	42	44.5	1.3	1.3	7.6	0.27	2.26	1.24	0.179
4T-09078/09195	25.5	24	42	44.5	1.3	1.3	9.4	0.27	2.26	1.24	0.19
4T-09067/09196	25.5	24	41.5	44.5	1.3	1.5	7.6	0.27	2.26	1.24	0.198
4T-21075/21212††	31.5	26	43	50	1.5	2.3	5.6	0.59	1.02	0.56	0.248
4T-1775/1729	27	25	49	51	1.5	1.3	6.5	0.31	1.95	1.07	0.268
4T-05079†/05185	26.5	24	40.5	42.5	1.5	1.3	4.2	0.36	1.68	0.92	0.118
4T-07079/07196	27.5	26	44.5	47	1.5	1	3.0	0.40	1.49	0.82	0.138
4T-09081/09195	27.5	25.4	42	44.5	1.5	1.3	9.4	0.27	2.26	1.24	0.18
4T-12580/12520	28.5	26	42.5	45.5	1.5	1.5	7.1	0.32	1.86	1.02	0.183
4T-M12649/M12610	29.5	27.5	44	46	1.3	1.3	6.4	0.28	2.16	1.19	0.169
4T-LM12749†/LM12711††	27.5	26	40	42.5	1.3	1.3	5.4	0.31	1.96	1.08	0.123
4T-07087/07196	28.5	27	44.5	47	1.3	1	3.0	0.40	1.49	0.82	0.128
4T-M12648/M12610	28.5	26.5	44	46	1.3	1.3	6.4	0.28	2.16	1.19	0.165
4T-1380/1328	29.5	27	45	48.5	1.5	1.5	7.4	0.29	2.05	1.13	0.196
4T-1380/1329††	29.5	27	46	49	1.5	1.5	7.4	0.29	2.05	1.13	0.22

1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.

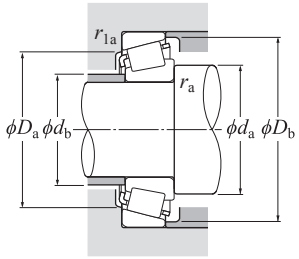
Inch series



d 22.225–28.575 mm

Boundary dimensions					Basic load rating		Allowable speed	
	mm				dynamic	static	min^{-1}	
					kN			
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
22.225	56.896	19.368	19.837	15.875	47.5	46.5	7 200	9 600
	57.150	22.225	22.225	17.462	52.5	49.5	7 100	9 500
22.606	47.000	15.500	15.500	12.000	30.5	32.5	8 200	11 000
23.812	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
	50.292	14.224	14.732	10.668	32.0	34.0	7 400	9 900
	56.896	19.368	19.837	15.875	47.5	46.5	7 200	9 600
24.981	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
25.000	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
25.159	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
25.400	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
	50.005	13.495	14.260	9.525	28.8	27.9	7 500	10 000
	50.292	14.224	14.732	10.668	32.0	34.0	7 400	9 900
	51.994	15.011	14.260	12.700	28.8	27.9	7 500	10 000
	56.896	19.368	19.837	15.875	47.5	46.5	7 200	9 600
	57.150	19.431	19.431	14.732	47.0	48.5	6 900	9 200
	61.912	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	64.292	21.433	21.433	16.670	57.5	64.5	6 100	8 100
	65.088	22.225	21.463	15.875	52.0	50.5	5 700	7 600
	66.421	23.812	25.433	19.050	71.5	72.5	6 200	8 200
26.157	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
26.162	66.421	23.812	25.433	19.050	71.5	72.5	6 200	8 200
26.988	50.292	14.224	14.732	10.668	32.0	34.0	7 400	9 900
	60.325	19.842	17.462	15.875	44.0	45.5	6 700	8 900
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	66.421	23.812	25.433	19.050	71.5	72.5	6 200	8 200
28.575	56.896	19.845	19.355	15.875	45.0	44.5	6 700	8 900
	57.150	17.462	17.462	13.495	44.0	45.5	6 700	8 900

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

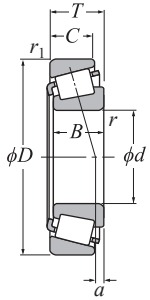
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1]	Installation-related dimensions						Load center	Constant	Axial load factors		Mass
	mm						mm				kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-1755/1729	29	27.5	49	51	1.3	1.3	6.5	0.31	1.95	1.07	0.252
4T-1280/1220	29.5	29	49	52	0.8	1.5	7.1	0.35	1.73	0.95	0.287
4T-LM72849/LM72810	30	28	40.5	44	1.5	1	3.0	0.47	1.27	0.70	0.125
4T-07093/07196	30.5	28.5	44.5	47	1.5	1	3	0.40	1.49	0.82	0.121
4T-L44640/L44610	30.5	28.5	44.5	47	1.5	1.3	3.4	0.37	1.60	0.88	0.133
4T-1779/1729	29.5	28.5	49	51	0.8	1.3	6.5	0.31	1.95	1.07	0.244
4T-07098/07196	31	29	44.5	47	1.5	1	3.0	0.40	1.49	0.82	0.121
4T-07097/07196	31	29	44.5	47	1.5	1	3.0	0.40	1.49	0.82	0.116
4T-07096/07196	31.5	29.5	44.5	47	1.5	1	3.0	0.40	1.49	0.82	0.12
4T-07100/07196	30.5	29.5	44.5	47	1	1	3.0	0.40	1.49	0.82	0.114
4T-07100S/07196	31.5	29.5	44.5	47	1.5	1	3.0	0.40	1.49	0.82	0.114
4T-L44643/L44610	32	30	44.5	47	1.3	1.3	3.4	0.37	1.60	0.88	0.13
4T-07100/07204	30.5	29.5	45	48	1	1.3	3.0	0.40	1.49	0.82	0.141
4T-1780/1729	30.5	30	49	51	0.8	1.3	6.5	0.31	1.95	1.07	0.234
4T-M84548/M84510	38.5	33	48.5	54	1.5	1.5	3.4	0.55	1.10	0.60	0.244
4T-15101/15243	32.5	31.5	54	58	0.8	2	6.0	0.35	1.71	0.94	0.301
4T-15100/15245	38	31.5	55	58	3.5	1.3	6.0	0.35	1.71	0.94	0.301
4T-15102/15245	34	31.5	55	58	1.5	1.3	6.0	0.35	1.71	0.94	0.303
4T-M86643/M86610	38	36.5	54	60	1.5	1.5	3.3	0.55	1.10	0.60	0.372
4T-23100/23256	39	34.5	53	63	1.5	1.5	2.0	0.73	0.82	0.45	0.363
4T-2687/2631	33.5	31.5	58	60	1.3	1.3	9.3	0.25	2.36	1.30	0.444
4T-15103/15245	33	32.5	55	58	0.8	1.3	6.0	0.35	1.71	0.94	0.3
4T-2682/2631	34.5	32	58	60	1.5	1.3	9.3	0.25	2.36	1.30	0.436
4T-L44649†/L44610	37.5	31	44.5	47	3.5	1.3	3.4	0.37	1.60	0.88	0.12
4T-15580†/15523	38.5	32	51	54	3.5	1.5	5.0	0.35	1.73	0.95	0.261
4T-15106†/15245	33.5	33	55	58	0.8	1.3	6.0	0.35	1.71	0.94	0.291
4T-2688†/2631	35	33	58	60	1.5	1.3	9.3	0.25	2.36	1.30	0.429
4T-1985/1930	34	33.5	51	54	0.8	0.8	5.9	0.33	1.82	1.00	0.217
4T-15590/15520	39.5	33.5	51	53	3.5	1.5	5.0	0.35	1.73	0.95	0.197

1) As for the maximum value for inner ring bore diameters of bearings whose bearing numbers are marked with "†" (inner ring), the precision class is an integer for Class 4 and Class 2 bearings only.

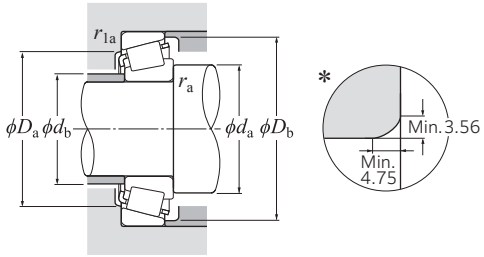
Inch series
J series



d 28.575–31.750 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static	Grease lubrication	Oil lubrication
d	*D*	*T*	*B*	*C*	C_r	C_{0r}		
28.575	58.738	19.050	19.355	15.080	45.0	44.5	6 700	8 900
	60.325	19.842	17.462	15.875	44.0	45.5	6 700	8 900
	60.325	19.845	19.355	15.875	45.0	44.5	6 700	8 900
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	64.292	21.433	21.433	16.670	57.5	64.5	6 100	8 100
	66.421	23.812	25.433	19.050	71.5	72.5	6 200	8 200
	68.262	22.225	22.225	17.462	63.0	67.0	5 800	7 700
	68.262	22.225	23.812	17.462	64.0	65.5	5 700	7 700
	69.850	23.812	25.357	19.050	76.5	81.5	5 700	7 600
	72.626	24.608	24.257	17.462	64.5	55.5	5 800	7 700
	73.025	22.225	22.225	17.462	62.5	68.0	5 300	7 000
29.000	50.292	14.224	14.732	10.668	31.0	35.5	7 200	9 600
29.367	66.421	23.812	25.433	19.050	71.5	72.5	6 200	8 200
29.987	62.000	16.002	16.566	14.288	43.0	42.0	6 300	8 400
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
30.000	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
	72.000	29.370	27.783	23.020	80.0	97.0	5 400	7 100
30.112	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
30.162	62.000	16.002	16.566	14.288	43.0	42.0	6 300	8 400
	64.292	21.433	21.433	16.670	57.5	64.5	6 100	8 100
	69.850	23.812	25.357	19.050	76.5	81.5	5 700	7 600
	72.626	30.162	29.997	23.812	93.5	98.0	5 500	7 300
30.213	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
30.226	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
31.750	59.131	15.875	16.764	11.811	38.5	41.0	6 300	8 400
	62.000	18.161	19.050	14.288	52.0	54.0	6 100	8 200
	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner ring bore diameters of bearings whose bearing numbers are marked with "†" (inner ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	*Y*	*X*	*Y*
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

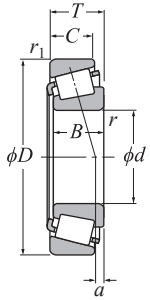
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of *e*, Y_2 and Y_0 see the table below.

Bearing number [1)2)]	Installation-related dimensions mm						Load center mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} [3)] Max.	r_{1as} Max.	*a*	*e*	Y_2	Y_0	(approx.)
4T-1985/1932	34	33.5	52	54	0.8	1.3	5.9	0.33	1.82	1.00	0.231
4T-15590/15523	39.5	33.5	51	54	3.5	1.5	5.0	0.35	1.73	0.95	0.25
4T-1985/1931	34	33.5	52	55	0.8	1.3	5.9	0.33	1.82	1.00	0.256
4T-15112/15245	40	34	55	58	3.5	1.3	6.0	0.35	1.71	0.94	0.279
4T-M86647/M86610	40	31	54	60	1.5	1.5	3.3	0.55	1.10	0.60	0.348
4T-2689/2631	37.5	36	58	60	1.3	1.3	9.3	0.25	2.36	1.30	0.363
4T-02474/02420	36.5	36	59	63	0.8	1.5	5.2	0.42	1.44	0.79	0.41
4T-2474/2420	36	35	60	63	0.8	1.5	6.5	0.34	1.77	0.97	0.38
4T-2578/2523	39	35	61	64	2.3	1.3	9.1	0.27	2.19	1.21	0.484
4T-41125/41286	48	36.5	61	68	4.8	1.5	3.7	0.60	1.00	0.55	0.475
4T-02872/02820	37.5	37	62	68	0.8	3.3	3.9	0.45	1.32	0.73	0.481
4T-L45449/L45410	40	33.5	44.5	48	3.5	1.3	3.5	0.37	1.62	0.89	0.113
4T-2690/2631	41	35	58	60	3.5	1.3	9.3	0.25	2.36	1.30	0.407
4T-17118†/17244	38.5	36	54	57	1.5	1.5	3.3	0.38	1.57	0.86	0.229
4T-15117†/15245	36.5	35	55	58	1.3	1.3	6.0	0.35	1.71	0.94	0.27
4T-14117A/14276	44	41	60	63	3.5	1.3	4.1	0.38	1.57	0.86	0.37
#4T-JHM88540/JHM88513	44.5	42.5	58	69	1.3	3.3	6.0	0.55	1.10	0.60	0.62
4T-15116/15245	36	35.5	55	58	0.8	1.3	6.0	0.35	1.71	0.94	0.27
4T-17119/17244	37	34.5	54	57	1.5	1.5	3.3	0.38	1.57	0.86	0.228
4T-M86649/M86610	44	38	54	60	1.5	1.5	3.3	0.55	1.10	0.60	0.336
4T-2558/2523	40	36.5	61	64	2.3	1.3	9.1	0.27	2.19	1.21	0.467
4T-3187/3120	39	38.5	61	67	0.8	3.3	9.9	0.33	1.80	0.99	0.621
4T-15118/15245	43	36.5	55	58	3.5	1.3	6.0	0.35	1.71	0.94	0.266
4T-15119/15245	37.5	35.5	55	58	1.5	1.3	6.0	0.35	1.71	0.94	0.269
4T-15120/15245	36	35.5	55	58	0.8	1.3	6.0	0.35	1.71	0.94	0.269
4T-14116/14274	38.5	38	59	63	0.8	3.3	4.1	0.38	1.57	0.86	0.369
4T-14116/14276	38.5	38	60	63	0.8	1.3	4.1	0.38	1.57	0.86	0.371
4T-LM67048/LM67010	42.5	36	52	56	*	1.3	2.8	0.41	1.46	0.80	0.183
4T-15123/15245	44	38	55	58	*	1.3	5.1	0.35	1.71	0.94	0.249
4T-15125/15245	42.5	36.5	55	58	3.5	1.3	6.0	0.35	1.71	0.94	0.254

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Chamfer dimensions of the bearings marked "*" are shown in the above drawings.

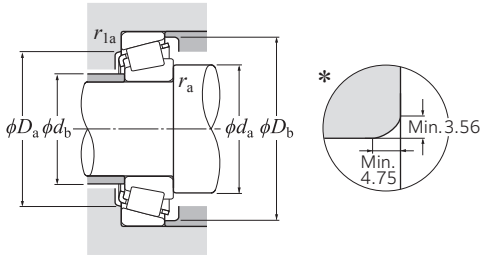
Inch series



d 31.750–34.925 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
31.750	62.000	19.050	20.638	14.288	52.0	54.0	6 100	8 200
	66.421	25.400	25.357	20.638	76.5	81.5	5 700	7 600
	68.262	22.225	22.225	17.462	63.0	67.0	5 800	7 700
	68.262	22.225	22.225	17.462	63.0	67.0	5 800	7 700
	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
	69.850	23.812	25.357	19.050	76.5	81.5	5 700	7 600
	69.850	23.812	25.357	19.050	76.5	81.5	5 700	7 600
	72.626	30.162	29.997	23.812	93.5	98.0	5 500	7 300
	72.626	30.162	29.997	23.812	93.5	98.0	5 500	7 300
	73.025	22.225	22.225	17.462	62.5	68.0	5 300	7 000
	73.025	22.225	23.812	17.462	69.5	75.5	5 200	7 000
	73.025	29.370	27.783	23.020	80.0	97.0	5 400	7 100
	73.812	29.370	27.783	23.020	80.0	97.0	5 400	7 100
	76.200	29.370	28.575	23.020	86.5	105	5 100	6 800
	79.375	29.370	29.771	23.812	103	114	4 900	6 600
33.338	68.262	22.225	22.225	17.462	62.5	71.0	5 700	7 500
	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
	69.850	23.812	25.357	19.050	76.5	81.5	5 700	7 600
	72.626	30.162	29.997	23.812	93.5	98.0	5 500	7 300
	73.025	29.370	27.783	23.020	80.0	97.0	5 400	7 100
	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800
	76.200	29.370	28.575	23.020	86.5	105	5 100	6 800
	76.200	29.370	28.575	23.020	86.5	105	5 100	6 800
	79.375	25.400	24.074	17.462	72.5	67.0	5 200	6 900
34.925	65.088	18.034	18.288	13.970	51.5	56.0	5 700	7 600
	65.088	18.034	18.288	13.970	51.5	56.0	5 700	7 600
	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
	72.233	25.400	25.400	19.842	72.0	84.5	5 400	7 200
	72.238	20.638	20.638	15.875	53.0	58.5	5 300	7 000
	73.025	22.225	22.225	17.462	62.5	68.0	5 300	7 000
	73.025	22.225	22.225	17.462	62.5	68.0	5 300	7 000
	73.025	22.225	23.812	17.462	69.5	75.5	5 200	7 000
	73.025	23.812	24.608	19.050	78.5	85.0	5 300	7 100
	73.025	23.812	24.608	19.050	78.5	85.0	5 300	7 100
	73.025	23.812	25.654	19.050	81.0	90.5	5 100	6 800
	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

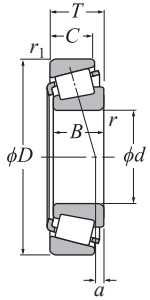
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number	Installation-related dimensions mm						Load center mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as}[1] Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-15126/15245	38.5	38	55	58	0.8	1.3	6.0	0.35	1.71	0.94	0.257
4T-2580/2520	38.5	37.5	56.9	62.5	0.8	3.3	9.1	0.27	2.19	1.21	0.41
4T-02475/02420	44.5	38.5	59	63	3.5	1.5	5.2	0.42	1.44	0.79	0.382
4T-02476/02420	39	38.5	59	63	0.8	1.5	5.2	0.42	1.44	0.79	0.384
4T-14124/14276	39.5	39	60	63	0.8	1.3	4.1	0.38	1.57	0.86	0.36
4T-14125A/14276	45	39	60	63	3.5	1.3	4.1	0.38	1.57	0.86	0.357
4T-2580/2523	38.5	37.5	61	64	0.8	1.3	9.1	0.27	2.19	1.21	0.455
4T-2582/2523	44	37.5	61	64	3.5	1.3	9.1	0.27	2.19	1.21	0.452
4T-3188/3120	40	39.5	61	67	0.8	3.3	9.9	0.33	1.80	0.99	0.606
4T-3193/3120	45.5	39.5	61	67	3.5	3.3	9.9	0.33	1.80	0.99	0.605
4T-02875/02820	45.5	39.5	62	68	3.5	3.3	3.9	0.45	1.32	0.73	0.453
4T-2879/2820	39.5	38.5	63	68	0.8	3.3	5.5	0.37	1.63	0.90	0.466
4T-HM88542/HM88510	45.5	42.6	59	70	1.3	3.3	6.0	0.55	1.10	0.60	0.622
4T-HM88542/HM88512	45.5	42.6	60	70	1.3	3.3	6.0	0.55	1.10	0.60	0.638
4T-HM89440/HM89410	45.5	44.3	62	73	0.8	3.3	5.8	0.55	1.10	0.60	0.686
4T-3476/3420	43	41	67	74	1.3	3.3	8.7	0.37	1.64	0.90	0.772
4T-M88048/M88010	42.5	41.2	58	65	0.8	1.5	2.9	0.55	1.10	0.60	0.379
4T-14130/14276	46.5	40	60	63	3.5	1.3	4.1	0.38	1.57	0.86	0.345
4T-2585/2523	45	39	61	64	3.5	1.3	9.1	0.27	2.19	1.21	0.436
4T-3196/3120	47	40.5	61	67	3.5	3.3	9.9	0.33	1.80	0.99	0.584
4T-HM88547/HM88510	45.5	42.6	59	70	0.8	3.3	6.0	0.55	1.10	0.60	0.603
4T-2785/2720	46	40	66	70	3.5	3.3	7.8	0.30	1.98	1.09	0.548
4T-HM89443/HM89410	46.5	44.3	62	73	0.8	3.3	5.8	0.55	1.10	0.60	0.667
4T-HM89444/HM89410	53	44.3	62	73	3.8	3.3	5.8	0.55	1.10	0.60	0.665
4T-43131/43312	51	42.1	67	74	3.5	1.5	1.4	0.67	0.90	0.49	0.568
4T-LM48548/LM48510	48	41.5	58	61	*	1.3	3.7	0.38	1.59	0.88	0.25
4T-LM48548A/LM48510	40.5	42.2	58	61	0.8	1.3	3.7	0.38	1.59	0.88	0.252
4T-14137A/14276	43.5	41.5	60	63	1.5	1.3	4.1	0.38	1.57	0.86	0.334
4T-HM88649/HM88610	48.5	42.5	60	69	2.3	2.3	4.6	0.55	1.10	0.60	0.489
4T-16137/16284	47	40.5	63	67	3.5	1.3	4.2	0.40	1.49	0.82	0.37
4T-02877/02820	48.5	42	62	68	3.5	3.3	3.9	0.45	1.32	0.73	0.423
4T-02878/02820	42.5	42	62	68	0.8	3.3	3.9	0.45	1.32	0.73	0.426
4T-2878/2820	42	41	63	68	0.8	3.3	5.5	0.37	1.63	0.90	0.435
4T-25877/25820	43	40.5	64	68	1.5	2.3	8.1	0.29	2.07	1.14	0.47
4T-25877/25821	43	40.5	65	68	1.5	0.8	8.1	0.29	2.07	1.14	0.473
4T-2793/2735X	42	41	66	69	0.8	0.8	7.8	0.30	1.98	1.09	0.444
4T-2793/2720	42	41	66	70	0.8	3.3	7.8	0.30	1.98	1.09	0.534

1) Chamfer dimensions of the bearings marked "*" are shown in the above drawings.

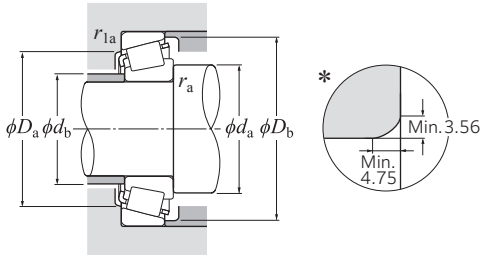
Inch series
J series



d 34.925–38.100 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
34.925	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800
	76.200	29.370	28.575	23.020	86.5	105	5 100	6 800
	76.200	29.370	28.575	23.812	89.5	97.0	5 100	6 800
	76.200	29.370	28.575	23.812	89.5	97.0	5 100	6 800
	79.375	29.370	29.771	23.812	103	114	4 900	6 600
	80.167	29.370	30.391	23.812	105	112	4 800	6 400
	85.725	30.162	30.162	23.812	116	132	4 500	6 000
34.976	69.012	19.845	19.583	15.875	53.5	58.0	5 600	7 400
34.988	59.974	15.875	16.764	11.938	39.0	47.5	6 100	8 100
	61.973	16.700	17.000	13.600	41.0	48.0	5 900	7 900
	61.973	18.000	17.000	15.000	41.0	48.0	5 900	7 900
35.000	70.000	24.000	23.500	19.000	69.0	78.0	5 500	7 300
	79.375	23.812	25.400	19.050	85.0	97.5	4 800	6 400
	80.000	21.000	22.403	17.826	75.5	75.0	4 700	6 300
35.717	72.233	25.400	25.400	19.842	72.0	84.5	5 400	7 200
	72.626	25.400	25.400	19.842	72.0	84.5	5 400	7 200
36.487	73.025	23.812	24.608	19.050	78.5	85.0	5 300	7 100
	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800
36.512	76.200	29.370	28.575	23.020	86.5	105	5 100	6 800
	76.200	29.370	28.575	23.020	86.5	105	5 100	6 800
	76.200	29.370	28.575	23.812	89.5	97.0	5 100	6 800
	79.375	29.370	28.829	22.664	95.5	104	5 000	6 600
	79.375	29.370	29.771	23.812	103	114	4 900	6 600
	88.500	25.400	23.698	17.462	78.5	78.0	4 000	5 300
38.000	63.000	17.000	17.000	13.500	43.0	52.5	5 700	7 600
38.100	63.500	12.700	11.908	9.525	28.7	33.5	5 500	7 300
	65.088	18.034	18.288	13.970	48.0	57.0	5 500	7 400
	69.012	19.050	19.050	15.083	53.0	59.5	5 300	7 100
	69.012	19.050	19.050	15.083	53.0	59.5	5 300	7 100
	71.438	15.875	16.520	11.908	48.0	51.0	5 400	7 200
	72.000	19.000	20.638	14.237	53.0	58.5	5 300	7 000

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

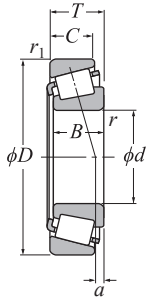
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number 1)2)	Installation-related dimensions mm						Load center 4) mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} 3) Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-2796/2729	47.5	41	68	70	3.5	0.8	7.8	0.30	1.98	1.09	0.536
4T-HM89446/HM89410	56	44.3	62	73	3.5	3.3	5.8	0.55	1.10	0.60	0.646
4T-31593/31520	50	43.5	64	72	3.5	3.3	7.8	0.40	1.49	0.82	0.626
4T-31594/31520	46	43.5	64	72	1.5	3.3	7.8	0.40	1.49	0.82	0.628
4T-3478/3420	50	43.5	67	74	3.5	3.3	8.7	0.37	1.64	0.90	0.731
4T-3379/3320	48	41.5	70	75	3.5	3.3	11.2	0.27	2.20	1.21	0.736
4T-3872/3820	53	46	73	81	3.5	3.3	8.1	0.40	1.49	0.82	0.902
4T-14139/14276	43.5	41.5	60	63	1.3	1.3	4.1	0.38	1.57	0.86	0.33
4T-L68149†/L68111††	45.5	39	53	56	*	1.3	2.5	0.42	1.44	0.79	0.179
4T-LM78349A†/LM78310A††	42	39.5	54	59	1.5	1.5	2.4	0.44	1.35	0.74	0.206
4T-LM78349†/LM78310C††	46	40	56	59	*	1.5	2.4	0.44	1.35	0.74	0.218
#4T-JS3549A/JS3510	47	42	60	66.5	2	1.5	3.6	0.55	1.10	0.60	0.42
4T-26883/26822	42.5	42	71	74	0.8	0.8	7.4	0.32	1.88	1.04	0.61
4T-339/332	42.5	41.5	73	75	0.8	1.3	6.6	0.27	2.20	1.21	0.534
4T-HM88648/HM88610	54	42.5	60	69	3.5	2.3	4.6	0.55	1.10	0.60	0.477
4T-HM88648/HM88611AS	54	42.5	59	69	3.5	3.3	3.0	0.55	1.10	0.60	0.482
4T-25880/25821	44	42	65	68	1.5	0.8	8.1	0.29	2.07	1.14	0.456
4T-2780/2720	44.5	42.5	66	70	1.5	3.3	7.8	0.30	1.98	1.09	0.516
4T-HM89448/HM89410	48.5	44.3	62	73	0.8	3.3	5.8	0.55	1.10	0.60	0.628
4T-HM89449/HM89411	57	44.3	65	73	3.5	0.8	5.8	0.55	1.10	0.60	0.63
4T-31597/31520	51	44.5	64	72	3.5	3.3	7.8	0.40	1.49	0.82	0.606
4T-HM89249/HM89210	55	44	66	75	3.5	3.3	5.8	0.55	1.10	0.60	0.689
4T-3479/3420	45.5	44.5	67	74	0.8	3.3	8.7	0.37	1.64	0.90	0.707
4T-44143/44348	54	50	75	84	2.3	1.5	-2.9	0.78	0.77	0.42	0.73
#4T-JL69349/JL69310	46.5	42.5	56	60	*	1.3	2.3	0.42	1.44	0.79	0.2
4T-13889/13830	45	42.5	59	60	1.5	0.8	0.8	0.35	1.73	0.95	0.148
4T-LM29748/LM29710	49	42.5	58.9	62	*	1.3	4.3	0.33	1.80	0.99	0.227
4T-13685/13621	49.5	43	61	65	3.5	2.3	3.0	0.40	1.49	0.82	0.294
4T-13687/13621	46.5	43	61	65	2	2.3	3.0	0.40	1.49	0.82	0.296
4T-19150/19281	45	43	63	66	1.5	1.5	1.4	0.44	1.35	0.74	0.241
4T-16150/16282	49.5	43	63	67	3.5	1.5	4.2	0.40	1.49	0.82	0.331

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Chamfer dimensions of the bearings marked "*" are shown in the above drawings.
4) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

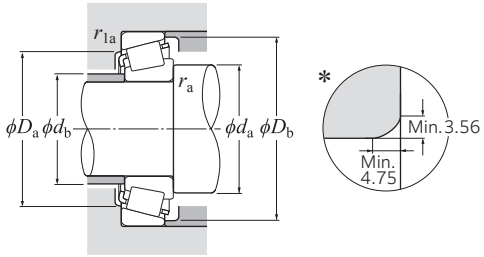
Inch series



d 38.100–41.275 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
38.100	76.200	20.638	20.940	15.507	61.5	63.0	5 000	6 700
	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800
	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800
	79.375	23.812	25.400	19.050	85.0	97.5	4 800	6 400
	79.375	29.370	29.771	23.812	103	114	4 900	6 600
	80.000	21.006	20.940	15.875	61.5	63.0	5 000	6 700
	80.035	24.608	23.698	18.512	74.5	82.5	4 800	6 400
	82.550	29.370	28.575	23.020	96.5	117	4 700	6 200
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	85.725	30.162	30.162	23.812	116	132	4 500	6 000
	87.312	30.162	30.886	23.812	104	117	4 400	5 900
	88.500	25.400	23.698	17.462	78.5	78.0	4 000	5 300
	88.500	26.988	29.083	22.225	106	107	4 600	6 100
39.688	76.200	23.812	25.654	19.050	81.0	90.5	5 100	6 800
	77.534	29.370	30.391	23.812	105	112	4 800	6 400
	79.375	23.812	25.400	19.050	85.0	97.5	4 800	6 400
	80.035	29.370	30.391	23.812	105	112	4 800	6 400
	80.167	29.370	30.391	23.812	105	112	4 800	6 400
	88.500	25.400	23.698	17.462	78.5	78.0	4 000	5 300
40.000	76.200	20.638	20.940	15.507	61.5	63.0	5 000	6 700
	80.000	21.000	22.403	17.826	75.5	75.0	4 700	6 300
	85.000	20.638	21.692	17.462	77.5	79.5	4 400	5 800
	88.500	26.988	29.083	22.225	106	107	4 600	6 100
	107.950	36.512	36.957	28.575	157	177	3 600	4 800
40.483	82.550	29.370	28.575	23.020	96.5	117	4 700	6 200
40.988	67.975	17.500	18.000	13.500	51.0	62.5	5 300	7 000
41.275	73.025	16.667	17.462	12.700	51.0	55.5	5 000	6 600
	73.431	19.558	19.812	14.732	62.0	69.5	5 000	6 600
	73.431	21.430	19.812	16.604	62.0	69.5	5 000	6 600
	76.200	18.009	17.384	14.288	47.0	51.5	4 900	6 500
	76.200	22.225	23.020	17.462	72.0	80.5	4 900	6 500
	76.200	25.400	25.400	20.638	85.0	97.5	4 800	6 400
	79.378	23.812	25.400	19.050	85.0	97.5	4 800	6 400
	80.000	18.009	17.384	14.288	47.0	51.5	4 900	6 500

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

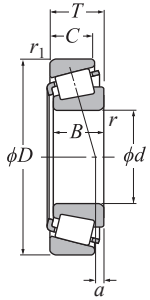
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number 1)	Installation-related dimensions mm						Load center 3) mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} 2) Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-28150/28300	45.5	43.5	68	71	1.5	1.3	4.8	0.40	1.49	0.82	0.406
4T-2776/2720	52	43.5	66	70	4.3	0.8	7.8	0.30	1.98	1.09	0.495
4T-2788/2720	50	43.5	66	70	3.5	3.3	7.8	0.30	1.98	1.09	0.494
4T-26878/26822	45	44.5	71	74	0.8	0.8	7.4	0.32	1.88	1.04	0.575
4T-3490/3420	52	45.5	67	74	3.5	3.3	8.7	0.37	1.64	0.90	0.688
4T-28150/28315	45.5	43.5	69	73	1.5	1.5	4.8	0.40	1.49	0.82	0.467
4T-27880/27820	48	47	68	75	0.8	1.5	2.5	0.56	1.07	0.59	0.567
4T-HM801346/HM801310	51	49.1	68	78	0.8	3.3	4.7	0.55	1.10	0.60	0.767
4T-25572/25520	46	46	74	77	0.8	0.8	6.2	0.33	1.79	0.99	0.646
4T-3875/3820	49.5	48.5	73	81	0.8	3.3	8.1	0.40	1.49	0.82	0.861
4T-3580/3525	48	45.5	75	81	1.5	3.3	10.0	0.31	1.96	1.08	0.881
4T-44150/44348	55	50.8	75	84	2.3	1.5	-2.9	0.78	0.77	0.42	0.714
4T-418/414	51	44.5	77	80	3.5	1.5	9.1	0.26	2.28	1.25	0.843
4T-2789/2720	52	45	66	70	3.5	3.3	7.8	0.30	1.98	1.09	0.475
4T-3382/3321	52	45.5	68	75	3.5	3.3	11.2	0.27	2.20	1.21	0.669
4T-26880/26822	48	45.5	71	74	1.5	0.8	7.4	0.32	1.88	1.04	0.556
4T-3382/3339	52	45.5	71	74.8	3.5	1.5	11.2	0.27	2.20	1.21	0.666
4T-3386/3320	46.5	45.5	70	75	0.8	3.3	11.2	0.27	2.20	1.21	0.672
4T-44158/44348	58	50.8	75	84	3.5	1.5	-2.9	0.78	0.77	0.42	0.691
4T-28158/28300	47.5	45	68	71	1.5	1.3	4.8	0.40	1.49	0.82	0.387
4T-344/332	52	45.5	73	75	3.5	1.3	6.6	0.27	2.20	1.21	0.479
4T-350A/354A	47.5	46.5	77	80	0.8	1.3	5.1	0.31	1.96	1.08	0.566
4T-420/414	52	46	77	80	3.5	1.5	9.1	0.26	2.28	1.25	0.817
4T-543/532X	57	50	94	100	3.5	3.3	12.3	0.30	2.02	1.11	1.77
4T-HM801349/HM801310	58	49.1	68	78	3.5	3.3	4.7	0.55	1.10	0.60	0.734
4T-LM300849†/LM300811††	52	45.5	61	65	*	1.5	3.6	0.35	1.72	0.95	0.232
4T-18590/18520	53	46	66	69	3.5	1.5	2.9	0.35	1.71	0.94	0.283
4T-LM501349/LM501310	54	48	67	70	3.5	0.8	3.3	0.40	1.50	0.83	0.334
4T-LM501349/LM501314	54	48	65	70	3.5	0.8	3.3	0.40	1.50	0.83	0.354
4T-11162/11300	49	46.5	67	71	1.5	1.5	0.7	0.49	1.23	0.68	0.337
4T-24780/24720	54	47	68	72	3.5	0.8	4.5	0.39	1.53	0.84	0.435
4T-26882/26823	54	47	69	73	3.5	1.5	7.4	0.32	1.88	1.04	0.49
4T-26885/26822	48	47	71	74	0.8	0.8	7.4	0.32	1.88	1.04	0.535
4T-11162/11315	49	46.5	69	73	1.5	1.5	0.7	0.49	1.23	0.68	0.389

2) Chamfer dimensions of the bearings marked "*" are shown in the above drawings.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

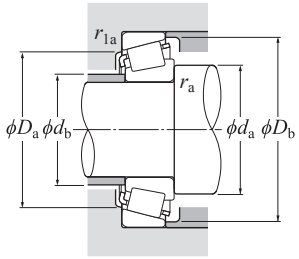
Inch series



d 41.275–44.450 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
41.275	80.000	21.000	22.403	17.826	75.5	75.0	4 700	6 300
	79.378	23.812	25.400	19.050	85.0	97.5	4 800	6 400
	82.550	26.543	25.654	20.193	89.0	104	4 600	6 100
	85.725	30.162	30.162	23.812	116	132	4 500	6 000
	87.312	30.162	30.886	23.812	104	117	4 400	5 900
	88.900	30.162	29.370	23.020	104	125	4 300	5 800
	90.488	39.688	40.386	33.338	151	175	4 300	5 800
	92.075	26.195	23.812	16.670	80.5	81.5	3 800	5 000
	93.662	31.750	31.750	26.195	115	131	4 100	5 500
	95.250	30.162	29.370	23.020	120	147	4 000	5 300
	95.250	30.958	28.300	20.638	91.5	92.0	3 700	5 000
	95.250	30.958	28.575	22.225	107	116	3 700	4 900
42.070	90.488	39.688	40.386	33.338	151	175	4 300	5 800
42.862	82.550	26.195	26.988	20.638	83.5	97.0	4 600	6 100
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	87.312	30.162	30.886	23.812	104	117	4 400	5 900
42.875	79.375	23.812	25.400	19.050	85.0	97.5	4 800	6 400
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
44.450	76.992	17.462	17.145	11.908	48.5	54.0	4 700	6 300
	79.375	17.462	17.462	13.495	50.5	56.0	4 600	6 200
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	84.138	30.162	30.886	23.812	104	117	4 400	5 900
	85.000	20.638	21.692	17.462	77.5	79.5	4 400	5 800
	87.312	30.162	30.886	23.812	104	117	4 400	5 900
	88.900	30.162	29.370	23.020	104	125	4 300	5 800
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	93.662	31.750	31.750	26.195	115	131	4 100	5 500
	95.250	27.783	28.575	22.225	119	139	3 900	5 200
	95.250	27.783	29.900	22.225	120	129	4 200	5 600
	95.250	30.162	29.370	23.020	120	147	4 000	5 300
	95.250	30.958	28.300	20.638	91.5	92.0	3 700	5 000
	95.250	30.958	28.575	22.225	107	116	3 700	4 900
	101.600	34.925	36.068	26.988	150	165	3 800	5 000
	104.775	30.162	29.317	24.605	127	148	3 500	4 700

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

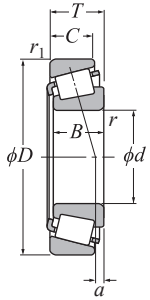
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number	Installation-related dimensions mm						Load center[1] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-336/332	47	46	73	75	0.8	1.3	6.6	0.27	2.20	1.21	0.468
4T-26882/26824	54	47	70	74	3.5	0.8	7.4	0.32	1.88	1.04	0.532
4T-M802048/M802011	57	50.6	70	79	3.5	3.3	3.2	0.55	1.10	0.60	0.641
4T-3880/3820	52	50	73	81	0.8	3.3	8.1	0.40	1.49	0.82	0.814
4T-3576/3525	49	48	75	81	0.8	3.3	10.0	0.31	1.96	1.08	0.83
4T-HM803145/HM803110	54	53	74	85	0.8	3.3	4.6	0.55	1.10	0.60	0.902
4T-4388/4335	60	52	77	85	3.5	3.3	15.0	0.28	2.11	1.16	1.26
4T-M903345/M903310	65	54	78	88	3.5	1.5	-3.6	0.83	0.72	0.40	0.758
4T-46162/46368	52	51	79	87	0.8	3.3	7.1	0.40	1.49	0.82	1.09
4T-HM804840/HM804810	61	54	81	91	3.5	3.3	3.7	0.55	1.10	0.60	1.08
4T-53162/53375	57	52.7	81	89	1.5	0.8	0.5	0.74	0.81	0.45	0.974
4T-HM903245/HM903210	63	54	81	91	3.5	0.8	-0.4	0.74	0.81	0.45	1.05
4T-4395/4335	60	52	77	85	3.5	3.3	15.0	0.28	2.11	1.16	1.24
4T-22780/22720	56	50	71	77	3.5	3.3	6.4	0.40	1.49	0.82	0.618
4T-25578/25520	53	49.5	74	77	2.3	0.8	6.2	0.33	1.79	0.99	0.584
4T-3579/3525	56	49.5	75	81	3.5	3.3	10.0	0.31	1.96	1.08	0.807
4T-26884/26822	55	48.5	71	74	3.5	0.8	7.4	0.32	1.88	1.04	0.511
4T-25577/25520	55	49	74	77	3.5	0.8	6.2	0.33	1.79	0.99	0.582
4T-12175/12303	52	49.5	68	73	1.5	1.5	-0.2	0.51	1.19	0.65	0.308
4T-18685/18620	54	49.5	71	74	2.8	1.5	2.2	0.37	1.60	0.88	0.347
4T-25580/25520	57	50	74	77	3.5	0.8	6.2	0.33	1.79	0.99	0.56
4T-25582/25520	60	50	74	77	5	0.8	6.2	0.33	1.79	0.99	0.564
4T-3578/3520	57	51	74	79.5	3.5	3.3	10.0	0.31	1.96	1.08	0.701
4T-355/354A	54	50	77	80	2.3	1.3	5.1	0.31	1.96	1.08	0.511
4T-3578/3525	57	51	75	81	3.5	3.3	10.0	0.31	1.96	1.08	0.78
4T-HM803149/HM803110	62	53.4	74	85	3.5	3.3	4.6	0.55	1.10	0.60	0.85
4T-3782/3720	58	52	82	87.9	3.5	3.3	8.3	0.34	1.77	0.97	0.959
4T-46175/46368	55	54	79	87	0.8	3.3	7.1	0.40	1.49	0.82	1.04
4T-33885/33821	53	53	85	90	0.8	2.3	8.0	0.33	1.82	1.00	0.986
4T-438/432	57	51	83	87	3.5	2.3	9.2	0.28	2.11	1.16	0.957
4T-HM804842/HM804810	57	57	81	91	0.8	3.3	3.7	0.55	1.10	0.60	1.04
4T-53177/53375	63	52.7	81	89	3.5	0.8	0.5	0.74	0.81	0.45	0.93
4T-HM903249/HM903210	65	54	81	91	3.5	0.8	-0.4	0.74	0.81	0.45	0.999
4T-527/522	59	53	89	95	3.5	3.3	12.9	0.29	2.10	1.16	1.36
4T-460/453X	60	54	92	98	3.5	3.3	7.1	0.34	1.79	0.98	1.29

1) Dimensions with "—" indicate a load center at the outside on the end of an inner ring.

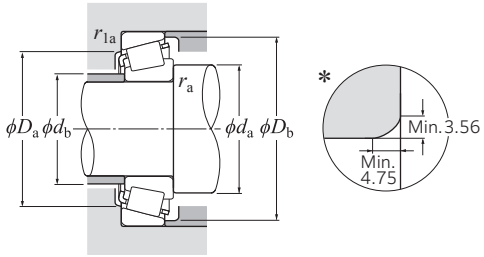
Inch series



d 44.450–47.625 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
44.450	104.775	30.162	30.958	23.812	144	169	3 500	4 700
	104.775	36.512	36.512	28.575	153	189	3 600	4 800
	111.125	30.162	26.909	20.638	115	136	3 200	4 200
	111.125	30.162	26.909	20.638	115	136	3 200	4 200
	127.000	50.800	52.388	41.275	277	320	3 200	4 300
44.983	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
45.000	85.000	20.638	21.692	17.462	77.5	79.5	4 400	5 800
	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
45.237	87.312	30.162	30.886	23.812	104	117	4 400	5 900
45.242	73.431	19.558	19.812	15.748	60.0	76.0	4 800	6 400
	77.788	19.842	19.842	15.080	63.5	73.5	4 600	6 200
45.618	82.550	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	83.058	23.876	25.400	19.114	84.5	98.0	4 500	6 000
	85.000	23.812	25.400	19.050	84.5	98.0	4 500	6 000
45.987	74.976	18.000	18.000	14.000	56.5	71.0	4 700	6 300
46.038	79.375	17.462	17.462	13.495	50.5	56.0	4 600	6 200
	82.931	23.812	25.400	19.050	84.5	98.0	4 500	6 000
	85.000	20.638	21.692	17.462	77.5	79.5	4 400	5 800
	85.000	25.400	25.608	20.638	87.5	104	4 400	5 800
	90.119	23.000	21.692	21.808	77.5	79.5	4 400	5 800
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	95.250	27.783	29.900	22.225	120	129	4 200	5 600
47.625	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
	88.900	25.400	25.400	19.050	91.0	101	4 200	5 600
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	95.250	30.162	29.370	23.020	120	147	4 000	5 300
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	101.600	34.925	36.068	26.988	150	165	3 800	5 000
	104.775	30.162	29.317	24.605	127	148	3 500	4 700

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

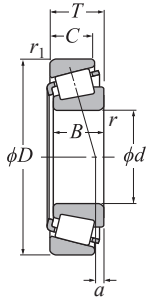
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number 1)	Installation-related dimensions mm						Load center 3) mm	Constant	Axial load factors		Mass kg
					r_{as} 2) Max.	r_{1as} Max.					
	d_a	d_b	D_a	D_b			a	e	Y_2	Y_0	(approx.)
4T-45280/45220	55	54	93	99	0.8	3.3	7.9	0.33	1.80	0.99	1.33
4T-HM807040/HM807010	66	59	89	100	3.5	3.3	7.4	0.49	1.23	0.68	1.62
4T-55175C/55437	70	64	92	105	3.5	3.3	-7.4	0.88	0.68	0.37	1.45
4T-55176C/55437	71	65	92	105	0.8	3.3	-7.4	0.88	0.68	0.37	1.09
4T-6277/6220	67	60	108	117	3.5	3.3	19.5	0.30	2.01	1.11	3.59
4T-25584/25520	53	51	74	77	1.5	0.8	6.2	0.33	1.79	0.99	0.556
4T-3776/3720	59	53	82	87.9	3.5	3.3	8.3	0.34	1.77	0.97	0.95
4T-358/354A	53	50	77	80	1.5	1.3	5.1	0.31	1.96	1.08	0.505
4T-367/362A	55	51	81	84	2	1.3	4.0	0.32	1.88	1.03	0.6
4T-3586/3525	58	52	75	81	3.5	3.3	10.0	0.31	1.96	1.08	0.767
4T-LM102949/LM102910	56	50	68	70	3.5	0.8	4.7	0.31	1.97	1.08	0.309
4T-LM603049/LM603011	58	52	71	74	3.5	0.8	2.2	0.43	1.41	0.77	0.371
4T-25590/25519	58	51	73	77	3.5	2	6.2	0.33	1.79	0.99	0.534
4T-25590/25520	58	51	74	77	3.5	0.8	6.2	0.33	1.79	0.99	0.544
4T-25590/25522	58	51	73	77	3.5	2	6.2	0.33	1.79	0.99	0.545
4T-25590/25526	58	51	74	78	3.5	2.3	6.2	0.33	1.79	0.99	0.581
4T-LM503349A†/LM503310††	57	51	67	71	*	1.5	1.9	0.40	1.49	0.82	0.298
4T-18690/18620	56	51	71	74	2.8	1.5	2.2	0.37	1.60	0.88	0.331
4T-25592/25520	58	52	74	77	3.5	0.8	6.2	0.33	1.79	0.99	0.538
4T-359A/354A	57	51	77	80	3.5	1.3	5.1	0.31	1.96	1.08	0.489
4T-2984/2924	58	52	76	80	3.5	1.3	6.4	0.35	1.73	0.95	0.616
4T-359S/352	55	51	78	82	2.3	2.3	5.1	0.31	1.96	1.08	0.654
4T-3777/3720	60	53	82	87.9	3.5	3.3	8.3	0.34	1.77	0.97	0.934
4T-436/432	59	52	83	87	3.5	2.3	9.2	0.28	2.11	1.16	0.93
4T-369A/362A	60	53	81	84	3.5	1.3	4.0	0.32	1.88	1.03	0.564
4T-M804048/M804010	59	56	77	85	0.8	3.3	1.7	0.55	1.10	0.60	0.664
4T-3778/3720	67	55	82	87.9	6.4	3.3	8.3	0.34	1.77	0.97	0.896
4T-HM804846/HM804810	66	57	81	91	3.5	3.3	3.7	0.55	1.10	0.60	0.979
4T-386A/382A	56	55	89	92	0.8	0.8	3.1	0.35	1.69	0.93	0.719
4T-528/522	62	55	89	95	3.5	3.3	12.9	0.29	2.10	1.16	1.3
4T-463/453X	65	56	92	98	4.8	3.3	7.1	0.34	1.79	0.98	1.24

2) Chamfer dimensions of the bearings marked "*" are shown in the above drawings.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

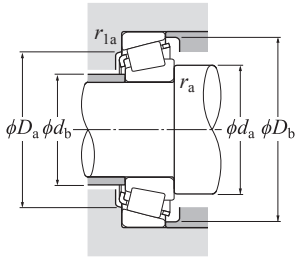
Inch series
J series



d 47.625–50.800 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
47.625	104.775	30.162	30.958	23.812	144	169	3 500	4 700
	111.125	30.162	26.909	20.638	115	136	3 200	4 200
	123.825	36.512	32.791	25.400	171	188	2 900	3 900
48.412	95.250	30.162	29.370	23.020	120	147	4 000	5 300
	95.250	30.162	29.370	23.020	120	147	4 000	5 300
49.212	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	103.188	43.658	44.475	36.512	193	232	3 800	5 000
	104.775	36.512	36.512	28.575	153	189	3 600	4 800
	114.300	44.450	44.450	34.925	206	225	3 600	4 800
	114.300	44.450	44.450	36.068	226	261	3 500	4 700
49.987	82.550	21.590	22.225	16.510	77.5	94.0	4 300	5 700
	92.075	24.608	25.400	19.845	93.0	116	4 000	5 300
	114.300	44.450	44.450	36.068	226	261	3 500	4 700
50.000	82.000	21.500	21.500	17.000	77.5	94.0	4 300	5 700
	84.000	22.000	22.000	17.500	77.5	94.5	4 300	5 700
	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
	90.000	28.000	28.000	23.000	118	141	4 100	5 400
	105.000	37.000	36.000	29.000	153	189	3 600	4 800
	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
50.800	82.550	21.590	22.225	16.510	77.5	94.0	4 300	5 700
	85.000	17.462	17.462	13.495	55.0	65.0	4 200	5 600
	88.900	17.462	17.462	13.495	55.0	65.0	4 200	5 600
	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
	90.000	20.000	22.225	15.875	85.0	90.5	4 100	5 500
	92.075	24.608	25.400	19.845	93.0	116	4 000	5 300
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	95.250	27.783	28.575	22.225	119	139	3 900	5 200
	95.250	30.162	30.302	23.812	113	134	4 000	5 300
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	97.630	24.608	24.608	19.446	98.0	128	3 700	4 900
	98.425	30.162	30.302	23.812	113	134	4 000	5 300

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner ring bore diameters of bearings whose bearing numbers are marked with "†" (inner ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

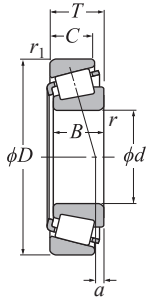
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1)2)]	Installation-related dimensions mm						Load center[3)] mm	Constant	Axial load factors		Mass kg
					r_{as} Max.	r_{1as} Max.					
	d_a	d_b	D_a	D_b			a	e	Y_2	Y_0	(approx.)
4T-45282/45220	63	57	93	99	3.5	3.3	7.9	0.33	1.80	0.99	1.33
4T-55187C/55437	69	62	92	105	3.5	3.3	-7.4	0.88	0.68	0.37	1.4
4T-72188C/72487	69	67	102	116	0.8	3.3	-1.5	0.74	0.81	0.45	2.16
4T-HM804848/HM804810	63	57	81	91	2.3	3.3	3.7	0.55	1.10	0.60	0.967
4T-HM804849/HM804810	66	57	81	91	3.5	3.3	3.7	0.55	1.10	0.60	0.965
4T-3781/3720	62	56	82	87.9	3.5	3.3	8.3	0.34	1.77	0.97	0.876
4T-5395/5335	66	60	89	97	3.5	3.3	16.1	0.30	2.02	1.11	1.75
4T-HM807044/HM807010	69	63	89	100	3.5	3.3	7.4	0.49	1.23	0.68	1.52
4T-65390/65320	70	60	97	107	3.5	3.3	12.5	0.43	1.39	0.77	2.23
4T-HH506348/HH506310	71	61	97	107	3.5	3.3	13.3	0.40	1.49	0.82	2.33
4T-LM104947A†/LM104911	55	55	75	78	0.5	1.3	5.8	0.31	1.97	1.08	0.434
4T-28579†/28521	60	56	83	87	2.3	0.8	4.6	0.38	1.59	0.87	0.718
4T-HH506349†/HH506310	72	61	97	107	3.5	3.3	13.3	0.40	1.49	0.82	2.31
#4T-JLM104948/JLM104910	61	55	76	78	3	0.5	5.4	0.31	1.97	1.08	0.42
#4T-JLM704649/JLM704610	64	56	76	80	3.5	1.5	2.3	0.44	1.37	0.75	0.466
4T-365/362A	58	55	81	84	2	1.3	4.0	0.32	1.88	1.03	0.534
4T-366/362A	59	55	81	84	2.3	1.3	4.0	0.32	1.88	1.03	0.53
#4T-JM205149/JM205110	63	57	80	85	3	2.5	7.4	0.33	1.82	1.00	0.755
#4T-JHM807045/JHM807012	69	63	90	100	3	2.5	7.5	0.49	1.23	0.68	1.52
4T-396/394A	61	60	101	105	0.8	1.3	0.7	0.40	1.49	0.82	1.07
4T-LM104949/LM104911	63	56	75	78	3.5	1.3	5.8	0.31	1.97	1.08	0.418
4T-18790/18720	62	56	77	80	3.5	1.5	0.8	0.41	1.48	0.81	0.375
4T-18790/18724	62	56	78	82	3.5	1.5	0.8	0.41	1.48	0.81	0.431
4T-368/362A	58	56	81	84	1.5	1.3	4.0	0.32	1.88	1.03	0.524
4T-370A/362A	65	56	81	84	5	1.3	4.0	0.32	1.88	1.03	0.516
4T-368A/362	62	56	81	84	3.5	2	4.0	0.32	1.88	1.03	0.53
4T-28580/28521	63	57	83	87	3.5	0.8	4.6	0.38	1.59	0.87	0.703
4T-3775/3720	58	58	82	87.9	0.8	3.3	8.3	0.34	1.77	0.97	0.85
4T-3780/3720	64	58	82	87.9	3.5	3.3	8.3	0.34	1.77	0.97	0.846
4T-33889/33821	64	58	85	90	3.5	2.3	8.0	0.33	1.82	1.00	0.878
4T-3780/3726	64	58	83.1	88.9	3.5	3.3	8.3	0.34	1.77	0.97	0.899
4T-385A/382A	61	60	89	92	2.3	0.8	3.1	0.35	1.69	0.93	0.675
4T-28678/28622	65	58	88	92	3.5	0.8	3.3	0.40	1.49	0.82	0.854
4T-3780/3732	64	58	84.1	89.9	3.5	3.3	8.3	0.34	1.77	0.97	0.99

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

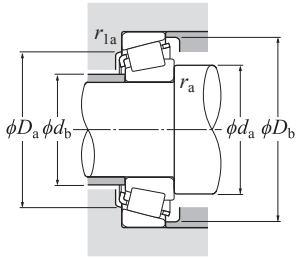
Inch series
J series



d 50.800–55.000 mm

Boundary dimensions mm				Basic load rating kN		Allowable speed min^{-1}	
				dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
50.800	101.600	31.750	31.750	25.400	122	136	3 700	5 000
	101.600	34.925	36.068	26.988	150	165	3 800	5 000
	104.775	30.162	29.317	24.605	127	148	3 500	4 700
	104.775	30.162	30.958	23.812	144	169	3 500	4 700
	104.775	36.512	36.512	28.575	153	189	3 600	4 800
	104.775	36.512	36.512	28.575	158	178	3 700	4 900
	107.950	36.512	36.957	28.575	157	177	3 600	4 800
	111.125	30.162	28.575	20.638	115	136	3 200	4 200
	112.712	30.162	26.909	20.638	115	136	3 200	4 200
	112.712	30.162	30.048	23.812	132	174	3 200	4 300
	112.712	30.162	30.162	23.812	153	195	3 200	4 200
	117.475	33.338	31.750	23.812	144	153	3 300	4 400
	120.650	41.275	41.275	31.750	190	213	3 300	4 400
	123.825	36.512	32.791	25.400	171	188	2 900	3 900
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
51.592	88.900	20.638	22.225	16.513	85.0	90.5	4 100	5 500
52.388	92.075	24.608	25.400	19.845	93.0	116	4 000	5 300
	93.264	30.162	30.302	23.812	113	134	4 000	5 300
	95.250	27.783	28.575	22.225	119	139	3 900	5 200
53.975	88.900	19.050	19.050	13.492	67.5	82.5	4 000	5 300
	95.250	27.783	28.575	22.225	119	139	3 900	5 200
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	104.775	30.162	30.958	23.812	144	169	3 500	4 700
	104.775	36.512	36.512	28.575	153	189	3 600	4 800
	107.950	36.512	36.957	28.575	157	177	3 600	4 800
	120.650	41.275	41.275	31.750	190	213	3 300	4 400
	122.238	33.338	31.750	23.812	149	163	3 100	4 200
	122.238	43.658	43.764	36.512	215	283	3 100	4 100
	123.825	36.512	32.791	25.400	171	188	2 900	3 900
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
	130.175	36.512	33.338	23.812	173	186	2 700	3 600
	140.030	36.512	33.236	23.520	190	212	2 600	3 400
54.488	104.775	36.512	36.512	28.575	153	189	3 600	4 800
55.000	90.000	23.000	23.000	18.500	86.0	109	3 900	5 300

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

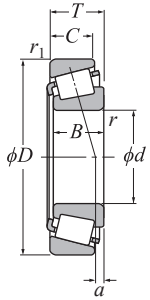
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1]	Installation-related dimensions mm						Load center [2] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-49585/49520	66	59	88	96	3.5	3.3	7.1	0.40	1.50	0.82	1.13
4T-529/522	61	60	89	95	0.8	3.3	12.9	0.29	2.10	1.16	1.23
4T-455/453X	60	59	92	98	0.8	3.3	7.1	0.34	1.79	0.98	1.19
4T-45284/45220	71	59	93	99	6.4	3.3	7.9	0.33	1.80	0.99	1.24
4T-HM807046/HM807010	70	63.1	89	100	3.5	3.3	7.4	0.49	1.23	0.68	1.48
4T-59200/59412	68	61	92	99	3.5	3.3	9.6	0.40	1.49	0.82	1.44
4T-537/532X	65	59	94	100	3.5	3.3	12.3	0.30	2.02	1.11	1.55
4T-HM907643/HM907614	74	65.3	91	105	3.5	3.3	-7.2	0.88	0.68	0.37	1.36
4T-55200C/55443	71	64.4	92	106	3.5	3.3	-7.4	0.88	0.68	0.37	1.34
4T-3975/3920	68	61	99	106	3.5	3.3	4.5	0.40	1.49	0.82	1.53
4T-39575/39520	68	61	101	107	3.5	3.3	6.6	0.34	1.77	0.97	1.54
4T-66200/66462	71	65	100	111	3.5	3.3	0.4	0.63	0.96	0.53	1.68
4T-619/612	67	61	105	110	3.5	3.3	14.4	0.31	1.91	1.05	2.3
4T-72200C/72487	77	67	102	116	3.5	3.3	-1.5	0.74	0.81	0.45	2.1
4T-555/552A	66	62	109	116	2.3	3.3	9.4	0.35	1.73	0.95	2.34
4T-368S/362A	59	56	81	84	2	1.3	4.0	0.32	1.88	1.03	0.512
4T-28584/28521	65	58	83	87	3.5	0.8	4.6	0.38	1.59	0.87	0.703
4T-3767/3720	63	59	82	87.9	2.3	3.3	8.3	0.34	1.77	0.97	0.817
4T-33890/33821	61	59	85	90	1.5	2.3	8.0	0.33	1.82	1.00	0.851
4T-LM806649/LM806610	65	61	80	85	2.3	2	-2.2	0.55	1.10	0.60	0.437
4T-33895/33822	63	60	86	90	1.5	0.8	8.0	0.33	1.82	1.00	0.823
4T-389A/382A	61	60	89	92	0.8	0.8	3.1	0.35	1.69	0.93	0.632
4T-45287/45220	62	62	93	99	0.8	3.3	7.9	0.33	1.80	0.99	1.17
4T-HM807049/HM807010	73	63.1	89	100	3.5	3.3	7.4	0.49	1.23	0.68	1.41
4T-539/532X	68	61	94	100	3.5	3.3	12.3	0.30	2.02	1.11	1.47
4T-621/612	70	63	105	110	3.5	3.3	14.4	0.31	1.91	1.05	2.22
4T-66584/66520	75	68	105	116	3.5	3.3	-1.8	0.67	0.90	0.50	1.81
4T-5578/5535	73	67	106	116	3.5	3.3	13.3	0.36	1.67	0.92	2.64
4T-72212C/72487	79	67	102	116	3.5	3.3	-1.5	0.74	0.81	0.45	2.03
4T-557S/552A	73	67	109	116	3.5	3.3	9.4	0.35	1.73	0.95	2.25
4T-HM911242/HM911210	79	74	109	123.6	3.5	3.3	-5.2	0.82	0.73	0.40	2.28
4T-78214C/78551	79	77.5	117	132	0.8	2.3	-8.5	0.87	0.69	0.38	2.77
4T-HM807048/HM807010	73	63	89	100	3.5	3.3	7.4	0.49	1.23	0.68	1.4
#4T-JLM506849/JLM506810	63	61	82	86	1.5	0.5	2.8	0.40	1.49	0.82	0.556

1) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
2) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

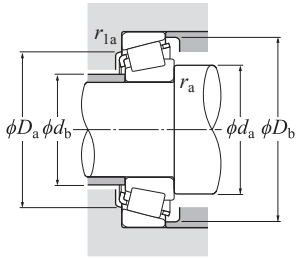
Inch series
J series



d 55.000–60.000 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
55.000	95.000	29.000	29.000	23.500	119	144	3 800	5 100
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	110.000	39.000	39.000	32.000	192	219	3 500	4 600
55.562	97.630	24.608	24.608	19.446	98.0	128	3 700	4 900
	123.825	36.512	32.791	25.400	171	188	2 900	3 900
	127.000	36.512	36.512	26.988	181	228	2 900	3 800
55.575	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
57.150	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
	97.630	24.608	24.608	19.446	98.0	128	3 700	4 900
	104.775	30.162	29.317	24.605	127	148	3 500	4 700
	104.775	30.162	29.317	24.605	127	148	3 500	4 700
	104.775	30.162	30.958	23.812	144	169	3 500	4 700
	107.950	27.783	29.317	22.225	127	148	3 500	4 700
	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
	110.000	27.795	29.317	27.000	127	148	3 500	4 700
	112.712	30.162	30.048	23.812	132	174	3 200	4 300
	112.712	30.162	30.162	23.812	153	195	3 200	4 200
	112.712	30.162	30.162	23.812	153	195	3 200	4 200
	117.475	30.162	30.162	23.812	129	175	3 000	4 000
	117.475	33.338	31.750	23.812	144	153	3 300	4 400
	120.650	41.275	41.275	31.750	190	213	3 300	4 400
	123.825	36.512	32.791	25.400	171	188	2 900	3 900
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
	140.030	36.512	33.236	23.520	190	212	2 600	3 400
57.531	96.838	21.000	21.946	15.875	86.5	96.5	3 700	5 000
59.972	122.238	33.338	31.750	23.812	149	163	3 100	4 200
59.987	146.050	41.275	39.688	25.400	220	234	2 400	3 200
60.000	95.000	24.000	24.000	19.000	92.5	122	3 700	4 900
	107.950	25.400	25.400	19.050	101	140	3 200	4 300

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner ring bore diameters of bearings whose bearing numbers are marked with "†" (inner ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load
$P_r = XF_r + YF_a$

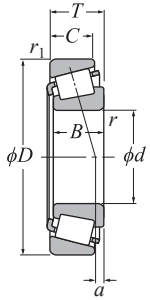
$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load
$P_{0r} = 0.5F_r + Y_0F_a$
When $P_{0r} < F_r$ use $P_{0r} = F_r$.
For values of e, Y_2 and Y_0 see the table below.

Bearing number [1)2)]	Installation-related dimensions mm						Load center[3)] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
#4T-JM207049/JM207010	64	62	85	91	1.5	2.5	7.6	0.33	1.79	0.99	0.823
4T-385/382A	65	61	89	92	2.3	0.8	3.1	0.35	1.69	0.93	0.615
#4T-JH307749/JH307710	71	64	97	104	3	2.5	11.7	0.35	1.73	0.95	1.7
4T-28680/28622	68	62	88	92	3.5	0.8	3.3	0.40	1.49	0.82	0.776
4T-72218C/72487	80	67	102	116	3.5	3.3	-1.5	0.74	0.81	0.45	2
4T-HM813840/HM813810	78	72	111	121	3.5	3.3	3.7	0.50	1.20	0.66	2.34
4T-389/382A	65	61	89	92	2.3	0.8	3.1	0.35	1.69	0.93	0.606
4T-387/382A	67	63	89	92	2.3	0.8	3.1	0.35	1.69	0.93	0.582
4T-387A/382A	70	63	89	92	3.5	0.8	3.1	0.35	1.69	0.93	0.58
4T-387AS/382A	73	63	89	92	5	0.8	3.1	0.35	1.69	0.93	0.575
4T-387S/382A	64	63	89	92	0.8	0.8	3.1	0.35	1.69	0.93	0.584
4T-28682/28622	70	63	88	92	3.5	0.8	3.3	0.40	1.49	0.82	0.749
4T-462/453X	67	63	92	98	2.3	3.3	7.1	0.34	1.79	0.98	1.06
4T-469/453X	72	68	92	98	3.5	3.3	7.1	0.34	1.79	0.98	1.06
4T-45289/45220	65	65	93	99	0.8	3.3	7.9	0.33	1.80	0.99	1.1
4T-469/453A	72	68	97	100	3.5	0.8	7.1	0.34	1.79	0.98	1.11
4T-390/394A	70	66	101	105	2.3	1.3	0.7	0.40	1.49	0.82	0.961
4T-469/454	72	68	96	100	3.5	2	7.1	0.34	1.79	0.98	1.24
4T-3979/3920	72	66	99	106	3.5	3.3	4.5	0.40	1.49	0.82	1.41
4T-39580/39520	74	68	101	107	3.5	3.3	6.6	0.34	1.77	0.97	1.41
4T-39581/39520	81	66	101	107	8	3.3	6.6	0.34	1.77	0.97	1.4
4T-33225/33462	74	68	104	112	3.5	3.3	2.6	0.44	1.38	0.76	1.58
4T-66225/66462	76	68.9	100	111	3.5	3.3	0.4	0.63	0.96	0.53	1.54
4T-623/612	72	66	105	110	3.5	3.3	14.4	0.31	1.91	1.05	2.13
4T-72225C/72487	81	67	102	116	3.5	3.3	-1.5	0.74	0.81	0.45	1.96
4T-555S/552A	76	70	109	116	3.5	3.3	9.4	0.35	1.73	0.95	2.17
4T-78225/78551	83	77	117	132	3.5	2.3	-8.5	0.87	0.69	0.38	2.69
4T-388A/382A	70	63	89	92	3.5	0.8	3.1	0.35	1.69	0.93	0.574
4T-66589/66520	74	73	105	116	0.8	3.3	-1.8	0.67	0.90	0.50	1.66
4T-H913840†/H913810	97	82	124	138	3.5	3.3	-4.3	0.78	0.77	0.42	3.22
#4T-JLM508748/JLM508710	75	66	85	91	5	2.5	3.0	0.40	1.49	0.82	0.609
4T-29580/29520	75	68	96	103	3.5	3.3	0.6	0.46	1.31	0.72	0.992

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

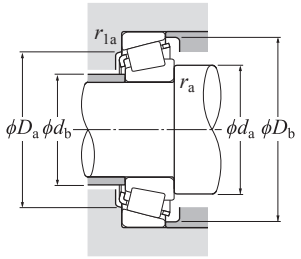
Inch series
J series



d 60.000–65.000 mm

Boundary dimensions					Basic load rating		Allowable speed	
		mm			dynamic kN	static	min^{-1}	
d	*D*	*T*	*B*	*C*	C_r	C_{0r}	Grease lubrication	Oil lubrication
60.000	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
	130.000	34.100	30.924	22.650	173	186	2 700	3 600
60.325	100.000	25.400	25.400	19.845	100	134	3 500	4 700
	112.712	30.162	30.048	23.812	132	174	3 200	4 300
	122.238	38.100	38.354	29.718	208	244	3 100	4 100
	122.238	43.658	43.764	36.512	215	283	3 100	4 100
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
	127.000	36.512	36.512	26.988	181	228	2 900	3 800
	127.000	44.450	44.450	34.925	226	263	3 100	4 200
	130.175	36.512	33.338	23.812	173	186	2 700	3 600
61.912	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
	136.525	46.038	46.038	36.512	248	355	2 600	3 500
	146.050	41.275	39.688	25.400	220	234	2 400	3 200
61.976	101.600	24.608	24.608	19.845	100	134	3 500	4 700
62.738	101.600	25.400	25.400	19.845	100	134	3 500	4 700
63.500	94.458	19.050	19.050	15.083	67.0	103	3 600	4 800
	107.950	25.400	25.400	19.050	101	140	3 200	4 300
	107.950	25.400	25.400	19.050	101	140	3 200	4 300
	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
	110.000	25.400	25.400	19.050	101	140	3 200	4 300
	112.712	30.162	30.048	23.812	132	174	3 200	4 300
	112.712	30.162	30.162	23.812	153	195	3 200	4 200
	120.000	29.794	29.007	24.237	142	177	3 000	4 000
	120.000	29.794	29.007	24.237	142	177	3 000	4 000
	122.238	38.100	38.354	29.718	208	244	3 100	4 100
	122.238	43.658	43.764	36.512	215	283	3 100	4 100
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
	127.000	36.512	36.170	28.575	181	229	2 900	3 800
	127.000	36.512	36.512	26.988	181	228	2 900	3 800
	136.525	41.275	41.275	31.750	215	262	2 800	3 800
	140.030	36.512	33.236	23.520	190	212	2 600	3 400
65.000	105.000	24.000	23.000	18.500	94.5	117	3 300	4 500
	110.000	28.000	28.000	22.500	132	174	3 200	4 300

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	*Y*	*X*	*Y*
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

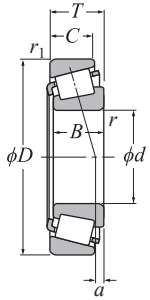
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of *e*, Y_2 and Y_0 see the table below.

Bearing number [1]	Installation-related dimensions						Load center [2]	Constant	Axial load factors		Mass
	mm						mm				kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	*a*	*e*	Y_2	Y_0	(approx.)
4T-397/394A	69	68	101	105	0.8	1.3	0.7	0.40	1.49	0.82	0.918
#4T-JHM911244/JHM911211	84	74	109	123	3.5	3.3	-7.6	0.82	0.73	0.40	2.01
4T-28985/28921	73	67	89	96	3.5	3.3	2.5	0.43	1.41	0.78	0.769
4T-3980/3920	75	68	99	106	3.5	3.3	4.5	0.40	1.49	0.82	1.34
4T-HM212044/HM212011	85	70	108	116	8	3.3	11.1	0.34	1.78	0.98	2.02
4T-5583/5535	78	72	106	116	3.5	3.3	13.3	0.36	1.67	0.92	2.45
4T-558/552A	76	72	109	116	2.3	3.3	9.4	0.35	1.73	0.95	2.09
4T-HM813841/HM813810	83	77	111	121	3.5	3.3	3.7	0.50	1.20	0.66	2.21
4T-65237/65500	87	71	107	119	3.5	3.3	9.3	0.49	1.23	0.68	2.59
4T-HM911245/HM911210	93	74	109	123.6	5	3.3	-5.2	0.82	0.73	0.40	2.12
4T-392/394A	70	69	101	105	0.8	1.3	0.7	0.40	1.49	0.82	0.88
4T-H715334/H715311	87	81	118	132	3.5	3.3	8.7	0.47	1.27	0.70	3.47
4T-H913842/H913810	90	82.4	124	138	3.5	3.3	-4.3	0.78	0.77	0.42	3.17
4T-28990/28920	72	68	90	97	2	3.3	1.7	0.43	1.41	0.78	0.766
4T-28995/28920	75	69	90	97	3.5	3.3	2.5	0.43	1.41	0.78	0.762
4T-L610549/L610510	71	69	86	91	1.5	1.5	-0.6	0.42	1.41	0.78	0.453
4T-29585/29520	77	71	96	103	3.5	3.3	0.6	0.46	1.31	0.72	0.924
4T-29586/29520	73	71	96	103	1.5	3.3	0.6	0.46	1.31	0.72	0.93
4T-390A/394A	73	70	101	105	1.5	1.3	0.7	0.40	1.49	0.82	0.858
4T-29585/29521	77	71	99	104	3.5	1.3	0.6	0.46	1.31	0.72	0.982
4T-3982/3920	77	71	99	106	3.5	3.3	4.5	0.40	1.49	0.82	1.27
4T-39585/39520	77	71	101	107	3.5	3.3	6.6	0.34	1.77	0.97	1.27
4T-477/472	73	72	107	114	0.8	2	3.9	0.38	1.56	0.86	1.6
4T-483/472	78	72	107	114	3.5	2	3.9	0.38	1.56	0.86	1.43
4T-HM212046/HM212011	80	73	108	116	3.5	3.3	11.1	0.34	1.78	0.98	1.95
4T-5584/5535	81	75	106	116	3.5	3.3	13.3	0.36	1.67	0.92	2.34
4T-559/552A	81	75	109	116	3.5	3.3	9.4	0.35	1.73	0.95	2.01
4T-565/563	80	73	112	120	3.5	3.3	8.3	0.36	1.65	0.91	2.11
4T-HM813842/HM813810	84	78	111	121	3.5	3.3	3.7	0.50	1.20	0.66	2.13
4T-639/632	81	74	118	125	3.5	3.3	11.4	0.36	1.66	0.91	2.85
4T-78250/78551	85	79	117	132	2.3	2.3	-8.5	0.87	0.69	0.38	2.54
#4T-JLM710949/JLM710910	77	71	96	100.5	3	1	0.3	0.45	1.32	0.73	0.744
#4T-JM511946/JM511910	78	72	99	105	3	2.5	3.4	0.40	1.49	0.82	1.09

1) Bearing numbers marked "#" designate **J-series** bearings. The tolerance of these bearings is listed in **Table 6.8** on page **A-66** to **A-67**.
2) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

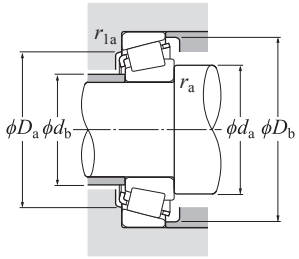
Inch series
J series



d 65.000–70.000 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
65.000	120.000	39.000	38.500	32.000	205	248	3 100	4 100
65.088	135.755	53.975	56.007	44.450	310	380	2 900	3 800
66.675	103.213	17.602	17.602	11.989	66.5	78.0	3 300	4 400
	107.950	25.400	25.400	19.050	101	140	3 200	4 300
	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
	112.712	30.162	30.048	23.812	132	174	3 200	4 300
	112.712	30.162	30.048	23.812	132	174	3 200	4 300
	112.712	30.162	30.162	23.812	153	195	3 200	4 200
	122.238	38.100	38.354	29.718	208	244	3 100	4 100
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
	127.000	36.512	36.512	26.988	181	228	2 900	3 800
	130.175	41.275	41.275	31.750	215	262	2 800	3 800
	135.755	53.975	56.007	44.450	310	380	2 900	3 800
	136.525	41.275	41.275	31.750	215	262	2 800	3 800
	136.525	41.275	41.275	31.750	251	293	2 700	3 700
68.262	110.000	22.000	21.996	18.824	99.5	120	3 200	4 300
	120.000	29.794	29.007	24.237	142	177	3 000	4 000
	123.825	38.100	36.678	30.162	175	216	3 000	4 100
	136.525	41.275	41.275	31.750	251	293	2 700	3 700
	136.525	46.038	46.038	36.512	248	355	2 600	3 500
69.850	112.712	25.400	25.400	19.050	106	151	3 100	4 100
	117.475	30.162	30.162	23.812	129	175	3 000	4 000
	120.000	29.794	29.007	24.237	142	177	3 000	4 000
	120.000	32.545	32.545	26.195	163	214	3 000	4 000
	120.650	25.400	25.400	19.050	106	151	3 100	4 100
	127.000	36.512	36.170	28.575	181	229	2 900	3 800
	136.525	41.275	41.275	31.750	215	262	2 800	3 800
	146.050	41.275	41.275	31.750	228	295	2 500	3 300
	150.089	44.450	46.672	36.512	289	360	2 400	3 200
	168.275	53.975	56.363	41.275	375	460	2 200	3 000
69.952	121.442	24.608	23.012	17.462	101	127	2 900	3 800
70.000	110.000	26.000	25.000	20.500	108	150	3 200	4 200
	115.000	29.000	29.000	23.000	138	171	3 100	4 100

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

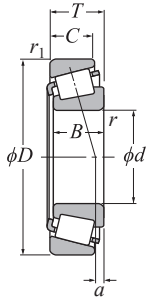
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1]	Installation-related dimensions mm						Load center [2] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
#4T-JH211749/JH211710	80	74	107	114	3	2.5	10.9	0.34	1.78	0.98	1.9
4T-6379/6320	84	77	117	126	3.5	3.3	18.8	0.32	1.85	1.02	3.71
4T-L812148/L812111	75	72	96	99	1.5	0.8	-3.7	0.49	1.23	0.68	0.48
4T-29590/29520	80	73	96	103	3.5	3.3	0.6	0.46	1.31	0.72	0.86
4T-395A/394A	73	73	101	105	0.8	1.3	0.7	0.40	1.49	0.82	0.803
4T-3984/3925	80	74	101	106	3.5	0.8	4.5	0.40	1.49	0.82	1.19
4T-3994/3920	86	75	99	106	5.5	3.3	4.5	0.40	1.49	0.82	1.18
4T-39590/39520	82	75	101	107	3.5	3.3	6.6	0.34	1.77	0.97	1.28
4T-HM212049/HM212010	82	75.5	110	116	3.5	1.5	11.1	0.34	1.78	0.98	1.84
4T-560/552A	84	77	109	116	3.5	3.3	9.4	0.35	1.73	0.95	1.9
4T-HM813844/HM813810	88	82	111	121	3.5	3.3	3.7	0.50	1.20	0.66	2.03
4T-641/633	83	77	116	124	3.5	3.3	11.4	0.36	1.66	0.91	2.41
4T-6386/6320	87	77	117	126	4.3	3.3	18.8	0.32	1.85	1.02	3.64
4T-641/632	83	77	118	125	3.5	3.3	11.4	0.36	1.66	0.91	2.75
4T-H414242/H414210	85	81	121	129	3.5	3.3	11.0	0.36	1.67	0.92	2.75
4T-399A/394A	78	74	101	105	2.3	1.3	0.7	0.40	1.49	0.82	0.772
4T-480/472	82	75	107	114	3.5	2	3.9	0.38	1.56	0.86	1.13
4T-560S/552A	83	76	109	116	3.5	3.3	9.4	0.35	1.73	0.95	1.87
4T-H414245/H414210	86	82	121	129	3.5	3.3	11.0	0.36	1.67	0.92	2.7
4T-H715343/H715311	92	86	118	132	3.5	3.3	8.7	0.47	1.27	0.70	3.23
4T-29675/29620	80	77	101	109	1.5	3.3	-0.9	0.49	1.23	0.68	0.95
4T-33275/33462	85	79	104	112	3.5	3.3	2.6	0.44	1.38	0.76	1.28
4T-482/472	83	77	107	114	3.5	2	3.9	0.38	1.56	0.86	1.33
4T-47487/47420	84	78	107	114	3.5	3.3	6.1	0.36	1.67	0.92	1.63
4T-29675/29630	80	77	104	113	1.5	3.3	-0.9	0.49	1.23	0.68	1.17
4T-566/563	85	78	112	120	3.5	3.3	8.3	0.36	1.65	0.91	1.91
4T-643/632	86	80	118	125	3.5	3.3	11.4	0.36	1.66	0.91	2.63
4T-655/653	88	82	131	139	3.5	3.3	8.0	0.41	1.47	0.81	3.28
4T-745A/742	88	82	134	142	3.5	3.3	12.0	0.33	1.84	1.01	3.93
4T-835/832	91	84	149	155	3.5	3.3	18.5	0.30	2.00	1.10	6.14
4T-34274/34478	81	78	110	116	2	2	-1.2	0.45	1.33	0.73	1.11
#4T-JLM813049/JLM813010	78	77	98	105	1	2.5	-0.3	0.49	1.23	0.68	0.888
#4T-JM612949/JM612910	83	77	103	110	3	2.5	2.5	0.43	1.39	0.77	1.12

1) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
2) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

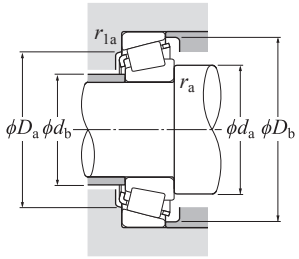
Inch series
J series



d 70.000–76.200 mm

Boundary dimensions					Basic load rating		Allowable speed	
		mm			dynamic kN	static	min^{-1}	
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
70.000	120.000	29.794	29.007	24.237	142	177	3 000	4 000
	150.000	41.275	39.688	25.400	220	234	2 400	3 200
71.438	117.475	30.162	30.162	23.812	129	175	3 000	4 000
	120.000	32.545	32.545	26.195	163	214	3 000	4 000
	127.000	36.512	36.170	28.575	181	229	2 900	3 800
	136.525	41.275	41.275	31.750	215	262	2 800	3 800
	136.525	41.275	41.275	31.750	251	293	2 700	3 700
	136.525	46.038	46.038	36.512	248	355	2 600	3 500
73.025	112.712	25.400	25.400	19.050	106	151	3 100	4 100
	117.475	30.162	30.162	23.812	129	175	3 000	4 000
	127.000	36.512	36.170	28.575	181	229	2 900	3 800
	139.992	36.512	36.098	28.575	197	265	2 600	3 400
	149.225	53.975	54.229	44.450	320	410	2 500	3 400
	150.089	44.450	46.672	36.512	289	360	2 400	3 200
73.817	112.712	25.400	25.400	19.050	106	151	3 100	4 100
	127.000	36.512	36.170	28.575	181	229	2 900	3 800
74.612	139.992	36.512	36.098	28.575	197	265	2 600	3 400
75.000	115.000	25.000	25.000	19.000	105	143	3 000	4 000
	120.000	31.000	29.500	25.000	145	197	2 900	3 900
	145.000	51.000	51.000	42.000	320	410	2 500	3 400
76.200	109.538	19.050	19.050	15.083	70.0	115	3 100	4 100
	121.442	24.608	23.012	17.462	101	127	2 900	3 800
	121.442	24.608	23.012	17.462	101	127	2 900	3 800
	127.000	30.162	31.000	22.225	150	194	2 800	3 700
	133.350	33.338	33.338	26.195	170	235	2 600	3 500
	133.350	39.688	39.688	32.545	196	305	2 600	3 500
	135.733	44.450	46.100	34.925	235	330	2 700	3 500
	136.525	30.162	29.769	22.225	143	189	2 600	3 500
	139.992	36.512	36.098	28.575	197	265	2 600	3 400
	139.992	36.512	36.098	28.575	197	265	2 600	3 400
	146.050	41.275	41.275	31.750	228	295	2 500	3 300
	149.225	53.975	54.229	44.450	320	410	2 500	3 400
	150.089	44.450	46.672	36.512	289	360	2 400	3 200

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

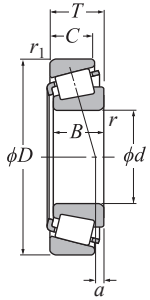
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1]	Installation-related dimensions						Load center [2]	Constant	Axial load factors		Mass
	mm						mm				kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-484/472	80	77	107	114	2	2	3.9	0.38	1.56	0.86	1.33
#4T-JH913848/JH913811	92	82.3	126	146	2	3.3	-4.3	0.78	0.77	0.42	3.09
4T-33281/33462	87	80	104	112	3.5	3.3	2.6	0.44	1.38	0.76	1.24
4T-47490/47420	86	79	107	114	3.5	3.3	6.1	0.36	1.67	0.92	1.42
4T-567A/563	86	80	112	120	3.5	3.3	8.3	0.36	1.65	0.91	1.87
4T-644/632	87	81	118	125	3.5	3.3	11.4	0.36	1.66	0.91	2.58
4T-H414249/H414210	89	83.3	121	129	3.5	3.3	11.0	0.36	1.67	0.92	2.58
4T-H715345/H715311	94	88	118	132	3.5	3.3	8.7	0.47	1.27	0.70	3.11
4T-29685/29620	86	80	101	109	3.5	3.3	-0.9	0.49	1.23	0.68	0.874
4T-33287/33462	88	81	104	112	3.5	3.3	2.6	0.44	1.38	0.76	1.19
4T-567/563	88	81	112	120	3.5	3.3	8.3	0.36	1.65	0.91	1.82
4T-576/572	90	83	125	133	3.5	3.3	5.5	0.40	1.49	0.82	2.52
4T-6460/6420	93	87	129	140	3.5	3.3	14.8	0.36	1.66	0.91	4.43
4T-744/742	91	85	134	142	3.5	3.3	12.0	0.33	1.84	1.01	3.8
4T-29688/29620	83	80	101	109	1.5	3.3	-0.9	0.49	1.23	0.68	0.862
4T-568/563	83	82	112	120	0.8	3.3	8.3	0.36	1.65	0.91	1.8
4T-577/572	91	85	125	133	3.5	3.3	5.5	0.40	1.49	0.82	2.47
#4T-JLM714149/JLM714110	88	82	104	110.5	3	2.5	-0.3	0.46	1.31	0.72	0.88
#4T-JM714249/JM714210	88	82.9	108	115	3	2.5	1.9	0.44	1.35	0.74	1.29
#4T-JH415647/JH415610	94	89	129	139	3	2.5	14.1	0.36	1.66	0.91	3.82
4T-L814749/L814710	84	82	100	105	1.5	1.5	-5.0	0.50	1.20	0.66	0.579
4T-34300/34478	86	83	110	116	2	2	-1.2	0.45	1.33	0.73	0.978
4T-34301/34478	89	83	110	116	3.5	2	-1.2	0.45	1.33	0.73	0.976
4T-42687/42620	90	84	114	121	3.5	3.3	2.8	0.42	1.43	0.79	1.46
4T-47678/47620	97	85	119	128	6.4	3.3	3.9	0.40	1.48	0.82	1.92
4T-HM516442/HM516410	93	87	118	128	3.5	3.3	7.5	0.40	1.49	0.82	2.43
4T-5760/5735	94	88	119	130	3.5	3.3	11.0	0.41	1.48	0.81	2.75
4T-495A/493	92	86	122	130	3.5	3.3	0.7	0.44	1.35	0.74	1.83
4T-575/572	92	86	125	133	3.5	3.3	5.5	0.40	1.49	0.82	2.42
4T-575S/572	99	86	125	133	6.8	3.3	5.5	0.40	1.49	0.82	2.4
4T-659/653	93	87	131	139	3.5	3.3	8.0	0.41	1.47	0.81	3.04
4T-6461A/6420	108	89	129	140	9.7	3.3	14.8	0.36	1.66	0.91	4.24
4T-748S/742	93	87	134	142	3.5	3.3	12.0	0.33	1.84	1.01	3.65

1) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
2) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

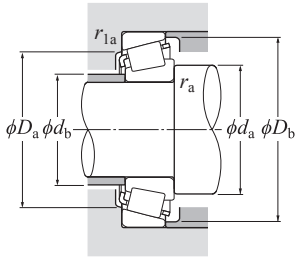
Inch series
J series



d 76.200–83.345 mm

Boundary dimensions mm				Basic load rating kN		Allowable speed min^{-1}	
				dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
76.200	149.225	53.975	54.229	44.450	320	410	2 500	3 400
	161.925	53.975	55.100	42.862	340	460	2 300	3 000
	180.975	53.975	53.183	35.720	360	415	1 900	2 600
	190.500	57.150	57.531	46.038	490	610	1 900	2 600
77.788	117.475	25.400	25.400	19.050	110	162	2 900	3 900
	121.442	24.608	23.012	17.462	101	127	2 900	3 800
	127.000	30.162	31.000	22.225	150	194	2 800	3 700
	136.525	30.162	29.769	22.225	143	189	2 600	3 500
	136.525	46.038	46.038	36.512	248	355	2 600	3 500
79.375	146.050	41.275	41.275	31.750	228	295	2 500	3 300
	161.925	47.625	48.260	38.100	299	385	2 300	3 100
	190.500	57.150	57.531	46.038	490	610	1 900	2 600
80.000	130.000	35.000	34.000	28.500	184	249	2 700	3 600
80.962	133.350	33.338	33.338	26.195	170	235	2 600	3 500
	136.525	30.162	29.769	22.225	143	189	2 600	3 500
	139.992	36.512	36.098	28.575	197	265	2 600	3 400
	150.089	44.450	46.672	36.512	289	360	2 400	3 200
82.550	125.412	25.400	25.400	19.845	113	163	2 700	3 600
	133.350	33.338	33.338	26.195	170	235	2 600	3 500
	133.350	39.688	39.688	32.545	196	305	2 600	3 500
	136.525	30.162	29.769	22.225	143	189	2 600	3 500
	139.992	36.512	36.098	28.575	197	265	2 600	3 400
	139.992	36.512	36.098	28.575	197	265	2 600	3 400
	146.050	41.275	41.275	31.750	228	295	2 500	3 300
	150.089	44.450	46.672	36.512	289	360	2 400	3 200
	152.400	39.688	36.322	30.162	199	279	2 300	3 100
	152.400	41.275	41.275	31.750	228	295	2 500	3 300
	161.925	47.625	48.260	38.100	299	385	2 300	3 100
	161.925	53.975	55.100	42.862	340	460	2 300	3 000
	168.275	53.975	56.363	41.275	375	460	2 200	3 000
83.345	125.412	25.400	25.400	19.845	113	163	2 700	3 600
	125.412	25.400	25.400	19.845	113	163	2 700	3 600
	125.412	25.400	25.400	19.845	113	163	2 700	3 600

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

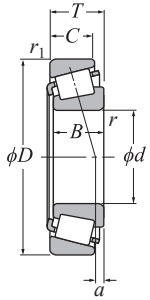
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number 1)2)	Installation-related dimensions mm						Load center3) mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-6461/6420	96	89	129	140	3.5	3.3	14.8	0.36	1.66	0.91	4.26
4T-6576/6535	99	92	141	154	3.5	3.3	12.8	0.40	1.50	0.82	5.43
4T-H917840/H917810††	110	100.1	152	170	3.5	3.3	-0.5	0.73	0.82	0.45	6.57
4T-HH221430/HH221410	101	95	171	179	3.5	3.3	14.4	0.33	1.79	0.99	8.71
4T-LM814849/LM814810	91	85	105	113	3.5	3.3	-2.3	0.51	1.18	0.65	0.929
4T-34306/34478	91	84	110	116	3.5	2	-1.2	0.45	1.33	0.73	0.94
4T-42690/42620	91	85	114	121	3.5	3.3	2.8	0.42	1.43	0.79	1.24
4T-495AS/493	93	87	122	130	3.5	3.3	0.7	0.44	1.35	0.74	1.78
4T-H715348/H715311	99	88	118	132	3.5	3.3	8.7	0.47	1.27	0.70	2.84
4T-661/653	96	90	131	139	3.5	3.3	8.0	0.41	1.47	0.81	2.92
4T-756A/752	109	94	144	150	8	3.3	12.0	0.34	1.76	0.97	4.55
4T-HH221431/HH221410	103	97	171	179	3.5	3.3	14.4	0.33	1.79	0.99	8.52
#4T-JM515649/JM515610	94	88	117	125	3	2.5	4.9	0.39	1.54	0.85	1.74
4T-47681/47620	95	89	119	128	3.5	3.3	3.9	0.40	1.48	0.82	1.78
4T-496/493	95	89	122	130	3.5	3.3	0.7	0.44	1.35	0.74	1.69
4T-581/572	96	90	125	133	3.5	3.3	5.5	0.40	1.49	0.82	2.25
4T-740/742	101	91	134	142	5	3.3	12.0	0.33	1.84	1.01	3.44
4T-27687/27620	96	89	115	120	3.5	1.5	-0.6	0.42	1.44	0.79	1.05
4T-47686/47620	98	92	119	128	3.5	3.3	3.9	0.40	1.48	0.82	1.72
4T-HM516448/HM516410	106	92	118	128	6.8	3.3	7.5	0.40	1.49	0.82	2.16
4T-495/493	97	90	122	130	3.5	3.3	0.7	0.44	1.35	0.74	1.64
4T-580/572	98	91	125	133	3.5	3.3	5.5	0.40	1.49	0.82	2.19
4T-582/572	104	91	125	133	6.8	3.3	5.5	0.40	1.49	0.82	2.18
4T-663/653	99	92	131	139	3.5	3.3	8.0	0.41	1.47	0.81	2.79
4T-749A/742	99	93	134	142	3.5	3.3	12.0	0.33	1.84	1.01	3.37
4T-595/592A	100	93	135	144	3.5	3.3	2.6	0.44	1.36	0.75	3.02
4T-663/652	99	92	134	141	3.5	3.3	8.0	0.41	1.47	0.81	3.16
4T-757/752	100	94	144	150	3.5	3.3	12.0	0.34	1.76	0.97	4.42
4T-6559C/6535	104	98	141	154	3.5	3.3	12.8	0.40	1.50	0.82	5.1
4T-842/832	101	94	149	155	3.5	3.3	18.5	0.30	2.00	1.10	5.47
4T-27689/27620	90	90	115	120	0.8	1.5	-0.6	0.42	1.44	0.79	1.06
4T-27690/27620	96	89	115	120	3.5	1.5	-0.6	0.42	1.44	0.79	1.03
4T-27691/27620	102	90	115	120	6.4	1.5	-0.6	0.42	1.44	0.79	1.04

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

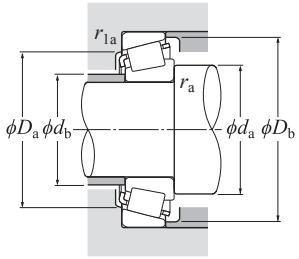
Inch series
J series



d 84.138–95.000 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
84.138	136.525	30.162	29.769	22.225	143	189	2 600	3 500
85.000	130.000	30.000	29.000	24.000	149	214	2 600	3 500
	140.000	39.000	38.000	31.500	218	297	2 500	3 400
85.026	150.089	44.450	46.672	36.512	289	360	2 400	3 200
85.725	133.350	30.162	29.769	22.225	143	189	2 600	3 500
	142.138	42.862	42.862	34.133	240	350	2 500	3 300
	146.050	41.275	41.275	31.750	228	295	2 500	3 300
	152.400	39.688	36.322	30.162	199	279	2 300	3 100
	161.925	47.625	48.260	38.100	299	385	2 300	3 100
87.960	148.430	28.575	28.971	21.433	153	215	2 300	3 100
88.900	121.442	15.083	15.083	11.112	63.0	88.0	2 700	3 600
	123.825	20.638	20.638	16.670	89.0	141	2 700	3 500
	148.430	28.575	28.971	21.433	153	215	2 300	3 100
	152.400	39.688	36.322	30.162	199	279	2 300	3 100
	161.925	47.625	48.260	38.100	299	385	2 300	3 100
	161.925	53.975	55.100	42.862	340	460	2 300	3 000
	168.275	53.975	56.363	41.275	375	460	2 200	3 000
89.974	146.975	40.000	40.000	32.500	252	340	2 400	3 200
90.000	145.000	35.000	34.000	27.000	210	279	2 400	3 200
	155.000	44.000	44.000	35.500	299	385	2 300	3 100
	190.000	50.800	46.038	31.750	310	365	1 800	2 400
90.488	161.925	47.625	48.260	38.100	299	385	2 300	3 100
92.075	146.050	33.338	34.925	26.195	181	266	2 400	3 100
	152.400	39.688	36.322	30.162	199	279	2 300	3 100
	168.275	41.275	41.275	30.162	247	340	2 100	2 800
93.662	148.430	28.575	28.971	21.433	153	215	2 300	3 100
95.000	150.000	35.000	34.000	27.000	199	279	2 300	3 100

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

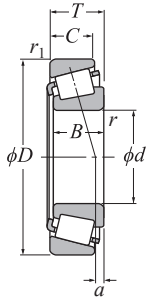
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1)2)]	Installation-related dimensions mm						Load center[3)] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-498/493	98	91	122	130	3.5	3.3	0.7	0.44	1.35	0.74	1.6
#4T-JM716648/JM716610	104	92	117	125	6	2.5	0.2	0.44	1.35	0.74	1.37
#4T-JHM516849/JHM516810	100	94	125	134	3	2.5	5.9	0.41	1.47	0.81	2.3
4T-749/742	101	95	134	142	3.5	3.3	12.0	0.33	1.84	1.01	3.24
4T-497/492A	99	93	120	128	3.5	3.3	0.7	0.44	1.35	0.74	1.43
4T-HM617049/HM617010	106	95.2	125	137	4.8	3.3	6.9	0.43	1.39	0.76	2.71
4T-665/653	102	95	131	139	3.5	3.3	8.0	0.41	1.47	0.81	2.65
4T-596/592A	102	96	135	144	3.5	3.3	2.6	0.44	1.36	0.75	2.9
4T-758/752	106	100	144	150	3.5	3.3	12.0	0.34	1.76	0.97	4.26
4T-42346/42584	103	98	134	142	3	3	-3.0	0.49	1.22	0.67	1.98
4T-LL217849/LL217810	97	94	115	117	1.5	1.5	-2.9	0.33	1.81	1.00	0.452
4T-L217849/L217810	97	94	116	119	1.5	1.5	-0.7	0.33	1.82	1.00	0.737
4T-42350/42584	104	98	134	142	3	3	-3.0	0.49	1.22	0.67	1.95
4T-593/592A	104	98	135	144	3.5	3.3	2.6	0.44	1.36	0.75	2.77
4T-759/752	108	101	144	150	3.5	3.3	12.0	0.34	1.76	0.97	4.1
4T-6580/6535	117	102	141	154	3.5	3.3	12.8	0.40	1.50	0.82	4.72
4T-850/832	106	100	149	155	3.5	3.3	18.5	0.30	2.00	1.10	5.09
4T-HM218248†/HM218210††	112	99	133	141	7	3.5	8.6	0.33	1.8	0.99	2.55
#4T-JM718149/JM718110	106	99	131	138.8	3	2.5	2.0	0.44	1.35	0.74	2.14
#4T-JHM318448/JHM318410	106	100	140	148	3	2.5	10.1	0.34	1.76	0.97	3.33
#4T-J90354/J90748	120	111.8	162	179.3	3.5	3.3	-12.9	0.87	0.69	0.38	6.32
4T-760/752	110	101	144	150	3.5	3.3	12.0	0.34	1.76	0.97	4.01
4T-47890/47820	107	101	131	140	3.5	3.3	0.6	0.45	1.34	0.74	2.08
4T-598A/592A	113	101	135	144	6.4	3.3	2.6	0.44	1.36	0.75	2.63
4T-681/672	110	104	149	160	3.5	3.3	3.0	0.47	1.28	0.7	3.87
4T-42368/42584	107	102	134	142	3	3	-3.0	0.49	1.22	0.67	1.8
#4T-JM719149/JM719113	109	104	135	143	3	2.5	1.7	0.44	1.36	0.75	2.19

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

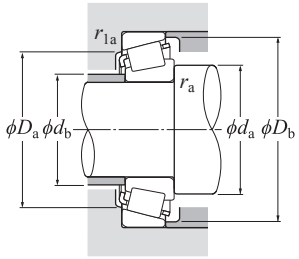
Inch series
J series



d 95.250–109.538 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
95.250	130.175	20.638	21.433	16.670	90.0	147	2 500	3 300
	146.050	33.338	34.925	26.195	181	266	2 400	3 100
	147.638	35.717	36.322	26.192	199	279	2 300	3 100
	148.430	28.575	28.971	21.433	153	215	2 300	3 100
	152.400	39.688	36.322	30.162	199	279	2 300	3 100
	157.162	36.512	36.116	26.195	208	305	2 200	2 900
	168.275	41.275	41.275	30.162	247	340	2 100	2 800
	190.500	57.150	57.531	46.038	490	610	1 900	2 600
96.838	148.430	28.575	28.971	21.433	153	215	2 300	3 100
	188.912	50.800	46.038	31.750	310	365	1 800	2 400
98.425	157.162	36.512	36.116	26.195	208	305	2 200	2 900
	168.275	41.275	41.275	30.162	247	340	2 100	2 800
99.974	212.725	66.675	66.675	53.975	635	810	1 700	2 300
100.000	155.000	36.000	35.000	28.000	213	310	2 200	2 900
100.012	157.162	36.512	36.116	26.195	208	305	2 200	2 900
101.600	157.162	36.512	36.116	26.195	208	305	2 200	2 900
	168.275	41.275	41.275	30.162	247	340	2 100	2 800
	180.975	47.625	48.006	38.100	315	430	2 000	2 700
	190.500	57.150	57.531	44.450	420	555	2 000	2 600
	190.500	57.150	57.531	46.038	490	610	1 900	2 600
	190.500	57.150	57.531	46.038	490	610	1 900	2 600
	212.725	66.675	66.675	53.975	525	695	1 800	2 300
	212.725	66.675	66.675	53.975	635	810	1 700	2 300
104.775	180.975	47.625	48.006	38.100	315	430	2 000	2 700
107.950	158.750	23.020	21.438	15.875	114	166	2 100	2 800
	159.987	34.925	34.925	26.988	186	320	2 100	2 800
	165.100	36.512	36.512	26.988	212	315	2 100	2 700
	212.725	66.675	66.675	53.975	525	695	1 800	2 300
109.538	158.750	23.020	21.438	15.875	114	166	2 100	2 800

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

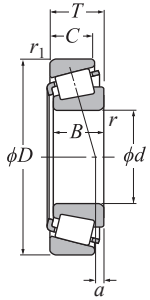
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1)2)]	Installation-related dimensions mm						Load center[3)] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-L319249/L319210	103	101	122	125	1.5	1.5	-1.0	0.35	1.72	0.95	0.786
4T-47896/47820	110	103	131	140	3.5	3.3	0.6	0.45	1.34	0.74	1.95
4T-594A/592XE	113	104	135	142	5	0.8	2.6	0.44	1.36	0.75	2.09
4T-42375/42584	108	103	134	142	3	3	-3.0	0.49	1.22	0.67	1.74
4T-594/592A	110	104	135	144	3.5	3.3	2.6	0.44	1.36	0.75	2.51
4T-52375/52618	112	105	142	152	3.5	3.3	0.6	0.47	1.26	0.69	2.76
4T-683/672	113	106	149	160	3.5	3.3	3.0	0.47	1.28	0.70	3.72
4T-HH221440/HH221410	125	110	171	179	8	3.3	14.4	0.33	1.79	0.99	7.5
4T-42381/42584	112	105	134	142	3.5	3	-3.0	0.49	1.22	0.67	1.69
4T-90381/90744	125	113	161	179	3.5	3.3	-12.9	0.87	0.69	0.38	5.46
4T-52387/52618	114	108	142	152	3.5	3.3	0.6	0.47	1.26	0.69	2.62
4T-685/672	116	109	149	160	3.5	3.3	3.0	0.47	1.28	0.70	3.57
4T-HH224334†/HH224310	124	120	192	201.7	3.5	3.3	18.9	0.33	1.84	1.01	11.5
#4T-JM720249/JM720210	115	109	140	149	3	2.5	-0.3	0.47	1.27	0.70	2.4
4T-52393/52618	116	109	142	152	3.5	3.3	0.6	0.47	1.26	0.69	2.55
4T-52400/52618	117	111	142	152	3.5	3.3	0.6	0.47	1.26	0.69	2.48
4T-687/672	118	112	149	160	3.5	3.3	3.0	0.47	1.28	0.70	3.4
4T-780/772††	119	113	161	168	3.5	3.3	8.1	0.39	1.56	0.86	5.12
4T-861/854	129	114	170	174	8	3.3	15.3	0.33	1.79	0.99	7
4T-HH221449/HH221410	131	115.9	171	179	8	3.3	14.4	0.33	1.79	0.99	7.07
4T-HH221449A/HH221410	122	115.9	171	179	3.5	3.3	14.4	0.33	1.79	0.99	7.06
4T-941/932	130	117	187	193.1	7	3.3	19.7	0.33	1.84	1.01	11.2
4T-HH224335/HH224310	132	121	192	201.7	7	3.3	18.9	0.33	1.84	1.01	11.3
4T-782/772††	122	116	161	168	3.5	3.3	8.1	0.39	1.56	0.86	4.92
4T-37425/37625	122	115	143	152	3.5	3.3	-14.0	0.61	0.99	0.54	1.37
4T-LM522546/LM522510	122	116	146	154	3.5	3.3	1.4	0.40	1.49	0.82	2.37
4T-56425/56650	123	117	149	159	3.5	3.3	-2.0	0.50	1.21	0.66	2.69
4T-936/932	137	122	187	193.1	8	3.3	19.7	0.33	1.84	1.01	10.7
4T-37431/37625	123	116	143	152	3.5	3.3	-14	0.61	0.99	0.54	1.32

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

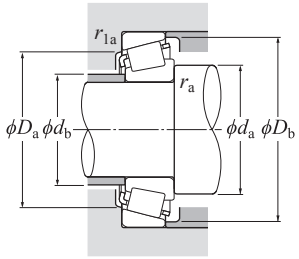
Inch series
J series



d 109.987–133.350 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
109.987	159.987	34.925	34.925	26.988	186	320	2 100	2 800
109.992	177.800	41.275	41.275	30.162	257	375	1 900	2 600
110.000	165.000	35.000	35.000	26.500	212	315	2 100	2 700
	180.000	47.000	46.000	38.000	340	480	1 900	2 600
111.125	214.312	55.562	52.388	39.688	450	560	1 500	2 000
114.300	177.800	41.275	41.275	30.162	257	375	1 900	2 600
	180.975	34.925	31.750	25.400	187	245	1 900	2 500
	212.725	66.675	66.675	53.975	525	695	1 800	2 300
	212.725	66.675	66.675	53.975	635	810	1 700	2 300
	228.600	53.975	49.428	38.100	475	620	1 400	1 900
115.087	190.500	47.625	49.212	34.925	335	475	1 800	2 500
117.475	180.975	34.925	31.750	25.400	187	245	1 900	2 500
120.000	170.000	25.400	25.400	19.050	141	210	2 000	2 600
120.650	234.950	63.500	63.500	49.212	580	825	1 500	2 000
123.825	182.562	39.688	38.100	33.338	249	435	1 800	2 400
127.000	182.562	39.688	38.100	33.338	249	435	1 800	2 400
	196.850	46.038	46.038	38.100	340	550	1 700	2 200
	215.900	47.625	47.625	34.925	355	540	1 600	2 100
	228.600	53.975	49.428	38.100	355	445	1 400	1 900
	228.600	53.975	49.428	38.100	475	620	1 400	1 900
	230.000	63.500	63.500	49.212	580	825	1 500	2 000
	254.000	77.788	82.550	61.912	820	1 070	1 400	1 900
128.588	206.375	47.625	47.625	34.925	350	520	1 700	2 200
130.175	196.850	46.038	46.038	38.100	340	550	1 700	2 200
	206.375	47.625	47.625	34.925	350	520	1 700	2 200
133.350	177.008	25.400	26.195	20.638	140	259	1 800	2 400

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.
1) As for the maximum value for inner and outer ring diameters of bearings whose bearing numbers are marked with "†" (inner ring) and "††" (outer ring), the precision class is an integer for Class 4 and Class 2 bearings only.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

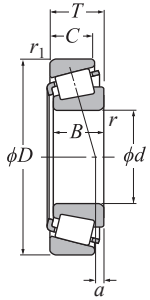
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

Bearing number [1)2)]	Installation-related dimensions mm						Load center[3)] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-LM522548/LM522510	133	118	146	154	8	3.3	1.4	0.40	1.49	0.82	2.24
4T-64433/64700	128	121	160	172	3.5	3.3	-1.1	0.52	1.16	0.64	3.77
#4T-JM822049/JM822010	125	119	149	159	3	2.5	-3.0	0.50	1.21	0.66	2.52
#4T-JHM522649/JHM522610	127	122	162	172	3	2.5	6.0	0.41	1.48	0.81	4.61
4T-H924045/H924010	139	131.2	186	205	3.5	3.3	-6.8	0.67	0.89	0.49	8.47
4T-64450/64700	131	125	160	172	3.5	3.3	-1.1	0.52	1.16	0.64	3.52
4T-68450/68712††	130	123	163	172	3.5	3.3	-5.4	0.50	1.21	0.66	2.93
4T-938/932	141	128	187	193.1	7	3.3	19.7	0.33	1.84	1.01	10.1
4T-HH224346/HH224310	143	131	192	201.7	7	3.3	18.9	0.33	1.84	1.01	10.1
4T-HM926740/HM926710	146	142	200	219.3	3.5	3.3	-13.5	0.74	0.81	0.45	9.76
4T-71453/71750	133	126	171	181	3.5	3.3	6.7	0.42	1.44	0.79	5.11
4T-68462/68712††	132	125	163	172	3.5	3.3	-5.4	0.50	1.21	0.66	2.78
#4T-JL724348/JL724314	132	127	156	163	3.3	3.3	-7.9	0.46	1.31	0.72	1.67
4T-95475/95925	149	137	209	217	6.4	3.3	14.0	0.37	1.62	0.89	12.6
4T-48286/48220	139	133	168	176	3.5	3.3	5.7	0.31	1.97	1.08	3.52
4T-48290/48220	141	135	168	176	3.5	3.3	5.7	0.31	1.97	1.08	3.33
4T-67388/67322	144	138	180	189	3.5	3.3	6.3	0.34	1.74	0.96	5.1
4T-74500/74850	148	141	196	208	3.5	3.3	-2.2	0.49	1.23	0.68	7.04
4T-97500/97900	151	144	197	213	3.5	3.3	-13.4	0.74	0.81	0.45	8.43
4T-HM926747/HM926710	156	143	200	219.3	3.5	3.3	-13.5	0.74	0.81	0.45	8.83
4T-95500/95905	154	142	207	217	6.4	3.3	14.0	0.37	1.62	0.89	12.9
4T-HH228349/HH228310	164	148	223	233.6	9.7	6.4	23.4	0.32	1.87	1.03	18
4T-799/792	146	140	186	196	3.3	3.3	1.9	0.46	1.31	0.72	5.77
4T-67389/67322	147	141	180	189	3.5	3.3	6.3	0.34	1.74	0.96	4.87
4T-799A/792	148	142	186	196	3.5	3.3	1.9	0.46	1.31	0.72	5.65
4T-L327249/L327210	142	140	167	171	1.5	1.5	-3.7	0.35	1.72	0.95	1.7

2) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
3) Dimensions with "–" indicate a load center at the outside on the end of an inner ring.

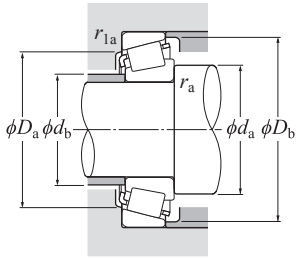
Inch series
J series



d 133.350–196.850 mm

Boundary dimensions mm					Basic load rating kN		Allowable speed min^{-1}	
					dynamic	static		
d	D	T	B	C	C_r	C_{0r}	Grease lubrication	Oil lubrication
133.350	190.500	39.688	39.688	33.338	262	475	1 700	2 300
	196.850	46.038	46.038	38.100	340	550	1 700	2 200
	196.850	46.038	46.038	38.100	340	550	1 700	2 200
	215.900	47.625	47.625	34.925	355	540	1 600	2 100
	234.950	63.500	63.500	49.212	580	825	1 500	2 000
136.525	190.500	39.688	39.688	33.338	262	475	1 700	2 300
	228.600	57.150	57.150	44.450	495	735	1 500	2 000
139.700	215.900	47.625	47.625	34.925	355	540	1 600	2 100
	228.600	57.150	57.150	44.450	495	735	1 500	2 000
	254.000	66.675	66.675	47.625	610	910	1 400	1 800
142.875	200.025	41.275	39.688	34.130	265	490	1 600	2 100
	200.025	41.275	39.688	34.130	265	490	1 600	2 100
146.050	193.675	28.575	28.575	23.020	183	340	1 600	2 200
	254.000	66.675	66.675	47.625	610	910	1 400	1 800
152.400	192.088	25.000	24.000	19.000	144	261	1 600	2 100
	222.250	46.830	46.830	34.925	350	585	1 500	2 000
158.750	205.583	23.812	23.812	18.258	140	247	1 500	2 000
	225.425	41.275	39.688	33.338	282	555	1 400	1 900
165.100	225.425	41.275	39.688	33.338	282	555	1 400	1 900
170.000	230.000	39.000	38.000	31.000	310	520	1 400	1 800
177.800	227.012	30.162	30.162	23.020	201	415	1 300	1 800
	247.650	47.625	47.625	38.100	380	690	1 300	1 700
180.000	250.000	47.000	45.000	37.000	410	710	1 300	1 700
190.000	260.000	46.000	44.000	36.500	405	720	1 200	1 600
196.850	241.300	23.812	23.017	17.462	177	330	1 200	1 600

Note: Chamfer dimensions on the back face of the inner and outer rings of the bearing are larger than the maximum values of installation-related dimensions r_{as} and r_{1as}.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	0	0.4	Y_2

Static equivalent radial load

$P_{0r} = 0.5F_r + Y_0F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

For values of e, Y_2 and Y_0 see the table below.

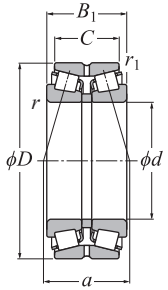
Bearing number [1]	Installation-related dimensions mm						Load center [2] mm	Constant	Axial load factors		Mass kg
	d_a	d_b	D_a	D_b	r_{as} Max.	r_{1as} Max.	a	e	Y_2	Y_0	(approx.)
4T-48385/48320	148	142	177	184	3.5	3.3	4.0	0.32	1.87	1.03	3.64
4T-67390/67322	150	144	180	189	3.5	3.3	6.3	0.34	1.74	0.96	4.63
4T-67391/67322	157	143	180	189	8	3.3	6.3	0.34	1.74	0.96	4.59
4T-74525/74850	152	146	196	208	3.5	3.3	-2.2	0.49	1.23	0.68	6.56
4T-95525/95925	166	148	209	217	9.7	3.3	14.0	0.37	1.62	0.89	11.3
4T-48393/48320	151	144	177	184	3.5	3.3	4.0	0.32	1.87	1.03	3.43
4T-896/892	156	150	205	216	3.5	3.3	6.0	0.42	1.43	0.78	9.12
4T-74550/74850	158	151	196	208	3.5	3.3	-2.2	0.49	1.23	0.68	6.05
4T-898/892	160	153	205	216	3.5	3.3	6.0	0.42	1.43	0.78	8.81
4T-99550/99100	170	156	227	238	7	3.3	12.1	0.41	1.47	0.81	14.3
4T-48684/48620	166	151	185	193	8	3.3	3.1	0.34	1.78	0.98	3.85
4T-48685/48620	158	151	185	193	3.5	3.3	3.1	0.34	1.78	0.98	3.89
4T-36690/36620	155	153	182	188	1.5	1.5	-5.0	0.37	1.63	0.90	2.26
4T-99575/99100	175	162	227	238	7	3.3	12.1	0.41	1.47	0.81	13.6
4T-L630349/L630310	162	158	183	187	2	2	-10.0	0.42	1.44	0.79	1.57
4T-M231648/M231610	178	163	207	213	8	1.5	5.9	0.33	1.80	0.99	5.7
4T-L432349/L432310	168	166	195	199	1.5	1.5	-9.8	0.37	1.61	0.88	1.89
4T-46780/46720	176	169	209	218	3.5	3.3	-2.6	0.38	1.57	0.86	5.19
4T-46790/46720	181	174	209	218	3.5	3.3	-2.6	0.38	1.57	0.86	4.68
#4T-JHM534149/JHM534110	184	178	217	224	3	2.5	-4.7	0.38	1.57	0.86	4.37
4T-36990/36920	188	186	214	221	1.5	1.5	-12.8	0.44	1.36	0.75	2.91
4T-67790/67720	194	188	229	240	3.5	3.3	-4.8	0.44	1.36	0.75	6.72
#4T-JM736149/JM736110	196	190.5	232	242.6	3	2.5	-9.0	0.48	1.25	0.69	6.74
#4T-JM738249/JM738210	206	200	242	252	3	2.5	-10.9	0.48	1.26	0.69	6.84
4T-LL639249/LL639210	205	203	232	236	1.5	1.5	-17.3	0.42	1.44	0.79	2.07

1) Bearing numbers marked "#" designate J-series bearings. The tolerance of these bearings is listed in Table 6.8 on page A-66 to A-67.
2) Dimensions with "—" indicate a load center at the outside on the end of an inner ring.

Double Row Tapered Roller Bearings

NTN

Back-to-back arrangement



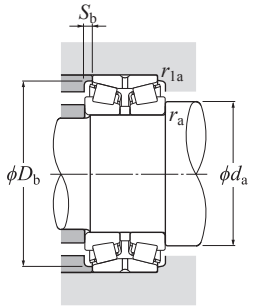
d 40–70 mm

Boundary dimensions mm						Basic load rating kN dynamic	kN static	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication
d	D	B_1	C	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	C_r	C_{0r}	C_u		
40	80	45	37.5	1.5	0.6	116	134	—	4 100	5 500
	80	55	43.5	1.5	0.6	151	187	—	4 100	5 500
	90	56	39.5	2	0.6	147	171	—	3 200	4 200
	90	56	45.5	2	0.6	174	204	—	3 700	4 900
45	85	47	37.5	1.5	0.6	129	157	—	3 700	4 900
	85	55	43.5	1.5	0.6	156	200	—	3 700	4 900
	100	60	41.5	2	0.6	183	218	—	2 800	3 800
	100	60	49.5	2	0.6	212	251	—	3 300	4 400
50	90	49	39.5	1.5	0.6	147	186	—	3 400	4 500
	90	55	43.5	1.5	0.6	166	218	26.6	3 400	4 500
	110	64	43.5	2.5	0.6	216	260	—	2 600	3 500
	110	64	51.5	2.5	0.6	252	305	—	3 000	4 000
	110	90	71.5	2.5	0.6	350	465	56.5	3 000	4 000
55	100	51	41.5	2	0.6	177	221	—	3 100	4 100
	100	60	48.5	2	0.6	206	269	33.0	3 100	4 100
	120	70	49	2.5	0.6	251	305	—	2 400	3 100
	120	70	57	2.5	0.6	295	360	43.5	2 700	3 700
	120	97	76	2.5	0.6	410	550	67.0	2 700	3 700
60	110	53	43.5	2	0.6	199	249	—	2 800	3 800
	110	66	54.5	2	0.6	247	330	40.0	2 800	3 800
	130	74	51	3	1	286	350	—	2 200	2 900
	130	74	59	3	1	340	420	51.0	2 500	3 400
	130	104	81	3	1	465	625	76.5	2 500	3 400
65	120	56	46.5	2	0.6	234	295	—	2 600	3 500
	120	73	61.5	2	0.6	300	410	50.0	2 600	3 500
	140	79	53	3	1	330	410	—	2 000	2 700
	140	79	63	3	1	385	475	57.5	2 300	3 100
	140	108	84	3	1	520	700	85.0	2 300	3 100
70	125	59	48.5	2	0.6	250	325	—	2 400	3 200
	125	74	61.5	2	0.6	315	440	53.5	2 400	3 200
	150	83	57	3	1	365	460	—	1 900	2 500
	150	83	67	3	1	435	545	64.0	2 200	2 900
	150	116	92	3	1	590	805	95.5	2 200	2 900

1) Smallest allowable dimension for chamfer dimension r or r_1.

Double Row Tapered Roller Bearings

NTN



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

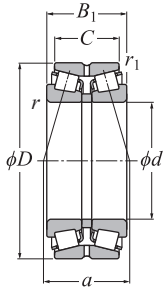
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

Bearing number	Abutment and fillet dimensions mm d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	Load center mm a	Constant e	Axial load factors Y_1	Y_2	Y_0	Mass kg (approx.)
4T-430208X	48.5	75	3.5	1.5	0.6	38.5	0.37	1.80	2.68	1.76	0.956
4T-432208X	48.5	75	5.5	1.5	0.6	43.5	0.37	1.80	2.68	1.76	1.18
4T-430308DX	50	86.5	8	2	0.6	64.5	0.83	0.82	1.22	0.80	1.59
4T-430308	50	83.5	5	2	0.6	44.5	0.35	1.96	2.91	1.91	1.7
4T-430209	53.5	80	4.5	1.5	0.6	42	0.40	1.67	2.48	1.63	1.08
4T-432209	53.5	81	5.5	1.5	0.6	46	0.40	1.67	2.48	1.63	1.27
4T-430309DX	55	96.5	9	2	0.6	70	0.83	0.82	1.22	0.80	2.11
4T-430309	55	93.5	5	2	0.6	47.5	0.35	1.96	2.91	1.91	2.17
4T-430210	58.5	85	4.5	1.5	0.6	45	0.42	1.61	2.39	1.57	1.23
432210U	58.5	86	5.5	1.5	0.6	47.5	0.42	1.61	2.39	1.57	1.4
4T-430310DX	62	104.5	10	2	0.6	75	0.83	0.82	1.22	0.80	2.7
4T-430310	62	103	6	2	0.6	51	0.35	1.96	2.91	1.91	2.81
432310U	62	102.5	9	2	0.6	62.5	0.35	1.96	2.91	1.91	3.98
4T-430211X	65	95	4.5	2	0.6	47.5	0.40	1.67	2.48	1.63	1.57
432211U	65	96	5.5	2	0.6	47.5	0.40	1.67	2.48	1.63	1.89
4T-430311DX	67	113.5	10.5	2	0.6	83	0.83	0.82	1.22	0.80	3.42
430311XU	67	112.5	6.5	2	0.6	56	0.35	1.96	2.91	1.91	3.57
432311U	67	111.5	10.5	2	0.6	66.5	0.35	1.96	2.91	1.91	5.05
4T-430212X	70	104	4.5	2	0.6	49.5	0.40	1.67	2.48	1.63	1.99
432212U	70	105	5.5	2	0.6	56	0.40	1.67	2.48	1.63	2.49
4T-430312DX	74	124	11.5	2.5	1	88.5	0.83	0.82	1.22	0.80	4.3
430312U	74	122	7.5	2.5	1	60	0.35	1.96	2.91	1.91	4.31
432312U	74	121.5	11.5	2.5	1	71	0.35	1.96	2.91	1.91	6.39
4T-430213X	75	114.5	4.5	2	0.6	54	0.40	1.67	2.48	1.63	2.56
432213U	75	115.5	5.5	2	0.6	62	0.40	1.67	2.48	1.63	3.41
4T-430313DX	79	133.5	13	2.5	1	94.5	0.83	0.82	1.22	0.80	5.26
430313XU	79	131.5	8	2.5	1	64	0.35	1.96	2.91	1.91	5.41
432313U	79	131.5	12	2.5	1	74.5	0.35	1.96	2.91	1.91	7.55
4T-430214	80	119	5	2	0.6	57.5	0.42	1.61	2.39	1.57	2.83
432214U	80	120.5	6	2	0.6	65	0.42	1.61	2.39	1.57	3.65
4T-430314DX	84	142.5	13	2.5	1	101.5	0.83	0.82	1.22	0.80	6.32
430314XU	84	141	8	2.5	1	67	0.35	1.96	2.91	1.91	6.53
432314U	84	141	12	2.5	1	80.5	0.35	1.96	2.91	1.91	9.28

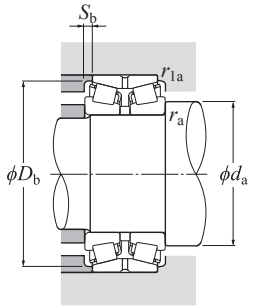
Back-to-back arrangement



d 75–105 mm

Boundary dimensions mm						Basic load rating kN dynamic	static	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Oil lubrication
d	D	B_1	C	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	C_r	C_{0r}	C_u		
75	130	62	51.5	2	0.6	264	350	—	2 300	3 000
	130	74	61.5	2	0.6	320	445	54.0	2 300	3 000
	160	87	59	3	1	410	510	59.5	1 700	2 300
	160	87	69	3	1	485	605	70.0	2 000	2 700
	160	125	99	3	1	675	935	109	2 000	2 700
80	140	64	51.5	2.5	0.6	305	400	47.5	2 100	2 800
	140	78	63.5	2.5	0.6	380	530	63.0	2 100	2 800
	170	92	61	3	1	450	565	64.5	1 600	2 200
	170	92	73	3	1	555	700	79.5	1 900	2 500
	170	131	104	3	1	755	1 050	120	1 900	2 500
85	150	70	57	2.5	0.6	345	465	54.0	2 000	2 700
	150	86	69	2.5	0.6	425	600	70.0	2 000	2 700
	180	98	65	4	1	470	585	66.0	1 500	2 100
	180	98	77	4	1	580	725	81.0	1 800	2 400
	180	137	108	4	1	765	1 050	118	1 800	2 400
90	160	74	61	2.5	0.6	395	535	61.0	1 900	2 500
	160	94	77	2.5	0.6	500	720	82.5	1 900	2 500
	190	102	69	4	1	515	645	71.0	1 500	1 900
	190	102	81	4	1	640	815	89.0	1 700	2 300
	190	144	115	4	1	855	1 190	131	1 700	2 300
95	170	78	63	3	1	430	580	65.0	1 800	2 400
	170	100	83	3	1	570	835	93.5	1 800	2 400
	200	108	85	4	1	700	890	96.5	1 600	2 100
	200	151	118	4	1	955	1 340	146	1 600	2 100
100	180	83	67	3	1	490	675	74.5	1 700	2 200
	180	107	87	3	1	630	925	102	1 700	2 200
	215	112	87	4	1	780	995	106	1 500	2 000
	215	162	127	4	1	1 090	1 540	164	1 500	2 000
105	190	88	70	3	1	545	760	82.5	1 600	2 100
	190	115	95	3	1	720	1 080	118	1 600	2 100

1) Smallest allowable dimension for chamfer dimension r or r_1.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

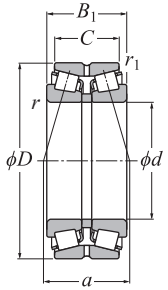
For values of e, Y_1, Y_2 and Y_0 see the table below.

Bearing number	Abutment and fillet dimensions mm					Load center mm	Constant	Axial load factors			Mass kg
	d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
4T-430215	85	125	5	2	0.6	61.5	0.44	1.55	2.31	1.52	3.1
432215U	85	125.5	6	2	0.6	67	0.44	1.55	2.31	1.52	3.68
430315DU	89	152.5	14	2.5	1	107	0.83	0.82	1.22	0.80	7.31
430315XU	89	150.5	9	2.5	1	70.5	0.35	1.96	2.91	1.91	7.71
432315U	89	150.5	13	2.5	1	87.5	0.35	1.96	2.91	1.91	11.5
430216XU	92	133	6	2	0.6	63	0.42	1.61	2.39	1.57	3.76
432216XU	92	135	7	2	0.6	69.5	0.42	1.61	2.39	1.57	4.7
430316DU	94	160.5	15.5	2.5	1	113.5	0.83	0.82	1.22	0.80	8.99
430316XU	94	160	9.5	2.5	1	75.5	0.35	1.96	2.91	1.91	9.4
432316U	94	161.5	13.5	2.5	1	91	0.35	1.96	2.91	1.91	13.6
430217XU	97	141.5	6.5	2	0.6	69	0.42	1.61	2.39	1.57	4.76
432217XU	97	143.5	8.5	2	0.6	76.5	0.42	1.61	2.39	1.57	5.99
430317DU	103	170	16.5	3	1	121.5	0.83	0.82	1.22	0.80	10.4
430317XU	103	168	10.5	3	1	80	0.35	1.96	2.91	1.91	10.8
432317U	103	169	14.5	3	1	96	0.35	1.96	2.91	1.91	15.4
430218U	102	151	6.5	2	0.6	73	0.42	1.61	2.39	1.57	5.85
432218U	102	153.5	8.5	2	0.6	81	0.42	1.61	2.39	1.57	7.35
430318DU	108	180.5	16.5	3	1	127	0.83	0.82	1.22	0.80	12.2
430318U	108	177.5	10.5	3	1	84	0.35	1.96	2.91	1.91	12.5
432318U	108	179	14.5	3	1	100	0.35	1.96	2.91	1.91	18.3
430219XU	109	160.5	7.5	2.5	1	76.5	0.42	1.61	2.39	1.57	6.85
432219XU	109	163	8.5	2.5	1	86.5	0.42	1.61	2.39	1.57	9.2
430319XU	113	185.5	11.5	3	1	89	0.35	1.96	2.91	1.91	14.6
432319U	113	187.5	16.5	3	1	106	0.35	1.96	2.91	1.91	21
430220XU	114	169.5	8	2.5	1	81.5	0.42	1.61	2.39	1.57	8.27
432220XU	114	172	10	2.5	1	92	0.42	1.61	2.39	1.57	11
430320XU	118	198.5	12.5	3	1	92	0.35	1.96	2.91	1.91	17.9
432320U	118	201.5	17.5	3	1	112.5	0.35	1.96	2.91	1.91	26.8
430221XU	119	178.5	9	2.5	1	86	0.42	1.61	2.39	1.57	9.8
432221XU	119	181.5	10	2.5	1	97.5	0.42	1.61	2.39	1.57	13.3

Double Row Tapered Roller Bearings

NTN

Back-to-back arrangement



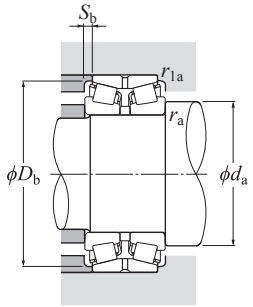
d 110–150 mm

Boundary dimensions mm						Basic load rating kN dynamic	static	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Oil lubrication
d	D	B_1	C	$r_{s\,min}$[1]	$r_{1s\,min}$[1]	C_r	C_{0r}	C_u		
110	180	56	50	2.5	0.6	253	340	37.5	1 600	2 200
	180	70	56	2.5	0.6	330	485	53.0	1 600	2 200
	200	92	74	3	1	615	865	92.5	1 500	2 000
	200	121	101	3	1	800	1 210	130	1 500	2 000
	240	118	93	4	1	910	1 170	120	1 400	1 800
	240	181	142	4	1	1 340	1 940	199	1 400	1 800
120	180	46	41	2.5	0.6	214	298	32.0	1 500	2 100
	180	58	46	2.5	0.6	255	375	40.0	1 500	2 100
	200	62	55	2.5	0.6	291	435	46.0	1 500	2 000
	200	78	62	2.5	0.6	415	610	64.5	1 500	2 000
	215	97	78	3	1	660	940	98.5	1 400	1 900
	215	132	109	3	1	875	1 360	143	1 400	1 900
	260	128	101	4	1	1 060	1 390	139	1 200	1 700
	260	188	145	4	1	1 550	2 270	228	1 200	1 700
130	200	52	46	2.5	0.6	249	365	38.5	1 400	1 900
	200	65	52	2.5	0.6	325	490	51.5	1 400	1 900
	210	64	57	2.5	0.6	350	485	50.5	1 400	1 800
	210	80	64	2.5	0.6	455	675	70.5	1 400	1 800
	230	98	78.5	4	1	710	1 010	103	1 300	1 700
	230	145	117.5	4	1	1 010	1 630	167	1 300	1 700
	280	137	107.5	5	1.5	1 430	1 660	162	1 200	1 600
	280	205	163.5	4	1.5	1 960	2 470	243	1 200	1 600
140	210	53	47	2.5	0.6	291	415	43.0	1 300	1 800
	210	66	53	2.5	0.6	335	535	55.0	1 300	1 800
	225	68	61	3	1	410	580	59.0	1 200	1 700
	225	84	68	3	1	435	650	66.0	1 200	1 700
	250	102	82.5	4	1	800	1 140	114	1 200	1 600
	250	153	125.5	4	1	1 160	1 840	184	1 200	1 600
	300	145	115.5	5	1.5	1 620	1 900	183	1 100	1 500
	300	145	115.5	4	1.5	1 220	1 560	150	1 100	1 400
	300	223	177.5	4	1.5	2 170	2 740	264	1 100	1 500
150	225	56	50	3	1	305	430	43.5	1 200	1 600
	225	70	56	3	1	395	630	64.0	1 200	1 600
	250	80	71	3	1	540	805	79.5	1 200	1 500
	250	100	80	3	1	670	1 040	103	1 200	1 500

1) Smallest allowable dimension for chamfer dimension r or r_1.

Double Row Tapered Roller Bearings

NTN



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

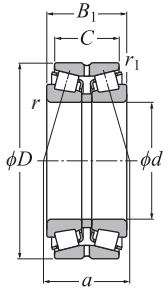
$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

Bearing number[2]	Abutment and fillet dimensions mm					Load center mm	Constant	Axial load factors			Mass kg
	d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
413122	122	170.5	3	2	0.6	66.5	0.40	1.68	2.50	1.64	4.93
423122	122	167.5	7	2	0.6	66.5	0.33	2.03	3.02	1.98	6.38
430222XU	124	188.5	9	2.5	1	90	0.42	1.61	2.39	1.57	11.4
432222XU	124	192	10	2.5	1	102.5	0.42	1.61	2.39	1.57	15.8
430322U	128	222	12.5	3	1	99	0.35	1.96	2.91	1.91	23.9
432322U	128	224	19.5	3	1	127	0.35	1.96	2.91	1.91	37.4
413024	132	172	2.5	2	0.6	59	0.37	1.80	2.69	1.76	3.85
423024	132	171.5	6	2	0.6	66	0.37	1.80	2.69	1.76	4.35
413124	132	185.5	3.5	2	0.6	76.5	0.43	1.57	2.34	1.53	7.24
423124	132	189.5	8	2	0.6	76.5	0.37	1.80	2.69	1.76	8.69
430224XU	134	203	9.5	2.5	1	98	0.44	1.55	2.31	1.52	13.8
432224XU	134	206	11.5	2.5	1	112.5	0.44	1.55	2.31	1.52	19.2
430324XU	138	239	13.5	3	1	107	0.35	1.96	2.91	1.91	30.3
432324U	138	240.5	21.5	3	1	129.5	0.35	1.96	2.91	1.91	47
413026	142	188	3	2	0.6	66	0.37	1.80	2.69	1.76	5.55
423026	142	190.5	6.5	2	0.6	71.5	0.37	1.80	2.69	1.76	6.62
413126	142	197	3.5	2	0.6	69	0.33	2.03	3.02	1.98	7.83
423126	142	199.5	8	2	0.6	79.5	0.37	1.80	2.69	1.76	9.4
430226XU	148	218	9.5	3	1	101.5	0.44	1.55	2.31	1.52	15.3
432226XU	148	220.5	13.5	3	1	123.5	0.44	1.55	2.31	1.52	24
***430326XUUTG**	152	257.5	14.5	4	1.5	116.5	0.35	1.96	2.91	1.91	37.9
***432326UTG**	148	264	20.5	3	1.5	143	0.35	1.95	2.90	1.91	56.6
413028	152	200	3	2	0.6	68.5	0.37	1.80	2.69	1.76	5.73
423028	152	198	6.5	2	0.6	75	0.37	1.84	2.74	1.80	7.07
413128	154	212	3.5	2.5	1	73.5	0.33	2.03	3.02	1.98	9.29
423128	154	211	8	2.5	1	88	0.37	1.80	2.69	1.76	11.1
430228XU	158	235	9.5	3	1	107.5	0.44	1.55	2.31	1.52	19.2
432228XU	158	239.5	13.5	3	1	131.5	0.44	1.55	2.31	1.52	30
***430328XUUTG**	162	275.5	14.5	4	1.5	122.5	0.35	1.96	2.91	1.91	45.3
430328X	158	275.5	14.5	4	1.5	123.5	0.35	1.95	2.90	1.91	43.2
***432328UTG**	158	280.5	22.5	3	1.5	156	0.35	1.95	2.90	1.91	68.9
413030	164	213.5	3	2.5	1	73.5	0.37	1.80	2.69	1.76	6.66
423030	164	213	7	2.5	1	79.5	0.37	1.80	2.69	1.76	8.48
413130	164	232.5	4.5	2.5	1	83.5	0.33	2.03	3.02	1.98	14.6
423130	164	236	10	2.5	1	96.5	0.37	1.80	2.69	1.76	17.6

2) Bearing numbers marked "∗" designate **ULTAGE™ series** bearings.

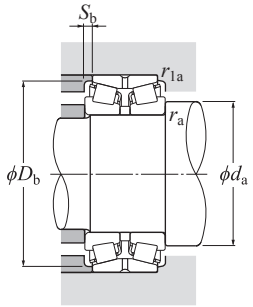
Back-to-back arrangement



d 150–200 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}	
d	D	B_1	C	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication
150	270	109	87	4	1	855	1 210	118	1 100	1 500
	270	164	130	4	1	1 330	2 140	209	1 100	1 500
	320	154	120	5	1.5	1 810	2 140	201	990	1 400
160	240	60	53	3	1	370	535	53.0	1 100	1 500
	240	75	60	3	1	475	765	76.0	1 100	1 500
	270	86	76	3	1	760	965	93.0	1 100	1 600
	270	108	86	3	1	865	1 180	114	1 100	1 600
	290	115	91	4	1	1 150	1 440	137	1 000	1 400
	290	178	144	4	1	1 960	2 840	272	1 000	1 400
	340	160	126	5	1.5	2 010	2 390	221	920	1 300
170	260	67	60	3	1	405	620	60.0	1 100	1 400
	260	84	67	3	1	545	865	83.5	1 100	1 400
	280	88	78	3	1	705	900	86.0	1 000	1 500
	280	110	88	3	1	930	1 270	122	1 000	1 500
	310	125	97	5	1.5	1 340	1 690	159	950	1 400
	310	192	152	5	1.5	2 190	3 200	300	950	1 400
180	280	74	66	3	1	545	735	69.5	1 000	1 400
	280	93	74	3	1	745	1 050	99.5	1 000	1 400
	300	96	85	4	1.5	910	1 190	111	940	1 400
	300	120	96	4	1.5	1 130	1 530	144	940	1 400
	320	127	99	5	1.5	1 380	1 780	165	890	1 300
	320	192	152	5	1.5	2 260	3 350	315	890	1 300
190	290	75	67	3	1	555	740	69.5	940	1 400
	290	94	75	3	1	790	1 110	104	940	1 400
	320	104	92	4	1.5	1 000	1 280	118	890	1 300
	320	130	104	4	1.5	1 260	1 710	157	890	1 300
	340	133	105	5	1.5	1 570	2 010	183	840	1 200
	340	204	160	5	1.5	2 530	3 700	335	840	1 200
200	310	82	73	3	1	680	940	87.0	900	1 300
	310	103	82	3	1	920	1 320	121	900	1 300
	340	112	100	4	1.5	1 240	1 660	150	840	1 200
	340	140	112	4	1.5	1 400	1 910	173	840	1 200
	360	142	110	5	1.5	1 730	2 210	198	800	1 100
	360	218	174	5	1.5	2 900	4 250	380	800	1 100

1) Smallest allowable dimension for chamfer dimension r or r_1.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

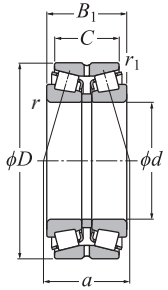
Bearing number [2]	Abutment and fillet dimensions mm					Load center mm	Constant	Axial load factors			Mass kg
	d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
430230U	168	251.5	11	3	1	114	0.44	1.55	2.31	1.52	24.1
432230XU	168	256	17	3	1	139	0.44	1.55	2.31	1.52	38
***430330UUTG**	172	294.5	17	4	1.5	131.5	0.35	1.96	2.91	1.91	54.6
413032	174	228.5	3.5	2.5	1	79	0.37	1.80	2.69	1.76	8.39
423032	174	228.5	7.5	2.5	1	85.5	0.37	1.80	2.69	1.76	10.7
***413132UTG**	174	256	5	2.5	1	98.5	0.40	1.68	2.50	1.64	18.2
***423132UTG**	174	252	11	2.5	1	106	0.37	1.80	2.69	1.76	22.5
***430232UUTG**	178	271	12	3	1	122	0.44	1.55	2.31	1.52	29.3
***432232UUTG**	178	277	17	3	1	149.5	0.44	1.55	2.31	1.52	49.9
***430332XUUTG**	182	312.5	17	4	1.5	137.5	0.35	1.96	2.91	1.91	63.8
413034	184	243.5	3.5	2.5	1	86.5	0.37	1.80	2.69	1.76	11.6
423034	184	245.5	8.5	2.5	1	93.5	0.37	1.80	2.69	1.76	14.3
***413134UTG**	184	262	5	2.5	1	104	0.40	1.68	2.50	1.64	19.2
***423134UTG**	184	262	11	2.5	1	108.5	0.37	1.80	2.69	1.76	24.2
***430234UUTG**	192	290.5	14	4	1.5	132.5	0.44	1.55	2.31	1.52	37.1
***432234XUUTG**	192	296	20	4	1.5	160	0.44	1.55	2.31	1.52	61.3
***413036UTG**	194	262	4	2.5	1	94	0.37	1.80	2.69	1.76	15.2
***423036UTG**	194	264	9.5	2.5	1	102	0.37	1.80	2.69	1.76	19
***413136UTG**	198	282	5.5	3	1.5	110.5	0.40	1.68	2.50	1.64	25
***423136UTG**	198	281	12	3	1.5	119	0.37	1.80	2.69	1.76	30.1
***430236UUTG**	202	300	14	4	1.5	139	0.45	1.50	2.23	1.47	39.1
***432236UUTG**	202	305.5	20	4	1.5	165	0.45	1.50	2.23	1.47	63.8
***413038UTG**	204	272.5	4	2.5	1	96	0.37	1.80	2.69	1.76	15.9
***423038UTG**	204	274	9.5	2.5	1	104.5	0.37	1.80	2.69	1.76	16.1
***413138UTG**	208	303	6	3	1.5	118.5	0.40	1.68	2.50	1.64	30.3
***423138UTG**	208	302	13	3	1.5	126.5	0.37	1.80	2.69	1.76	37.7
***430238UUTG**	212	321	14	4	1.5	141.5	0.44	1.55	2.31	1.52	47
***432238UUTG**	212	325.5	22	4	1.5	173.5	0.44	1.55	2.31	1.52	75.6
***413040UTG**	214	289.5	4.5	2.5	1	103	0.37	1.80	2.69	1.76	20.9
***423040UTG**	214	293	10.5	2.5	1	112	0.37	1.80	2.69	1.76	26.6
***413140UTG**	218	320	6	3	1.5	125.5	0.40	1.68	2.50	1.64	38.6
***423140UTG**	218	319	14	3	1.5	134.5	0.37	1.80	2.69	1.76	47.3
***430240UUTG**	222	338	16	4	1.5	154	0.44	1.55	2.31	1.52	55.8
***432240UUTG**	222	342.5	22	4	1.5	180	0.41	1.66	2.47	1.62	91.5

2) Bearing numbers marked "*" designate **ULTAGE™ series** bearings.

Double Row Tapered Roller Bearings

NTN

Back-to-back arrangement



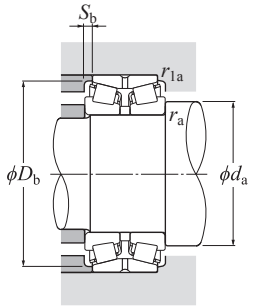
d 220–340 mm

Boundary dimensions						Basic load rating		Fatigue load limit	Allowable speed	
		mm				dynamic kN	static kN	kN	min^{-1} Grease lubrication	min^{-1} Oil lubrication
d	D	B_1	C	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	C_r	C_{0r}	C_u		
220	340	90	80	4	1.5	765	1 060	94.5	810	1 200
	340	113	90	4	1.5	1 130	1 650	148	810	1 200
	370	120	107	5	1.5	1 420	1 920	169	760	1 100
	370	150	120	5	1.5	1 570	2 260	199	760	1 100
	400	158	122	4	1.5	1 790	2 440	212	710	1 000
240	360	92	82	4	1.5	840	1 160	101	730	1 000
	360	115	92	4	1.5	1 170	1 770	155	730	1 000
	400	128	114	5	1.5	1 580	2 130	183	690	1 000
	400	160	128	5	1.5	1 790	2 600	223	690	1 000
	440	165	127	4	1.5	2 150	2 960	250	640	900
	440	266	212	4	1.5	3 750	5 500	465	640	900
260	400	104	92	5	1.5	1 070	1 540	131	670	1 000
	400	130	104	5	1.5	1 470	2 190	187	670	1 000
	440	144	128	5	1.5	1 920	2 630	220	630	910
	440	180	144	5	1.5	2 510	3 750	310	630	910
280	420	106	94	5	1.5	1 140	1 630	137	620	880
	420	133	106	5	1.5	1 540	2 340	196	620	880
	460	146	130	6	2	2 100	2 900	239	580	830
	460	183	146	6	2	2 480	3 650	300	580	830
300	460	118	105	5	1.5	1 370	1 990	163	570	810
	460	148	118	5	1.5	2 070	3 150	257	570	810
	500	160	142	6	2	2 580	3 600	290	530	770
	500	200	160	6	2	2 690	4 050	325	530	770
320	480	121	108	5	1.5	1 520	2 250	181	530	750
	480	151	121	5	1.5	2 030	3 100	247	530	750
	540	176	157	6	2	2 870	4 100	320	500	710
	540	220	176	6	2	3 200	4 900	385	500	710
340	520	133	118	6	2	1 890	2 870	226	500	700
	520	165	133	6	2	2 420	3 750	295	500	700
	580	190	169	6	2	3 450	4 900	380	460	660
	580	238	190	6	2	4 300	6 500	500	460	660

1) Smallest allowable dimension for chamfer dimension r or r_1.

Double Row Tapered Roller Bearings

NTN



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

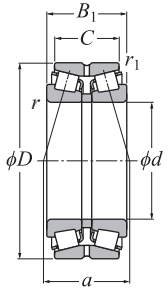
Bearing number [2]	Abutment and fillet dimensions mm					Load center mm	Constant	Axial load factors			Mass kg
	d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
***413044UTG**	238	320	5	3	1.5	111.5	0.37	1.80	2.69	1.76	27.1
***423044UTG**	238	321	11.5	3	1.5	124.5	0.37	1.80	2.69	1.76	33
***413144UTG**	242	349	6.5	4	1.5	135	0.40	1.68	2.50	1.64	47.8
***423144UTG**	242	344	15	4	1.5	154	0.40	1.68	2.50	1.64	58.1
***430244UTG**	238	368	18	3	1.5	178.5	0.49	1.38	2.06	1.35	77
***413048UTG**	258	341	5	3	1.5	117.5	0.37	1.80	2.69	1.76	29.1
***423048UTG**	258	340.5	11.5	3	1.5	130.5	0.37	1.80	2.69	1.76	36.3
***413148UTG**	262	378	7	4	1.5	144.5	0.40	1.68	2.50	1.64	58.5
***423148UTG**	262	376	16	4	1.5	164	0.40	1.68	2.50	1.64	71.4
***430248UTG**	258	406	19	3	1.5	189	0.49	1.38	2.06	1.35	100
***432248UTG**	258	421.5	27	3	1.5	226	0.43	1.57	2.34	1.53	160
***413052UTG**	282	375	6	4	1.5	130.5	0.37	1.80	2.69	1.76	43.4
***423052UTG**	282	377	13	4	1.5	143	0.37	1.80	2.69	1.76	53
***413152UTG**	282	415	8	4	1.5	161	0.40	1.68	2.50	1.64	82
***423152UTG**	282	416	18	4	1.5	176.5	0.40	1.68	2.50	1.64	100
***413056UTG**	302	396.5	6	4	1.5	136.5	0.37	1.80	2.69	1.76	46
***423056UTG**	302	399.5	13.5	4	1.5	148.5	0.37	1.80	2.69	1.76	56.8
***413156UTG**	308	438	8	5	2	168	0.40	1.68	2.50	1.64	85.5
***423156UTG**	308	435.5	18.5	5	2	182.5	0.40	1.68	2.50	1.64	110
***413060UTG**	322	431	6.5	4	1.5	151	0.37	1.80	2.69	1.76	65.6
***423060UTG**	322	436.5	15	4	1.5	163	0.37	1.80	2.69	1.76	77.8
***413160UTG**	328	475	9	5	2	182	0.40	1.68	2.50	1.64	110
***423160UTG**	328	467	20	5	2	201.5	0.40	1.68	2.50	1.64	140
***413064UTG**	342	452	6.5	4	1.5	156.5	0.37	1.80	2.69	1.76	69.2
***423064UTG**	342	457.5	15	4	1.5	170	0.37	1.80	2.69	1.76	82
***413164UTG**	348	509	9.5	5	2	197.5	0.40	1.68	2.50	1.64	150
***423164UTG**	348	504.5	22	5	2	216.5	0.40	1.68	2.50	1.64	190
***413068UTG**	368	491	7.5	5	2	169.5	0.37	1.80	2.69	1.76	93.1
***423068UTG**	368	492	16	5	2	184	0.37	1.80	2.69	1.76	110
***413168UTG**	368	548	10.5	5	2	213	0.40	1.68	2.50	1.64	190
***423168UTG**	368	546	24	5	2	237	0.40	1.68	2.50	1.64	240

2) Bearing numbers marked "∗" designate **ULTAGE™ series** bearings.

Double Row Tapered Roller Bearings

NTN

Back-to-back arrangement



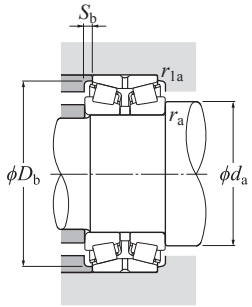
d 360–500 mm

Boundary dimensions mm						Basic load rating kN dynamic	Basic load rating kN static	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication
d	D	B_1	C	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	C_r	C_{0r}	C_u		
360	540	134	120	6	2	1 880	2 810	218	460	660
	540	169	134	6	2	2 630	4 200	325	460	660
	600	192	171	6	2	3 500	5 050	385	430	620
	600	240	192	6	2	4 100	6 500	495	430	620
380	560	135	122	6	2	2 170	3 350	255	440	620
	560	171	135	6	2	2 670	4 350	335	440	620
	620	194	173	6	2	3 650	5 250	395	410	580
	620	243	194	6	2	4 250	6 700	505	410	580
400	600	148	132	6	2	2 390	3 700	276	410	580
	600	185	148	6	2	3 250	5 450	410	410	580
	650	200	178	6	3	3 850	5 800	430	380	540
	650	250	200	6	3	4 800	7 850	580	380	540
420	620	150	134	6	2	2 710	4 250	315	390	550
	620	188	150	6	2	3 400	5 900	435	390	550
	700	224	200	6	3	4 750	7 200	525	360	510
	700	280	224	6	3	6 150	9 700	705	360	510
440	650	157	140	6	3	3 150	5 150	375	370	520
	650	196	157	6	3	3 350	5 450	400	370	520
	720	226	201	6	3	5 150	7 800	560	340	480
	720	283	226	6	3	6 400	10 300	740	340	480
460	680	163	145	6	3	3 350	5 350	390	350	500
	680	204	163	6	3	3 950	6 750	485	350	500
	760	300	240	7.5	4	6 300	10 300	725	320	450
480	700	165	147	6	3	3 200	5 000	360	330	470
	700	206	165	6	3	3 900	6 700	480	330	470
	790	310	248	7.5	4	6 750	11 100	775	310	430
500	720	167	149	6	3	3 350	5 400	380	320	450
	720	209	167	6	3	3 950	6 900	485	320	450
	830	264	235	7.5	4	6 700	10 500	725	290	410

1) Smallest allowable dimension for chamfer dimension r or r_1.

Double Row Tapered Roller Bearings

NTN



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

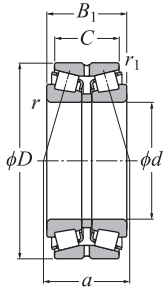
$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

Bearing number [2]	Abutment and fillet dimensions mm d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	Load center mm a	Constant e	Axial load factors Y_1	Y_2	Y_0	Mass kg (approx.)
∗413072UTG	388	510	7	5	2	176	0.37	1.80	2.69	1.76	98.2
∗423072UTG	388	512	17.5	5	2	192	0.37	1.80	2.69	1.76	120
∗413172UTG	388	565	10.5	5	2	218.5	0.40	1.68	2.50	1.64	200
∗423172UTG	388	563.5	24	5	2	239.5	0.40	1.68	2.50	1.64	250
∗413076UTG	408	532	6.5	5	2	183	0.37	1.80	2.69	1.76	100
∗423076UTG	408	532	18	5	2	196.5	0.37	1.80	2.69	1.76	130
∗413176UTG	408	587	10.5	5	2	224.5	0.40	1.68	2.50	1.64	210
∗423176UTG	408	582	24.5	5	2	249	0.40	1.68	2.50	1.64	260
∗413080UTG	428	567	8	5	2	194	0.37	1.80	2.69	1.76	130
∗423080UTG	428	567	18.5	5	2	210	0.37	1.80	2.69	1.76	170
∗413180UTG	428	614	11	5	2.5	232	0.40	1.68	2.50	1.64	240
∗423180UTG	428	613.5	25	5	2.5	256.5	0.40	1.68	2.50	1.64	290
∗413084UTG	448	589	8	5	2	199.5	0.37	1.80	2.69	1.76	140
∗423084UTG	448	586	19	5	2	220	0.37	1.80	2.69	1.76	180
∗413184UTG	448	658.5	12	5	2.5	258	0.40	1.68	2.50	1.64	320
∗423184UTG	448	663	28	5	2.5	287	0.40	1.68	2.50	1.64	380
∗413088UTG	468	618	8.5	5	2.5	208	0.37	1.80	2.69	1.76	160
∗423088UTG	468	617.5	19.5	5	2.5	229.5	0.37	1.80	2.69	1.76	190
∗413188UTG	468	675	12.5	5	2.5	263	0.40	1.68	2.50	1.64	330
∗423188UTG	468	681.5	28.5	5	2.5	288.5	0.40	1.68	2.50	1.64	460
∗413092UTG	488	650	9	5	2.5	217.5	0.37	1.80	2.69	1.76	180
∗423092UTG	488	647.5	20.5	5	2.5	239.5	0.37	1.80	2.69	1.76	230
∗423192UTG	496	715.5	30	6	3	305	0.40	1.68	2.50	1.64	480
∗413096UTG	508	669	9	5	2.5	222.5	0.37	1.80	2.69	1.76	190
∗423096UTG	508	667.5	20.5	5	2.5	245.5	0.37	1.80	2.69	1.76	240
∗423196UTG	516	761.5	31	6	3	328.5	0.40	1.68	2.50	1.64	540
∗4130/500UTG	528	690	9	5	2.5	230	0.37	1.80	2.69	1.76	200
∗4230/500UTG	528	687	21	5	2.5	249.5	0.37	1.80	2.69	1.76	250
∗4131/500UTG	536	784	14.5	6	3	296	0.40	1.68	2.50	1.64	530

2) Bearing numbers marked "∗" designate **ULTAGE™ series** bearings.

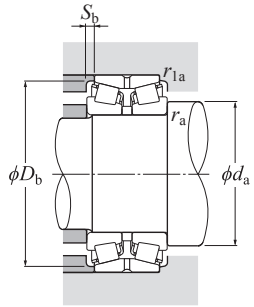
Back-to-back arrangement



d 530–600 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}	
d	D	B_1	C	$r_{s\,min}$ [1]	$r_{1s\,min}$ [1]	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication
530	780	185	163	6	3	3 750	5 900	410	290	420
600	870	200	176	6	3	5 000	8 550	570	250	360

1) Smallest allowable dimension for chamfer dimension r or r_1.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

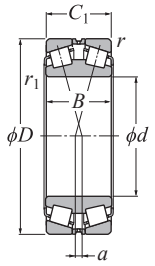
Bearing number [2]	Abutment and fillet dimensions mm					Load center mm	Constant	Axial load factors			Mass kg
	d_a Min.	D_b Min.	S_b Min.	r_{as} Max.	r_{1as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
***4130/530UTG**	558	740	11	5	2.5	249.5	0.37	1.80	2.69	1.76	270
***4130/600UTG**	628	828	12	5	2.5	277	0.37	1.80	2.69	1.76	350

2) Bearing numbers marked "＊" designate **ULTAGE™ series** bearings.

Double Row Tapered Roller Bearings

NTN

Face-to-face arrangement



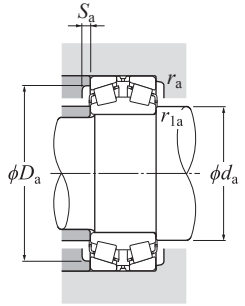
d 110–280 mm

Bearing number	Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}	
	d	D	B	C_1	$r_{1s\,min}$ 1)	$r_{s\,min}$ 1)	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication
110	180	56	56	2.5	2		330	485	53.0	1 600	2 200
120	180	46	46	2.5	2		255	375	40.0	1 500	2 100
	200	62	62	2.5	2		415	610	64.5	1 500	2 000
130	200	52	52	2.5	2		325	490	51.5	1 400	1 900
	210	64	64	2.5	2		455	675	70.5	1 400	1 800
140	210	53	53	2.5	2		335	535	55.0	1 300	1 800
	225	68	68	3	2.5		435	650	66.0	1 200	1 700
150	225	56	56	3	2.5		395	630	64.0	1 200	1 600
	250	80	80	3	2.5		670	1 040	103.0	1 200	1 500
160	240	60	60	3	2.5		475	765	76.0	1 100	1 500
	270	86	86	3	2.5		865	1 180	114	1 100	1 600
170	260	67	67	3	2.5		545	865	83.5	1 100	1 400
	280	88	88	3	2.5		930	1 270	122	1 000	1 500
180	280	74	74	3	2.5		745	1 050	99.5	1 000	1 400
	300	96	96	4	3		1 130	1 530	144	960	1 400
190	290	75	75	3	2.5		790	1 110	104	950	1 400
	320	104	104	4	3		1 260	1 710	157	900	1 300
200	310	82	82	3	2.5		920	1 320	121	900	1 300
	340	112	112	4	3		1 400	1 910	173	850	1 200
220	340	90	90	4	3		1 130	1 650	148	810	1 200
	370	120	120	5	4		1 570	2 260	199	770	1 100
240	360	92	92	4	3		1 170	1 770	155	730	1 000
	400	128	128	5	4		1 790	2 600	223	700	1 000
260	400	104	104	5	4		1 470	2 190	187	670	1 000
	440	144	144	5	4		2 510	3 750	310	640	910
280	420	106	106	5	4		1 540	2 340	196	610	880

1) Smallest allowable dimension for chamfer dimension r or r_1.

Double Row Tapered Roller Bearings

NTN



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

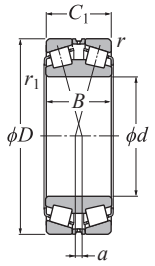
Bearing number 2)	Installation-related dimensions mm						Load center mm	Constant	Axial load factors			Mass kg
	d_a Max.	D_a Max.	D_a Min.	S_a Min.	r_{1as} Max.	r_{as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
323122	126.5	170	157.5	8	2	2	1	0.33	2.03	3.02	1.98	5.54
323024	134	168	162.5	8	2	2	12	0.37	1.80	2.69	1.76	4.08
323124	141.5	190	176	8	2	2	6.5	0.37	1.80	2.69	1.76	7.82
323026	148.5	190	178.5	8	2	2	13.5	0.37	1.80	2.69	1.76	5.74
323126	147.5	200	185	8	2	2	7.5	0.37	1.80	2.69	1.76	8.38
323028	157.5	200	187.5	8	2	2	14	0.37	1.84	2.74	1.80	6.36
323128	161	213	197.5	10	2.5	2	8	0.37	1.80	2.69	1.76	9.82
323030	167.5	213	200	10	2.5	2	15.5	0.37	1.80	2.69	1.76	7.63
323130	175.5	238	219	10	2.5	2	6.5	0.37	1.80	2.69	1.76	15.7
323032	179	228	215.5	10	2.5	2	17.5	0.37	1.80	2.69	1.76	9.42
***323132UTG**	187.5	258	233.5	10	2.5	2	8	0.37	1.80	2.69	1.76	20
323034E1	192	248	231	10	2.5	2	18	0.37	1.80	2.69	1.76	12.8
***323134UTG**	195.5	268	244	10	2.5	2	8.5	0.37	1.80	2.69	1.76	21.8
***323036UTG**	205	268	248.5	10	2.5	2	17	0.37	1.80	2.69	1.76	16.5
***323136UTG**	206	286	262	12	3	2.5	8	0.37	1.80	2.69	1.76	27.2
***323038UTG**	213	278	258	12	2.5	2	17.5	0.37	1.80	2.69	1.76	17.9
***323138UTG**	220.5	306	279.5	12	3	2.5	8.5	0.37	1.80	2.69	1.76	33.2
***323040UTG**	225.5	298	275	12	2.5	2	19	0.37	1.80	2.69	1.76	22.3
***323140UTG**	233	326	294.5	12	3	2.5	8.5	0.37	1.80	2.69	1.76	41.8
***323044UTG**	249	326	302.5	12	3	2.5	21.5	0.37	1.80	2.69	1.76	29.8
***323144UTG**	254.5	352	317	14	4	3	14	0.40	1.68	2.50	1.64	52.2
***323048UTG**	269	346	322	14	3	2.5	25.5	0.37	1.80	2.69	1.76	32.5
***323148UTG**	277.5	382	347	14	4	3	17	0.40	1.68	2.50	1.64	63.4
***323052UTG**	291.5	382	354.5	14	4	3	25	0.37	1.80	2.69	1.76	47.7
***323152UTG**	300.5	422	381.5	16	4	3	16.5	0.40	1.68	2.50	1.64	90.5
***323056UTG**	311.5	402	376	16	4	3	29.5	0.37	1.80	2.69	1.76	50.5

2) Bearing numbers marked "*" designate **ULTAGE™ series** bearings.

Double Row Tapered Roller Bearings

NTN

Face-to-face arrangement



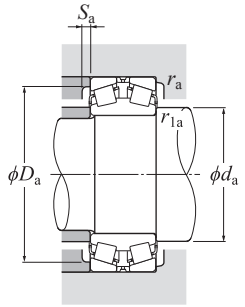
d 280–500 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}	
d	D	B	C_1	$r_{1s\,min}$ [1]	$r_{s\,min}$ [1]	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication
280	460	146	146	6	5	2 480	3 650	300	590	830
300	460	118	118	5	4	2 070	3 150	257	570	810
	500	160	160	6	5	2 690	4 050	325	540	770
320	480	121	121	5	4	2 030	3 100	247	530	750
	540	176	176	6	5	3 200	4 900	385	500	710
340	520	133	133	6	5	2 420	3 750	295	490	700
	580	190	190	6	5	4 300	6 500	500	460	660
360	540	134	134	6	5	2 630	4 200	325	460	660
	600	192	192	6	5	4 100	6 500	495	430	620
380	560	135	135	6	5	2 310	4 350	335	440	580
	620	194	194	6	5	3 700	6 700	505	410	540
400	600	148	148	6	5	3 250	5 450	410	410	580
	650	200	200	6	6	4 800	7 850	580	380	540
420	620	150	150	6	5	3 400	5 900	435	390	550
	700	224	224	6	6	6 150	9 700	705	360	510
440	650	157	157	6	6	3 350	5 450	400	370	520
	720	226	226	6	6	6 400	10 300	740	340	480
460	680	163	163	6	6	3 950	6 750	485	350	500
	760	240	240	7.5	7.5	6 300	10 300	725	320	450
480	700	165	165	6	6	3 900	6 700	480	330	470
	790	248	248	7.5	7.5	6 750	11 100	775	300	430
500	720	167	167	6	6	3 950	6 900	485	320	450

1) Smallest allowable dimension for chamfer dimension r or r_1.

Double Row Tapered Roller Bearings

NTN



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

Bearing number [2]	Installation-related dimensions mm						Load center mm	Constant	Axial load factors			Mass kg
	d_a Max.	D_a Max.	D_a Min.	S_a Min.	r_{1as} Max.	r_{as} Max.	a	e	Y_1	Y_2	Y_0	(approx.)
∗**323156UTG**	318.5	438	402	16	5	4	19.5	0.40	1.68	2.50	1.64	93.6
∗**323060UTG**	337	442	566	16	4	3	31	0.37	1.80	2.69	1.76	69.2
∗**323160UTG**	344.5	478	432	16	5	4	16.5	0.40	1.68	2.50	1.64	130
∗**323064UTG**	354	462	432	16	4	3	34	0.37	1.80	2.69	1.76	73.4
∗**323164UTG**	369.5	518	464	18	5	4	18.5	0.40	1.68	2.50	1.64	170
∗**323068UTG**	379	498	463.5	18	5	4	36	0.37	1.80	2.69	1.76	100
∗**323168UTG**	388.5	558	500	18	5	4	20.5	0.40	1.68	2.50	1.64	210
∗**323072UTG**	398	518	483.5	18	5	4	41	0.37	1.80	2.69	1.76	110
∗**323172UTG**	412.5	578	518.5	18	5	4	25.5	0.40	1.68	2.50	1.64	220
323076	418	538	504	18	5	4	42.5	0.37	1.80	2.69	1.76	110
323176	428	598	537.5	20	5	4	27	0.40	1.68	2.50	1.64	230
∗**323080UTG**	444	578	535.5	18	5	4	45	0.37	1.80	2.69	1.76	150
∗**323180UTG**	452.5	622	566	20	5	5	32.5	0.40	1.68	2.50	1.64	260
∗**323084UTG**	464.5	598	555	20	5	4	50	0.37	1.80	2.69	1.76	150
∗**323184UTG**	475	672	611	25	5	5	35	0.40	1.68	2.50	1.64	350
∗**323088UTG**	485.5	622	584	20	5	5	52.5	0.37	1.80	2.69	1.76	180
∗**323188UTG**	493.5	692	629	25	5	5	33	0.40	1.68	2.50	1.64	360
∗**323092UTG**	507.5	652	612.5	25	5	5	56.5	0.37	1.80	2.69	1.76	200
∗**323192UTG**	525	724	660	25	6	6	31	0.40	1.68	2.50	1.64	430
∗**323096UTG**	527	672	632.5	25	5	5	60.5	0.37	1.80	2.69	1.76	210
∗**323196UTG**	547.5	754	688.5	30	6	6	34.5	0.40	1.68	2.50	1.64	480
∗**3230/500UTG**	548.5	692	652	25	5	5	61.5	0.37	1.80	2.69	1.76	220

2) Bearing numbers marked "∗" designate **ULTAGE™ series** bearings.

Spherical Roller Bearings





1. Types, design features, and characteristics

Spherical roller bearings consist of an outer ring having a continuous spherical raceway and two rows of barrel-shaped rollers guided by an inner ring with two raceways (see **Fig. 1**). This bearing has self-aligning properties, and therefore is suited for use where misalignment between the inner and outer rings occurs from housing installation error or shaft bending.

Spherical roller bearings have a large capacity for radial loads, axial loads in either direction, and combined loads. They are also suited for applications where vibration and shock loads are encountered. When spherical roller bearings are used with a vertical shaft or under a large axial load, the load on the rollers of the row that is not subject to the axial load becomes small, and the resulting skidding on the rollers may result in wear. If the ratio of the axial load to the radial load exceeds the factor e in the dimension table ($F_a/F_r > e$), consult **NTN** Engineering.

In addition to spherical roller bearings with cylindrical bores, spherical roller bearings with tapered bores are also available. Bearings with tapered bores are specified by the suffix "K" at the end of the spherical roller bearing part number. The standard taper ratio is 1:12 for bearings with a "K" suffix; for bearings in series 240 and 241, the suffix "K30" indicates the taper ratio for a bearing is 1:30. Most tapered bore bearings incorporate the use of adapters and withdrawal sleeves for shaft mounting.

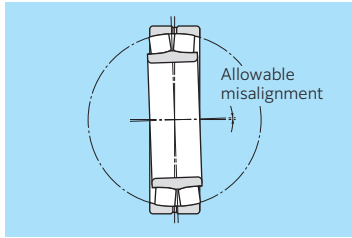
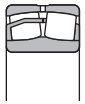
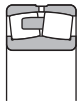
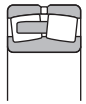
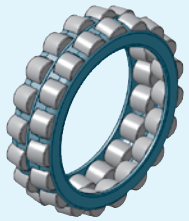
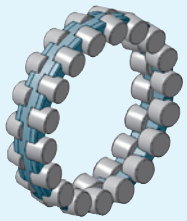
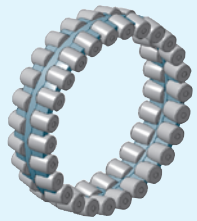
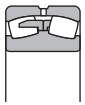
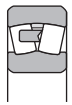
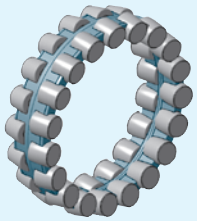
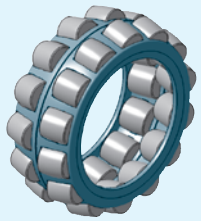
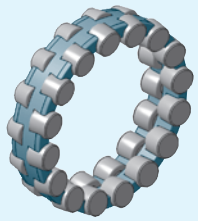


Fig. 1

Table 1 Types of spherical roller bearings

Type	ULTAGE™ series [1]		
	Type EA	Type EM	Type EM (large size)
Design			
Bearing series	Series other than 213 with outside diameter of 420 mm or smaller		Series with outside diameter of 440 to 580 mm
Rollers	Symmetrical		
Cage type	Pressed cage	Machined cage	Machined cage
Cage shape			
Max. operating temperature	200 °C		
Type	Type B	Type 213C	Type 213
Design			
Bearing series	Other than ULTAGE™ series (outside diameter of 600 mm or larger)	Series 213 with bore diameter of 50 mm or smaller	Series 213 with bore diameter of 55 mm or larger
Rollers	Asymmetrical	Symmetrical	Asymmetrical
Cage type	Machined cage	Pressed cage	Machined cage
Cage shape			
Max. operating temperature	120 °C (instantaneous) 100 °C (continuous)		

1) ULTAGE™ series spherical roller bearings are the products developed to meet the demands of "long operating life", "higher speed", and "improved handling" that are required for various industrial machinery.
For details, see the special catalog "**ULTAGE™ series Spherical Roller Bearings [Type EA, Type EM] (CAT. No. 3033/E)**".

2. ULTAGE™ series fits

Table 2 Shaft tolerance class in common use

Conditions		Shaft diameter (mm) Over	Shaft diameter (mm) Incl.	Shaft tolerance class	Remarks
Cylindrical bore bearing (Class 0)					
Inner ring rotational load or load of undetermined direction	Light load [1] or Normal load [1] or Fluctuating load	18 25 40 60 100 200	25 40 60 100 200 500	k5 m5 n5 n6 p6 r6	
	Heavy load [1] or Impact load	50 70 140	70 140 200 [2]	n5 p6 r6	Use bearings with larger internal clearances than CN clearance bearings.
Static inner ring load	Inner ring must move easily over shaft.	Overall shaft diameter		g6	For large bearings, f6 will suffice to facilitate movement.
	Inner ring does not have to move easily over shaft.	Overall shaft diameter		h6	
Tapered bore bearing (Class 0) (with adapter or withdrawal sleeve)					
Full load		Overall shaft diameter		h9/IT5 [3]	h10/IT7 [3] will suffice for power transmitting shafts.

1) Standards for light loads, normal loads, and heavy loads
- Light loads: dynamic equivalent radial load ≤ $0.05C_r$
- Normal loads: $0.05C_r$ < dynamic equivalent radial load ≤ $0.10C_r$
- Heavy loads: $0.10C_r$ < dynamic equivalent radial load

2) When the shaft diameter exceeds ϕ200 mm and the bearing is to be used under heavy load or impact load conditions, please consult **NTN** Engineering.
3) The shaft shape error (roundness, cylindricity, etc.) must be within the tolerance range of IT5 and IT7.
Note: 1. All values and fits listed in the above tables are for solid steel shafts.
2. Use the formula below to calculate necessary interference. The upper limit value should not exceed 1/1 000 of the shaft diameter.
- When $F_r \leq 0.3C_{0r}$, necessary interference Δ_{dF} (μm) is $\Delta_{dF} = 0.08\ (d \cdot F_r/B)^{1/2}$
- When $F_r > 0.3C_{0r}$, $\Delta_{dF} = 0.02\ (F_r/B)$

[d: bearing bore diameter (mm), B: inner ring width (mm), F_r: radial load, (N), C_{0r}: basic static rating load (N)]
When the difference between the bearing temperature and the ambient temperature during bearing operation is to be considered, consider the effective interference Δ_{dT} (μm) by the temperature difference as the necessary interference.
$\Delta_{dT} = 0.0015 \cdot d \cdot \Delta T$
(ΔT: Difference between bearing temperature and ambient temperature °C)

Table 3 Housing bore tolerance class in common use

Conditions				Housing bore tolerance class	Remarks
Housing	Load type, etc.		Outer ring axial direction movement		
Single housing or split housing	Static outer ring load	All types of loads	Yes	H7	G7 can be used for large bearings or bearings with a large temperature differential between the outer ring and housing.
		Light [1] or ordinary load [1]	Yes	H8	—
		Shaft and inner ring become hot.	Easily	G7	F7 can be used for large bearings or bearings with a large temperature differential between the outer ring and housing.
Single housing		Requires precise rotation under light or ordinary loads.	As a rule, it cannot move.	K6	—
			Yes	JS6	—
		Requires low noise operation.	Yes	H6	—
	Indeterminate load	Light or ordinary load	Yes	JS7	—
		Ordinary or heavy load [1]	As a rule, it cannot move.	K7	—
		High impact load	No	M7	—
	Rotating outer ring load	Light or fluctuating load	No	M7	—
		Ordinary or heavy load	No	N7	—
		Heavy load or large impact load with thin wall housing	No	P7	—

1) Standards for light loads, normal loads, and heavy loads
- Light loads: dynamic equivalent radial load ≤ $0.05C_r$
- Normal loads: $0.05C_r$ < dynamic equivalent radial load ≤ $0.10C_r$
- Heavy loads: $0.10C_r$ < dynamic equivalent radial load

Note: All values and fits listed in the above tables are for cast iron or steel housings.

3. Allowable speed of ULTAGE™ series

As the rotational speed of the bearing increases, the temperature of the bearing also increases because of the friction heat produced inside the bearing. Excessive heat will significantly deteriorate the bearing performance, causing abnormal temperature rises and seizure.

Factors affecting the allowable speed of bearings are as follows.

(1) Bearing type
(2) Bearing size
(3) Lubrication (grease lubrication, circulating lubrication, oil lubrication, etc.)
(4) Bearing internal clearance (bearing internal clearance during operation)
(5) Bearing load
(6) Shaft and housing accuracy

The allowable speed specified in the bearing dimension table is the limit for heat dissipation and satisfactory lubrication conditions before the bearing is adversely affected.

The allowable speed of ULTAGE™ series spherical roller bearings specified in the catalog is defined as follows.

[Oil lubrication]

The allowable speed for oil lubrication is the speed at which the outer ring temperature reaches 80 °C with room temperature spindle oil (lubrication oil viscosity: ISO VG32) supplied at 1 liter/min under an operating load of 5 % of the basic static load rating C_{0r}.

[Grease lubrication]

The allowable speed for grease lubrication is the speed at which the outer ring temperature reaches 80 °C with lithium-based grease (consistency: NLGI3) filled 20 to 30 % of the free space under an operating load of 5 % of the basic static load rating C_{0r}.

In either of the lubrication methods, the bearing temperature rise differs if the usage condition (operating load, rotational speed pattern, lubricating condition, etc.) is different; therefore, the bearings must be selected with sufficient allowable speed as specified in the catalog.

If 80 % of the allowable speed specified in the dimension table is exceeded or the bearing is used in vibration or impact conditions, please consult **NTN** Engineering.

See section “9. Allowable speed” for the allowable speed of the spherical roller bearings that are not part of the ULTAGE™ series.

4. Oil inlet and groove for outer ring

Both ULTAGE™ series and type B spherical roller bearings are provided with oil inlets and an oil groove (see **Fig. 2** and **Table 4**).

Types 213 and C do not have oil inlets and grooves. However, they can be made based on customer request. Contact **NTN** Engineering with the bearing numbers and supplementary suffix code "D1" (refer to page A-48).

If a pin to prevent outer ring rotation is necessary, contact **NTN** Engineering.

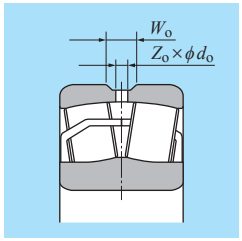


Fig. 2

Table 4 Oil inlet number

Nominal bearing outside diameter D mm		Number of oil inlets	
		D1	W33 (Manufacturing in Europe)
Incl.	Below	Z_o	Z_o
—	320	4	3
320	1 010	8	3
1 010	—	12	—

Note: For oil groove width W_o and diameter of oil inlet d_o, see the dimension table.

5. Allowable misalignment angle

Spherical roller bearings have the same self-aligning properties as other self-aligning bearings. The allowable misalignment angle varies according to dimension series and load conditions, but the general allowable misalignment angles are listed below:

- Normal load or more: ·····1/115
- Light load: ·····1/30

* Increasing the misalignment angle beyond the allowable angle may cause the rollers to protrude from the outer ring and interfere with nearby components.

6. Adapters and withdrawal sleeves

Adapters are used for installation of bearings with tapered bores on cylindrical shafts (see **Fig. 3**). Withdrawal sleeves are also used to install and disassemble bearings with tapered bores onto and off of cylindrical shafts (see **Fig. 4**). In disassembling the bearing from the shaft, the nut is turned against the side face of the inner ring utilizing the bolt provided on the withdrawal sleeve, and then the sleeve is drawn away from the bearing's bore (Precision and dimensions of adapter and withdrawal sleeve are defined in JIS B 1552 and JIS B 1556).

For bearings with a bore diameter of 200 mm or more, high pressure oil (hydraulic) type adapters and withdrawal sleeves can be made to make installation and disassembly easier. As shown in **Fig. 5** construction is designed to reduce friction by injecting high pressure oil between the surfaces of the adapter sleeve and bearing inner bore by means of a pressure fitting.

If the oil supply inlet is attached in the nut side of the adapter, the supplementary suffix "HF" is added to the bearing number; if the oil supply inlet is attached on the opposite side, the suffix "HB" is added to the bearing number. For adapter sleeves, the supplementary suffix "H" is added to the bearing's number for both cases. The hydraulic sleeve nut is equipped with holes for bolts used for mounting and dismounting and holes for hydraulic piping. The suffix SP (with screw holes) or SPB (with bolts) is added to the bearing number of the nut.

For information on the **hydraulic adapters and withdrawal sleeves**, see the special catalog "**Adapters, Withdrawal Sleeves, Locknuts, Lockwashers & Lockplates, Hydraulic Nuts (CAT. No. 4201/E)**".

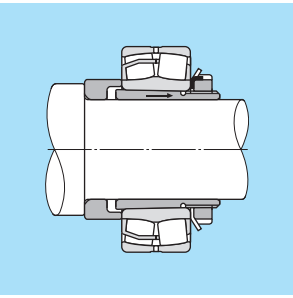


Fig. 3

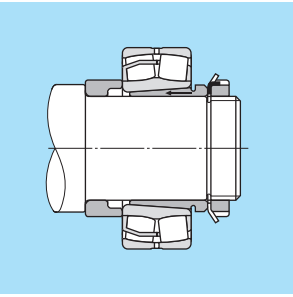


Fig. 4

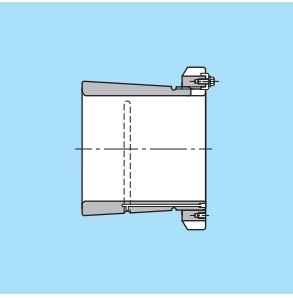
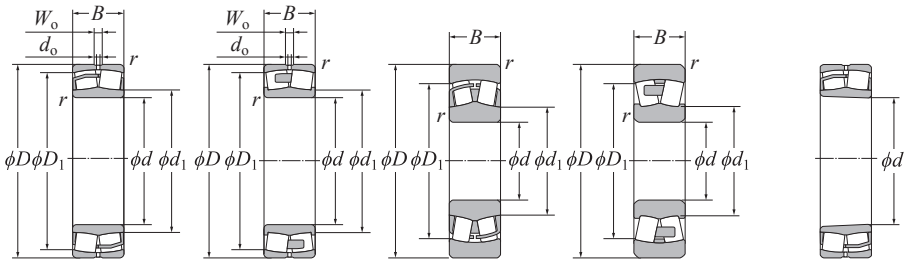


Fig. 5

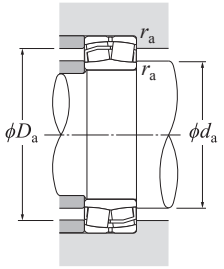


Cylindrical bore [Type EA] | Cylindrical bore [Type EM] | Cylindrical bore [Type 213C] | Cylindrical bore [Type 213] | Tapered bore

d 25–60 mm

Boundary dimensions mm						Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing numbers 1) 4) Cylindrical bore	Bearing numbers 1) 4) Tapered bore 2)
d	D	B	$r_{s\,min}$ 3)	W_o	d_o	C_r	C_{0r}	C_u				
25	52	18	1	3	1.5	57.3	46.1	3.23	10 400	13 000	∗22205EAW33	∗22205EAKW33
	52	18	1	3	1.5	57.3	46.1	3.23	10 400	13 000	∗22205EMW33	∗22205EMKW33
30	62	20	1	4	2	75.7	64.5	4.58	8 800	11 000	∗22206EAW33	∗22206EAKW33
	62	20	1	4	2	75.7	64.5	4.58	8 800	11 000	∗22206EMW33	∗22206EMKW33
35	72	23	1.1	5	2	100	92.0	6.11	7 500	9 400	∗22207EAW33	∗22207EAKW33
	72	23	1.1	5	2	100	92.0	6.11	7 500	9 400	∗22207EMW33	∗22207EMKW33
40	80	23	1.1	5	2.5	116	105	7.78	6 800	8 500	∗22208EAD1	∗22208EAKD1
	80	23	1.1	5	2.5	110	98.0	7.29	6 800	8 500	∗22208EMD1	∗22208EMKD1
	90	23	1.5	6	3	98.0	90.0	12.6	4 900	6 400	21308C	21308CK
	90	33	1.5	6	3	169	152	9.36	5 400	6 600	∗22308EAD1	∗22308EAKD1
	90	33	1.5	6	3	169	152	9.36	5 400	6 600	∗22308EMD1	∗22308EMKD1
45	85	23	1.1	6	2.5	121	113	8.76	6 100	7 700	∗22209EAD1	∗22209EAKD1
	85	23	1.1	6	2.5	116	106	8.24	6 100	7 700	∗22209EMD1	∗22209EMKD1
	100	25	1.5	6	3	114	106	14.1	4 400	5 700	21309C	21309CK
	100	36	1.5	6	3	206	187	11.8	4 600	5 700	∗22309EAD1	∗22309EAKD1
	100	36	1.5	6	3	206	187	11.8	4 600	5 700	∗22309EMD1	∗22309EMKD1
50	90	23	1.1	6	2.5	130	124	10.1	5 700	7 200	∗22210EAD1	∗22210EAKD1
	90	23	1.1	6	2.5	125	117	9.54	5 700	7 200	∗22210EMD1	∗22210EMKD1
	110	27	2	6	3	131	127	13.7	4 000	5 200	21310C	21310CK
	110	40	2	7	3.5	250	232	14.0	4 300	5 300	∗22310EAD1	∗22310EAKD1
	110	40	2	7	3.5	250	232	14.0	4 300	5 300	∗22310EMD1	∗22310EMKD1
55	100	25	1.5	6	3	155	148	12.6	5 300	6 700	∗22211EAD1	∗22211EAKD1
	100	25	1.5	6	3	148	140	11.9	5 300	6 700	∗22211EMD1	∗22211EMKD1
	120	29	2	6	3	161	163	16.1	3 700	4 800	21311	21311K
	120	43	2	8	3.5	296	274	17.4	3 900	4 800	∗22311EAD1	∗22311EAKD1
	120	43	2	8	3.5	296	274	17.4	3 900	4 800	∗22311EMD1	∗22311EMKD1
60	110	28	1.5	7	3	187	181	15.4	4 800	6 000	∗22212EAD1	∗22212EAKD1
	110	28	1.5	7	3	179	171	14.6	4 800	6 000	∗22212EMD1	∗22212EMKD1
	130	31	2.1	7	4	186	191	28.2	3 400	4 400	21312	21312K
	130	46	2.1	9	4	340	319	20.3	3 600	4 600	∗22312EAD1	∗22312EAKD1
	130	46	2.1	9	4	340	319	20.3	3 600	4 600	∗22312EMD1	∗22312EMKD1

1) Bearing numbers with "∗" are ULTAGE™ series and have outer ring oil inlets 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.
4) "W33" indicates manufacturing in Europe and have three oil inlets.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

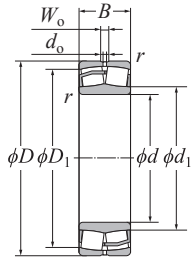
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

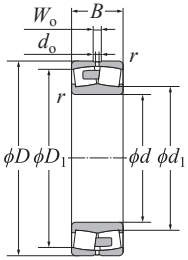
For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
30	30	46	46	1	0.34	2.00	2.98	1.96	0.173	0.169
30	30	46	46	1	0.34	2.00	2.98	1.96	0.174	0.171
37	36	56	55	1	0.31	2.15	3.20	2.10	0.278	0.272
37	36	56	55	1	0.31	2.15	3.20	2.10	0.281	0.275
45	42	65	63	1.1	0.31	2.21	3.29	2.16	0.438	0.43
45	42	65	63	1.1	0.31	2.21	3.29	2.16	0.442	0.433
50	47	73	71	1.1	0.27	2.47	3.67	2.41	0.528	0.518
50	47	73	71	1.1	0.27	2.47	3.67	2.41	0.529	0.519
52	48.5	81.5	76	1.5	0.26	2.55	3.80	2.50	0.705	0.694
52	49	81	78	1.5	0.36	1.87	2.79	1.83	1.02	1
52	49	81	78	1.5	0.36	1.87	2.79	1.83	1.03	1.01
54	52	78	76	1.1	0.26	2.64	3.93	2.58	0.572	0.561
54	52	78	76	1.1	0.26	2.64	3.93	2.58	0.577	0.566
58	53.5	91.5	85	1.5	0.26	2.60	3.87	2.54	0.927	0.912
58	54	91	87	1.5	0.36	1.90	2.83	1.86	1.37	1.34
58	54	91	87	1.5	0.36	1.90	2.83	1.86	1.38	1.35
59	57	83	81	1.1	0.24	2.84	4.23	2.78	0.614	0.602
59	57	83	81	1.1	0.24	2.84	4.23	2.78	0.616	0.604
65	60	100	93	2	0.26	2.64	3.93	2.58	1.21	1.19
63	61	99	95	2	0.36	1.87	2.79	1.83	1.82	1.79
63	61	99	95	2	0.36	1.87	2.79	1.83	1.84	1.8
66	64	91	90	1.5	0.23	2.95	4.40	2.89	0.83	0.814
66	64	91	90	1.5	0.23	2.95	4.40	2.89	0.827	0.811
73	65	110	102	2	0.25	2.69	4.00	2.63	1.71	1.69
68	66	109	104	2	0.36	1.87	2.79	1.83	2.31	2.26
68	66	109	104	2	0.36	1.87	2.79	1.83	2.34	2.29
71	69	101	99	1.5	0.24	2.84	4.23	2.78	1.14	1.12
71	69	101	99	1.5	0.24	2.84	4.23	2.78	1.15	1.13
78	72	118	109	2	0.25	2.69	4.00	2.63	2.1	2.07
75	72	118	113	2.1	0.35	1.95	2.90	1.91	2.86	2.8
75	72	118	113	2.1	0.35	1.95	2.90	1.91	2.91	2.85

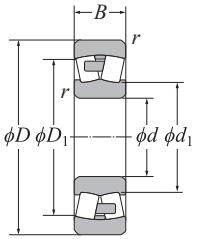
Note: For the bearings other than ULTAGE™ series, outer rings with oil inlets and oil grooves can also be made based on your request. In this case, supplementary suffix "D1" is added after a bearing number. Example: 21311D1



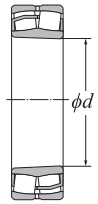
Cylindrical bore [Type EA]



Cylindrical bore [Type EM]



Cylindrical bore [Type 213]

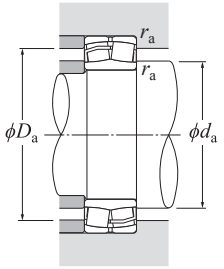


Tapered bore

d 65–95 mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed min^{-1} Grease lubrication	Oil lubrication	Bearing numbers [1] Cylindrical bore	Tapered bore [2]
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	C_r	C_{0r}	C_u				
65	120	31	1.5	8	3.5	226	224	18.2	4 400	5 500	∗22213EAD1	∗22213EAKD1
	120	31	1.5	8	3.5	217	212	17.2	4 400	5 500	∗22213EMD1	∗22213EMKD1
	140	33	2.1	7	4	216	228	31.0	3 100	4 000	21313	21313K
	140	48	2.1	9	4	369	343	23.4	3 300	4 100	∗22313EAD1	∗22313EAKD1
	140	48	2.1	9	4	369	343	23.4	3 300	4 100	∗22313EMD1	∗22313EMKD1
70	125	31	1.5	7	3.5	235	240	20.1	4 100	5 200	∗22214EAD1	∗22214EAKD1
	125	31	1.5	7	3.5	235	240	20.1	4 100	5 200	∗22214EMD1	∗22214EMKD1
	150	35	2.1	7	4	245	262	33.5	2 900	3 800	21314	21314K
	150	51	2.1	10	5	420	396	26.0	3 000	3 800	∗22314EAD1	∗22314EAKD1
	150	51	2.1	10	5	420	396	26.0	3 000	3 800	∗22314EMD1	∗22314EMKD1
75	130	31	1.5	7	3.5	244	249	21.1	4 000	5 000	∗22215EAD1	∗22215EAKD1
	130	31	1.5	7	3.5	244	249	21.1	4 000	5 000	∗22215EMD1	∗22215EMKD1
	160	37	2.1	7	4	266	287	27.5	2 700	3 500	21315	21315K
	160	55	2.1	10	5	491	467	29.8	2 900	3 600	∗22315EAD1	∗22315EAKD1
	160	55	2.1	10	5	491	467	29.8	2 900	3 600	∗22315EMD1	∗22315EMKD1
80	140	33	2	8	3.5	278	287	24.0	3 700	4 600	∗22216EAD1	∗22216EAKD1
	140	33	2	8	3.5	267	272	22.8	3 700	4 600	∗22216EMD1	∗22216EMKD1
	170	39	2.1	7	4	289	315	30.5	2 500	3 300	21316	21316K
	170	58	2.1	10	5	541	522	32.5	2 700	3 400	∗22316EAD1	∗22316EAKD1
	170	58	2.1	10	5	541	522	32.5	2 700	3 400	∗22316EMD1	∗22316EMKD1
85	150	36	2	8	3.5	324	330	27.1	3 400	4 300	∗22217EAD1	∗22217EAKD1
	150	36	2	8	3.5	324	330	27.1	3 400	4 300	∗22217EMD1	∗22217EMKD1
	180	41	3	7	4	320	355	45.0	2 400	3 100	21317	21317K
	180	60	3	11	5	599	604	36.4	2 600	3 200	∗22317EAD1	∗22317EAKD1
	180	60	3	11	5	599	604	36.4	2 600	3 200	∗22317EMD1	∗22317EMKD1
90	160	40	2	10	4.5	384	398	30.2	3 200	4 000	∗22218EAD1	∗22218EAKD1
	160	40	2	10	4.5	384	398	30.2	3 200	4 000	∗22218EMD1	∗22218EMKD1
	160	52.4	2	9	4	467	513	30.0	2 600	3 200	∗23218EMD1	∗23218EMKD1
	190	43	3	7	4	355	400	50.5	2 300	3 000	21318	21318K
	190	64	3	12	5	668	652	40.0	2 500	3 000	∗22318EAD1	∗22318EAKD1
	190	64	3	12	5	668	652	40.0	2 500	3 000	∗22318EMD1	∗22318EMKD1
95	170	43	2.1	10	4.5	416	417	33.4	3 000	3 800	∗22219EAD1	∗22219EAKD1
	170	43	2.1	10	4.5	416	417	33.4	3 000	3 800	∗22219EMD1	∗22219EMKD1

1) Bearing numbers with "∗" are ULTAGE™ series and have outer ring oil inlets 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.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

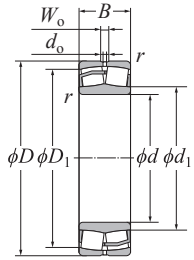
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

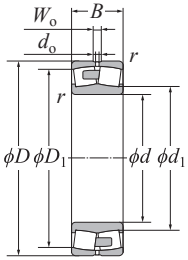
For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
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

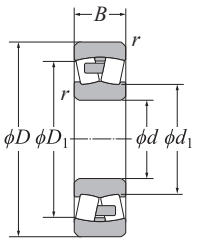
Note: For the bearings other than ULTAGE™ series, outer rings with oil inlets and oil grooves can also be made based on your request. In this case, supplementary suffix "D1" is added after a bearing number. **Example: 21317D1**



Cylindrical bore [Type EA]



Cylindrical bore [Type EM]



Cylindrical bore [Type 213]

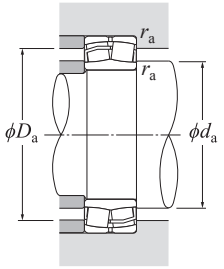


Tapered bore

d 95–130 mm

Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers [1]	
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [2]
95	200	45	3	7	4	375	420	54.0	2 100	2 700	**21319**	**21319K**
	200	67	3	12	6	732	751	43.4	2 300	2 800	***22319EAD1**	***22319EAKD1**
	200	67	3	12	6	732	751	43.4	2 300	2 800	***22319EMD1**	***22319EMKD1**
100	165	52	2	8	4	464	563	30.7	2 400	3 000	***23120EAD1**	***23120EAKD1**
	165	52	2	8	4	480	590	32.1	2 400	3 000	***23120EMD1**	***23120EMKD1**
	180	46	2.1	11	5	472	495	36.9	2 800	3 600	***22220EAD1**	***22220EAKD1**
	180	46	2.1	11	5	472	495	36.9	2 800	3 600	***22220EMD1**	***22220EMKD1**
	180	60.3	2.1	9	4.5	586	661	36.3	2 300	2 900	***23220EMD1**	***23220EMKD1**
	215	47	3	9	5	410	465	42.5	2 000	2 600	**21320**	**21320K**
	215	73	3	13	6	827	844	50.1	2 100	2 600	***22320EAD1**	***22320EAKD1**
	215	73	3	13	6	827	844	50.1	2 100	2 600	***22320EMD1**	***22320EMKD1**
110	170	45	2	8	3.5	417	517	32.1	2 600	3 300	***23022EAD1**	***23022EAKD1**
	170	45	2	8	3.5	417	517	32.1	2 600	3 300	***23022EMD1**	***23022EMKD1**
	180	56	2	9	4	547	669	36.2	2 200	2 800	***23122EAD1**	***23122EAKD1**
	180	56	2	9	4	547	669	36.2	2 200	2 800	***23122EMD1**	***23122EMKD1**
	180	69	2	8	4	622	769	35.7	2 200	2 700	***24122EMD1**	***24122EMK30D1**
	200	53	2.1	12	6	602	643	45.0	2 600	3 300	***22222EAD1**	***22222EAKD1**
	200	53	2.1	12	6	602	643	45.0	2 600	3 300	***22222EMD1**	***22222EMKD1**
	200	69.8	2.1	11	5	752	869	43.9	2 100	2 600	***23222EMD1**	***23222EMKD1**
	240	50	3	9	5	550	615	61.5	1 800	2 300	**21322**	**21322K**
	240	80	3	16	7	975	972	59.0	2 000	2 400	***22322EAD1**	***22322EAKD1**
	240	80	3	16	7	975	972	59.0	2 000	2 400	***22322EMD1**	***22322EMKD1**
120	180	46	2	8	3.5	446	577	35.8	2 400	3 100	***23024EAD1**	***23024EAKD1**
	180	46	2	8	3.5	446	577	35.8	2 400	3 100	***23024EMD1**	***23024EMKD1**
	180	60	2	8	3.5	526	726	34.4	2 100	2 600	***24024EMD1**	***24024EMK30D1**
	200	62	2	10	4.5	663	820	43.4	2 000	2 500	***23124EAD1**	***23124EAKD1**
	200	62	2	10	4.5	663	820	43.4	2 000	2 500	***23124EMD1**	***23124EMKD1**
	200	80	2	10	4.5	756	991	41.3	1 900	2 500	***24124EMD1**	***24124EMK30D1**
	215	58	2.1	12	6	688	753	49.9	2 400	3 000	***22224EAD1**	***22224EAKD1**
	215	58	2.1	12	6	688	753	49.9	2 400	3 000	***22224EMD1**	***22224EMKD1**
	215	76	2.1	11	5	857	998	49.8	1 900	2 400	***23224EMD1**	***23224EMKD1**
	260	86	3	18	8	1 170	1 280	68.4	1 800	2 200	***22324EAD1**	***22324EAKD1**
	260	86	3	18	8	1 170	1 280	68.4	1 800	2 200	***22324EMD1**	***22324EMKD1**
130	200	52	2	9	4	565	721	44.2	2 200	2 900	***23026EAD1**	***23026EAKD1**
	200	52	2	9	4	565	721	44.2	2 200	2 900	***23026EMD1**	***23026EMKD1**

1) Bearing numbers with "*" are **ULTAGE™ series** and have outer ring oil inlets and oil grooves as standard. 2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30. 3) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

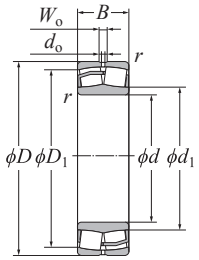
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

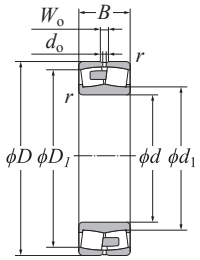
For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
127	109	186	171	2.5	0.23	3.01	4.48	2.94	7.1	7
120	109	186	174	3	0.32	2.09	3.11	2.04	9.91	9.71
120	109	186	174	3	0.32	2.09	3.11	2.04	10	9.82
114	111	154	147	2	0.28	2.39	3.56	2.34	4.37	4.24
114	111	154	147	2	0.28	2.39	3.56	2.34	4.45	4.32
118	112	168	161	2.1	0.24	2.84	4.23	2.78	4.9	4.8
118	112	168	161	2.1	0.24	2.84	4.23	2.78	5.02	4.93
118	112	168	159	2.1	0.31	2.18	3.24	2.13	6.51	6.33
133	114	201	179	2.5	0.22	3.01	4.48	2.94	8.89	8.78
127	114	201	187	3	0.34	1.98	2.94	1.93	12.6	12.3
127	114	201	187	3	0.34	1.98	2.94	1.93	12.9	12.7
123	119	161	155	2	0.23	2.95	4.40	2.89	3.66	3.55
123	119	161	155	2	0.23	2.95	4.40	2.89	3.66	3.55
125	121	169	161	2	0.28	2.43	3.61	2.37	5.66	5.49
125	121	169	161	2	0.28	2.43	3.61	2.37	5.53	5.36
121	121	169	158	2	0.36	1.90	2.83	1.86	6.75	6.65
130	122	188	179	2.1	0.25	2.69	4.00	2.63	7.1	6.95
130	122	188	179	2.1	0.25	2.69	4.00	2.63	7.3	7.15
130	122	188	176	2.1	0.32	2.12	3.15	2.07	9.41	9.14
146	124	226	203	2.5	0.21	3.20	4.77	3.13	11.2	11.1
139	124	226	209	3	0.32	2.09	3.11	2.04	17	16.6
139	124	226	209	3	0.32	2.09	3.11	2.04	17.4	17.1
134	129	171	165	2	0.22	3.14	4.67	3.07	4.02	3.9
134	129	171	165	2	0.22	3.14	4.67	3.07	4.02	3.9
132	129	171	161	2	0.29	2.32	3.45	2.26	5.28	5.21
138	131	189	179	2	0.28	2.43	3.61	2.37	7.72	7.49
138	131	189	179	2	0.28	2.43	3.61	2.37	7.77	7.54
136	131	189	173	2	0.37	1.84	2.74	1.80	10	9.87
141	132	203	193	2.1	0.25	2.74	4.08	2.68	8.88	8.68
141	132	203	193	2.1	0.25	2.74	4.08	2.68	9.01	8.82
139	132	203	190	2.1	0.32	2.09	3.11	2.04	11.7	11.3
156	134	246	225	3	0.32	2.09	3.11	2.04	22.3	21.9
156	134	246	225	3	0.32	2.09	3.11	2.04	22.7	22.2
145	139	191	183	2	0.22	3.01	4.48	2.94	5.88	5.71
145	139	191	183	2	0.22	3.01	4.48	2.94	5.9	5.73

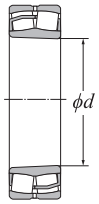
Note: For the bearings other than **ULTAGE™ series**, outer rings with oil inlets and oil grooves can also be made based on your request. In this case, supplementary suffix "**D1**" is added after a bearing number. **Example: 21322D1**



Cylindrical bore [Type EA]



Cylindrical bore [Type EM]

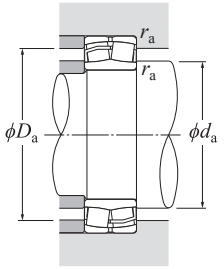


Tapered bore

d 130–160 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers [1]	
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [2]
130	200	69	2	9	4	682	936	42.2	1 900	2 400	∗24026EMD1	∗24026EMK30D1
	210	64	2	10	4.5	710	906	47.1	1 900	2 400	∗23126EAD1	∗23126EAKD1
	210	64	2	10	4.5	710	906	47.1	1 900	2 400	∗23126EMD1	∗23126EMKD1
	210	80	2	10	4.5	803	1 080	45.0	1 800	2 400	∗24126EMD1	∗24126EMK30D1
	230	64	3	13	6	808	898	56.6	2 200	2 800	∗22226EAD1	∗22226EAKD1
	230	64	3	13	6	808	898	56.6	2 200	2 800	∗22226EMD1	∗22226EMKD1
	230	80	3	12	5	958	1 130	55.4	1 700	2 300	∗23226EMD1	∗23226EMKD1
	280	93	4	19	9	1 330	1 400	77.8	1 600	2 000	∗22326EAD1	∗22326EAKD1
	280	93	4	19	9	1 330	1 400	77.8	1 600	2 000	∗22326EMD1	∗22326EMKD1
140	210	53	2	9	4	597	783	47.5	2 100	2 700	∗23028EAD1	∗23028EAKD1
	210	53	2	9	4	597	783	47.5	2 100	2 700	∗23028EMD1	∗23028EMKD1
	210	69	2	9	4	709	990	46.0	1 800	2 200	∗24028EMD1	∗24028EMK30D1
	225	68	2.1	11	5	802	1 030	53.1	1 800	2 200	∗23128EAD1	∗23128EAKD1
	225	68	2.1	11	5	802	1 030	53.1	1 800	2 200	∗23128EMD1	∗23128EMKD1
	225	85	2.1	10	4.5	951	1 280	53.3	1 700	2 200	∗24128EMD1	∗24128EMK30D1
	250	68	3	14	7	912	1 010	65.8	2 000	2 500	∗22228EAD1	∗22228EAKD1
	250	68	3	14	7	912	1 010	65.8	2 000	2 500	∗22228EMD1	∗22228EMKD1
	250	88	3	13	6	1 140	1 370	64.2	1 600	2 100	∗23228EMD1	∗23228EMKD1
	300	102	4	19	9	1 540	1 720	88.8	1 500	1 900	∗22328EAD1	∗22328EAKD1
	300	102	4	19	9	1 540	1 720	88.8	1 500	1 900	∗22328EMD1	∗22328EMKD1
150	225	56	2.1	10	4.5	660	893	52.9	2 000	2 500	∗23030EAD1	∗23030EAKD1
	225	56	2.1	10	4.5	660	893	52.9	2 000	2 500	∗23030EMD1	∗23030EMKD1
	225	75	2.1	10	4.5	789	1 140	51.2	1 700	2 100	∗24030EMD1	∗24030EMK30D1
	250	80	2.1	13	6	1 060	1 350	65.1	1 600	2 000	∗23130EAD1	∗23130EAKD1
	250	80	2.1	13	6	1 060	1 350	65.1	1 600	2 000	∗23130EMD1	∗23130EMKD1
	250	100	2.1	12	6	1 180	1 590	62.8	1 600	2 000	∗24130EMD1	∗24130EMK30D1
	270	73	3	15	7	1 080	1 220	74.4	1 800	2 300	∗22230EAD1	∗22230EAKD1
	270	73	3	15	7	1 080	1 220	74.4	1 800	2 300	∗22230EMD1	∗22230EMKD1
	270	96	3	14	6	1 340	1 620	74.0	1 500	1 900	∗23230EMD1	∗23230EMKD1
	320	108	4	20	9	1 740	1 890	98.9	1 400	1 700	∗22330EMD1	∗22330EMKD1
160	220	45	2	9	4	455	683	45.6	1 900	2 400	∗23932EMD1	∗23932EMKD1
	240	60	2.1	11	5	748	1 000	59.1	1 800	2 300	∗23032EAD1	∗23032EAKD1
	240	60	2.1	11	5	748	1 000	59.1	1 800	2 300	∗23032EMD1	∗23032EMKD1
	240	80	2.1	10	5	901	1 290	56.8	1 600	2 000	∗24032EMD1	∗24032EMK30D1
	270	86	2.1	14	6	1 220	1 580	73.6	1 500	1 900	∗23132EAD1	∗23132EAKD1
	270	86	2.1	14	6	1 220	1 580	73.6	1 500	1 900	∗23132EMD1	∗23132EMKD1

1) Bearing numbers with "∗" are **ULTAGE™ series** and have outer ring oil inlets and oil grooves as standard. 2) Bearings appended with "K" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30. 3) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

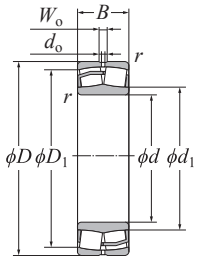
$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

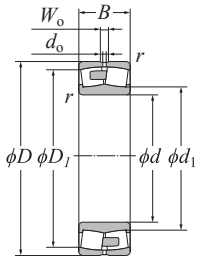
$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

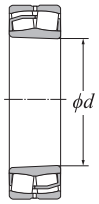
Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
143	139	191	178	2	0.31	2.20	3.27	2.15	7.82	7.71
148	141	199	189	2	0.27	2.51	3.74	2.45	8.45	8.19
148	141	199	189	2	0.27	2.51	3.74	2.45	8.51	8.25
146	141	199	183	2	0.34	1.96	2.92	1.92	10.7	10.5
151	144	216	206	3	0.25	2.69	4.00	2.63	11	10.7
151	144	216	206	3	0.25	2.69	4.00	2.63	11.1	10.9
150	144	216	203	3	0.32	2.12	3.15	2.07	13.8	13.4
164	147	263	243	4	0.33	2.06	3.06	2.01	27.2	26.6
164	147	263	243	4	0.33	2.06	3.06	2.01	28	27.5
155	149	201	193	2	0.22	3.14	4.67	3.07	6.32	6.13
155	149	201	193	2	0.22	3.14	4.67	3.07	6.37	6.18
153	149	201	188	2	0.28	2.37	3.53	2.32	8.27	8.15
159	152	213	203	2.1	0.26	2.55	3.80	2.50	10.3	9.94
159	152	213	203	2.1	0.26	2.55	3.80	2.50	10.3	10
156	152	213	198	2.1	0.34	1.98	2.94	1.93	12.9	12.8
163	154	236	224	3	0.25	2.74	4.08	2.68	13.9	13.6
163	154	236	224	3	0.25	2.74	4.08	2.68	14.2	13.9
162	154	236	220	3	0.33	2.06	3.06	2.01	18.2	17.7
181	157	283	261	4	0.33	2.03	3.02	1.98	34.4	33.7
181	157	283	261	4	0.33	2.03	3.02	1.98	35.4	34.7
167	161	214	207	2.1	0.21	3.20	4.77	3.13	7.68	7.45
167	161	214	207	2.1	0.21	3.20	4.77	3.13	7.73	7.5
165	161	214	202	2.1	0.29	2.32	3.45	2.26	10.4	10.3
171	162	238	223	2.1	0.29	2.35	3.50	2.30	15.7	15.2
171	162	238	223	2.1	0.29	2.35	3.50	2.30	15.8	15.3
168	162	238	216	2.1	0.36	1.85	2.76	1.81	19.7	19.4
177	164	256	242	3	0.25	2.74	4.08	2.68	17.6	17.3
177	164	256	242	3	0.25	2.74	4.08	2.68	18	17.7
174	164	256	237	3	0.33	2.03	3.02	1.98	23.6	22.9
188	167	303	279	4	0.34	2.00	2.98	1.96	42.2	41.3
175	169	211	205	2	0.17	3.90	5.81	3.81	5.09	4.94
177	171	229	221	2.1	0.21	3.20	4.77	3.13	9.32	9.03
177	171	229	221	2.1	0.21	3.20	4.77	3.13	9.37	9.09
175	171	229	215	2.1	0.29	2.32	3.45	2.26	12.6	12.4
185	172	258	240	2.1	0.29	2.35	3.50	2.30	20.1	19.5
185	172	258	240	2.1	0.29	2.35	3.50	2.30	20.2	19.6



Cylindrical bore [Type EA]



Cylindrical bore [Type EM]

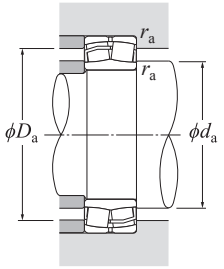


Tapered bore

d 160–190 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers [1]	
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [2]
160	270	109	2.1	14	6	1 360	1 860	70.6	1 500	1 800	∗24132EMD1	∗24132EMK30D1
	290	80	3	17	8	1 220	1 390	84.1	1 700	2 100	∗22232EAD1	∗22232EAKD1
	290	80	3	17	8	1 220	1 390	84.1	1 700	2 100	∗22232EMD1	∗22232EMKD1
	290	104	3	15	7	1 550	1 890	83.8	1 400	1 800	∗23232EMD1	∗23232EMKD1
	340	114	4	20	10	1 950	2 210	109	1 300	1 600	∗22332EMD1	∗22332EMKD1
170	230	45	2	9	4.5	468	723	48.8	1 800	2 300	∗23934EMD1	∗23934EMKD1
	260	67	2.1	12	5	914	1 240	68.8	1 700	2 200	∗23034EAD1	∗23034EAKD1
	260	67	2.1	12	5	914	1 240	68.8	1 700	2 200	∗23034EMD1	∗23034EMKD1
	260	90	2.1	11	5	1 100	1 600	66.3	1 500	1 900	∗24034EMD1	∗24034EMK30D1
	280	88	2.1	14	6	1 270	1 700	77.3	1 400	1 800	∗23134EAD1	∗23134EAKD1
	280	88	2.1	14	6	1 270	1 700	77.3	1 400	1 800	∗23134EMD1	∗23134EMKD1
	280	109	2.1	14	6	1 410	1 990	74.4	1 400	1 700	∗24134EMD1	∗24134EMK30D1
	310	86	4	18	8	1 400	1 610	94.7	1 600	2 000	∗22234EMD1	∗22234EMKD1
	310	110	4	16	8	1 700	2 070	94.6	1 300	1 700	∗23234EMD1	∗23234EMKD1
	360	120	4	20	10	2 200	2 630	121	1 200	1 500	∗22334EMD1	∗22334EMKD1
180	250	52	2	10	5	573	869	57.2	1 700	2 100	∗23936EMD1	∗23936EMKD1
	280	74	2.1	13	6	1 080	1 450	78.6	1 600	2 000	∗23036EAD1	∗23036EAKD1
	280	74	2.1	13	6	1 080	1 450	78.6	1 600	2 000	∗23036EMD1	∗23036EMKD1
	280	100	2.1	13	6	1 310	1 880	76.0	1 400	1 800	∗24036EMD1	∗24036EMK30D1
	300	96	3	15	7	1 490	1 960	88.7	1 300	1 700	∗23136EAD1	∗23136EAKD1
	300	96	3	15	7	1 490	1 960	88.7	1 300	1 700	∗23136EMD1	∗23136EMKD1
	300	118	3	15	7	1 660	2 290	85.5	1 300	1 600	∗24136EMD1	∗24136EMK30D1
	320	86	4	18	8	1 450	1 660	101	1 500	1 900	∗22236EMD1	∗22236EMKD1
	320	112	4	16	8	1 800	2 270	101	1 200	1 600	∗23236EMD1	∗23236EMKD1
	380	126	4	21	10	2 420	2 810	132	1 100	1 400	∗22336EMD1	∗22336EMKD1
190	260	52	2	10	5	603	935	62.8	1 600	2 000	∗23938EMD1	∗23938EMKD1
	290	75	2.1	13	6	1 140	1 570	83.5	1 500	1 900	∗23038EAD1	∗23038EAKD1
	290	75	2.1	13	6	1 140	1 570	83.5	1 500	1 900	∗23038EMD1	∗23038EMKD1
	290	100	2.1	13	6	1 360	2 000	80.7	1 300	1 700	∗24038EMD1	∗24038EMK30D1
	320	104	3	17	8	1 670	2 250	100	1 200	1 600	∗23138EMD1	∗23138EMKD1
	320	128	3	16	8	1 900	2 700	96.8	1 200	1 500	∗24138EMD1	∗24138EMK30D1
	340	92	4	20	9	1 620	1 870	112	1 400	1 800	∗22238EMD1	∗22238EMKD1
	340	120	4	18	8	1 990	2 480	109	1 200	1 500	∗23238EMD1	∗23238EMKD1
	400	132	5	21	10	2 600	3 120	145	1 000	1 300	∗22338EMD1	∗22338EMKD1

1) Bearing numbers with "∗" are **ULTAGE™ series** and have outer ring oil inlets and oil grooves as standard. 2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30. 3) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

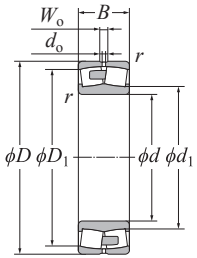
$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

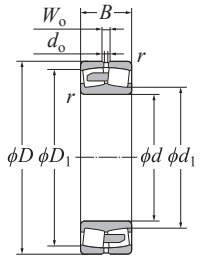
$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

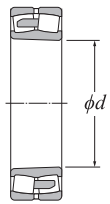
Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
181	172	258	232	2.1	0.37	1.83	2.72	1.79	25.4	25.1
190	174	276	260	3	0.25	2.69	4.00	2.63	22.3	21.8
190	174	276	260	3	0.25	2.69	4.00	2.63	22.9	22.4
187	174	276	254	3	0.33	2.03	3.02	1.98	29.6	28.8
205	177	323	296	4	0.33	2.03	3.02	1.98	50.5	49.5
185	179	221	215	2	0.16	4.11	6.12	4.02	5.39	5.23
190	181	249	238	2.1	0.22	3.07	4.57	3.00	12.7	12.3
190	181	249	238	2.1	0.22	3.07	4.57	3.00	12.8	12.4
186	181	249	231	2.1	0.30	2.23	3.32	2.18	17.2	16.9
195	182	268	250	2.1	0.28	2.39	3.56	2.34	21.5	20.9
195	182	268	250	2.1	0.28	2.39	3.56	2.34	21.6	20.9
193	182	268	243	2.1	0.35	1.91	2.85	1.87	26.7	26.3
201	187	293	277	4	0.26	2.60	3.87	2.54	28.3	27.7
199	187	293	272	4	0.33	2.03	3.02	1.98	35.8	34.8
223	187	343	313	4	0.32	2.09	3.11	2.04	60.3	59.1
199	189	241	232	2	0.17	3.90	5.81	3.81	7.79	7.56
201	191	269	255	2.1	0.23	2.95	4.40	2.89	16.8	16.3
201	191	269	255	2.1	0.23	2.95	4.40	2.89	16.9	16.4
199	191	269	248	2.1	0.31	2.15	3.20	2.10	22.8	22.4
205	194	286	267	3	0.29	2.32	3.45	2.26	27.2	26.4
205	194	286	267	3	0.29	2.32	3.45	2.26	27.4	26.5
202	194	286	259	3	0.36	1.87	2.79	1.83	33.5	33
209	197	303	287	4	0.25	2.74	4.08	2.68	29.3	28.7
210	197	303	282	4	0.33	2.06	3.06	2.01	38.2	37.1
229	197	363	329	4	0.32	2.09	3.11	2.04	70.2	68.7
209	199	251	243	2	0.17	4.05	6.04	3.96	8.2	7.96
213	201	279	266	2.1	0.22	3.01	4.48	2.94	17.8	17.3
213	201	279	266	2.1	0.22	3.01	4.48	2.94	17.9	17.4
209	201	279	258	2.1	0.30	2.23	3.32	2.18	23.8	23.4
221	204	306	284	3	0.29	2.32	3.45	2.26	34.3	33.2
216	204	306	275	3	0.37	1.84	2.74	1.80	42.1	41.5
222	207	323	305	4	0.25	2.74	4.08	2.68	35.6	34.9
220	207	323	299	4	0.33	2.03	3.02	1.98	46.1	44.7
247	210	380	346	5	0.32	2.12	3.15	2.07	81.5	79.9



Cylindrical bore
[Type EM]



Cylindrical bore
[Type EM (large size)]

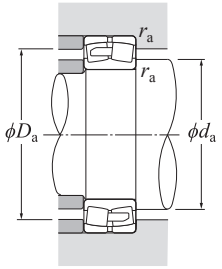


Tapered bore

d 200–280 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers [1]	
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [2]
200	280	60	2.1	12	6	766	1 190	71.8	1 500	1 900	∗23940EMD1	∗23940EMKD1
	310	82	2.1	15	7	1 310	1 790	94.1	1 400	1 800	∗23040EMD1	∗23040EMKD1
	310	109	2.1	14	7	1 570	2 280	91.1	1 200	1 600	∗24040EMD1	∗24040EMK30D1
	340	112	3	18	8	1 890	2 510	110	1 100	1 400	∗23140EMD1	∗23140EMKD1
	340	140	3	17	8	2 130	2 930	105	1 100	1 400	∗24140EMD1	∗24140EMK30D1
	360	98	4	20	10	1 810	2 100	124	1 400	1 700	∗22240EMD1	∗22240EMKD1
	360	128	4	19	9	2 250	2 840	120	1 100	1 300	∗23240EMD1	∗23240EMKD1
	420	138	5	21	10	2 830	3 530	158	950	1 200	∗22340EMD1	∗22340EMKD1
220	300	60	2.1	12	6	789	1 260	79.4	1 400	1 700	∗23944EMD1	∗23944EMKD1
	340	90	3	15	7	1 530	2 110	109	1 300	1 600	∗23044EMD1	∗23044EMKD1
	340	118	3	15	7	1 850	2 720	106	1 100	1 400	∗24044EMD1	∗24044EMK30D1
	370	120	4	19	9	2 190	2 940	128	1 000	1 300	∗23144EMD1	∗23144EMKD1
	370	150	4	19	9	2 540	3 620	124	1 000	1 300	∗24144EMD1	∗24144EMK30D1
	400	108	4	21	11	2 210	2 690	149	1 200	1 500	∗22244EMD1	∗22244EMKD1
	400	144	4	20	10	2 890	3 830	147	1 000	1 200	∗23244EMD1	∗23244EMKD1
	460	145	5	20	12	3 010	3 560	163	850	1 090	∗22344EMD1	∗22344EMKD1
240	320	60	2.1	12	6	815	1 350	87.7	1 300	1 600	∗23948EMD1	∗23948EMKD1
	360	92	3	16	8	1 630	2 350	120	1 100	1 400	∗23048EMD1	∗23048EMKD1
	360	118	3	16	8	1 940	2 980	116	1 000	1 300	∗24048EMD1	∗24048EMK30D1
	400	128	4	20	9	2 510	3 500	147	960	1 200	∗23148EMD1	∗23148EMKD1
	400	160	4	19	9	2 910	4 290	142	960	1 200	∗24148EMD1	∗24148EMK30D1
	440	120	4	16	10	2 470	3 110	159	1 060	1 350	∗22248EMD1	∗22248EMKD1
	440	160	4	20	12	3 140	4 260	156	850	1 090	∗23248EMD1	∗23248EMKD1
	500	155	5	20	12	3 500	4 170	193	780	1 000	∗22348EMD1	∗22348EMKD1
260	360	75	2.1	14	7	1 130	1 940	105	1 100	1 400	∗23952EMD1	∗23952EMKD1
	400	104	4	18	8	2 060	2 910	144	1 000	1 300	∗23052EMD1	∗23052EMKD1
	400	140	4	18	8	2 520	3 820	139	960	1 200	∗24052EMD1	∗24052EMK30D1
	440	144	4	20	12	2 780	4 020	160	860	1 090	∗23152EMD1	∗23152EMKD1
	440	180	4	27	16	3 290	4 880	147	850	1 090	∗24152EMD1	∗24152EMK30D1
	480	130	5	20	12	2 890	3 680	183	970	1 240	∗22252EMD1	∗22252EMKD1
	480	174	5	27	16	3 650	5 050	180	780	1 000	∗23252EMD1	∗23252EMKD1
	540	165	6	27	16	4 020	4 830	221	720	920	∗22352EMD1	∗22352EMKD1
280	380	75	2.1	14	7	1 180	2 050	115	1 000	1 300	∗23956EMD1	∗23956EMKD1
	420	106	4	18	8	2 170	3 150	155	960	1 200	∗23056EMD1	∗23056EMKD1

1) Bearing numbers with "∗" are **ULTAGE™ series** and have outer ring oil inlets and oil grooves as standard. Bearing models having outside diameter D dimension of 440 mm or more are the type EM (large size). 2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30. 3) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

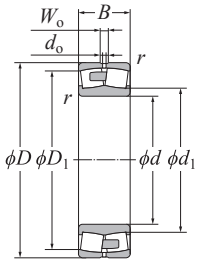
$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

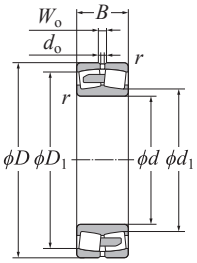
$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

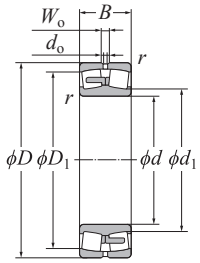
Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
221	211	269	260	2.1	0.18	3.76	5.59	3.67	12	11.6
223	211	299	283	2.1	0.23	2.95	4.40	2.89	22.8	22.1
221	211	299	275	2.1	0.31	2.18	3.24	2.13	30.2	29.7
231	214	326	301	3	0.30	2.25	3.34	2.20	41.9	40.6
224	214	326	291	3	0.39	1.74	2.59	1.70	51.5	50.7
234	217	343	323	4	0.25	2.74	4.08	2.68	42.7	41.8
232	217	343	315	4	0.34	1.98	2.94	1.93	55.2	53.6
265	220	400	364	5	0.31	2.15	3.20	2.10	94.6	92.7
241	231	289	280	2.1	0.17	4.05	6.04	3.96	12.5	12.1
246	233	327	310	3	0.23	2.95	4.40	2.89	29.9	29.1
243	233	327	302	3	0.31	2.20	3.27	2.15	39.2	38.6
252	237	353	328	4	0.30	2.28	3.39	2.23	52.3	50.7
247	237	353	317	4	0.38	1.78	2.65	1.74	65.2	64.3
264	237	383	358	4	0.25	2.74	4.08	2.68	59.6	58.4
261	237	383	349	4	0.34	2.00	2.98	1.96	79.4	77.1
277	240	440	388	5	0.32	2.10	3.13	2.06	119	116
262	251	309	301	2.1	0.15	4.40	6.56	4.31	13.5	13.1
267	253	347	329	3	0.22	3.07	4.57	3.00	32	31.7
264	253	347	322	3	0.28	2.37	3.53	2.32	42.2	41.6
276	257	383	356	4	0.29	2.32	3.45	2.26	65.1	63.1
270	257	383	344	4	0.37	1.82	2.70	1.78	81	79.8
288	257	423	383	4	0.27	2.53	3.77	2.47	82.6	80.9
284	257	423	372	4	0.36	1.86	2.77	1.82	108	105
299	260	480	421	5	0.32	2.12	3.15	2.07	149	146
292	271	349	335	2.1	0.17	3.90	5.81	3.81	23.9	23.1
291	275	385	366	4	0.23	2.95	4.40	2.89	47.8	46.3
286	275	385	354	4	0.31	2.16	3.22	2.12	63.6	62.6
302	277	423	380	4	0.31	2.15	3.20	2.10	92.2	89.5
295	277	423	371	4	0.40	1.69	2.52	1.65	111	109
312	280	460	415	5	0.27	2.53	3.77	2.47	108	105
310	280	460	405	5	0.36	1.87	2.79	1.83	143	139
324	286	514	456	6	0.31	2.16	3.22	2.12	186	183
310	291	369	356	2.1	0.16	4.16	6.20	4.07	25.2	24.4
310	295	405	386	4	0.22	3.07	4.57	3.00	51.3	49.7



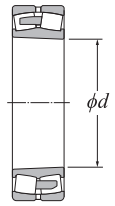
Cylindrical bore [Type EM]



Cylindrical bore [Type EM (large size)]



Cylindrical bore

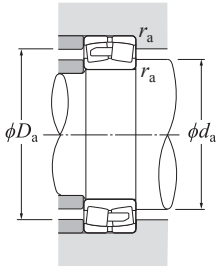


Tapered bore

d 280–360 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers [1]	
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [2]
280	420	140	4	18	8	2 620	4 060	150	880	1 100	∗24056EMD1	∗24056EMK30D1
	460	146	5	20	12	2 980	4 400	182	810	1 030	∗23156EMD1	∗23156EMKD1
	460	180	5	27	16	3 550	5 450	167	810	1 030	∗24156EMD1	∗24156EMK30D1
	500	130	5	20	12	3 010	3 920	198	920	1 180	∗22256EMD1	∗22256EMKD1
	500	176	5	27	16	3 770	5 340	193	740	950	∗23256EMD1	∗23256EMKD1
	580	175	6	27	16	4 490	5 450	249	670	860	∗22356EMD1	∗22356EMKD1
300	420	90	3	14	8	1 600	2 620	145	890	1 140	∗23960EMD1	∗23960EMKD1
	460	118	4	16	10	2 400	3 610	176	890	1 130	∗23060EMD1	∗23060EMKD1
	460	160	4	20	12	3 150	5 190	166	760	970	∗24060EMD1	∗24060EMK30D1
	500	160	5	20	12	3 540	5 170	205	750	950	∗23160EMD1	∗23160EMKD1
	500	200	5	27	16	4 270	6 610	198	750	950	∗24160EMD1	∗24160EMK30D1
	540	140	5	20	12	3 470	4 590	232	860	1 080	∗22260EMD1	∗22260EMKD1
	540	192	5	27	16	4 520	6 280	228	690	880	∗23260EMD1	∗23260EMKD1
	620	185	7.5	27	16	4 000	5 400	490	550	720	22360B	22360BK
320	440	90	3	14	8	1 670	2 820	154	840	1 080	∗23964EMD1	∗23964EMKD1
	480	121	4	20	12	2 540	4 020	191	850	1 070	∗23064EMD1	∗23064EMKD1
	480	160	4	20	12	3 250	5 400	184	720	920	∗24064EMD1	∗24064EMK30D1
	540	176	5	27	16	4 020	6 020	227	700	880	∗23164EMD1	∗23164EMKD1
	540	218	5	33	20	5 010	7 720	225	690	880	∗24164EMD1	∗24164EMK30D1
	580	150	5	20	12	3 950	5 100	261	800	1 020	∗22264EMD1	∗22264EMKD1
	580	208	5	33	20	5 230	7 370	259	640	820	∗23264EMD1	∗23264EMKD1
340	460	90	3	14	8	1 710	2 980	162	800	1 020	∗23968EMD1	∗23968EMKD1
	520	133	5	20	12	2 990	4 690	219	790	1 000	∗23068EMD1	∗23068EMKD1
	520	180	5	27	16	3 910	6 510	206	670	860	∗24068EMD1	∗24068EMK30D1
	580	190	5	27	16	4 670	6 870	257	650	830	∗23168EMD1	∗23168EMKD1
	580	243	5	33	20	5 980	9 340	254	650	830	∗24168EMD1	∗24168EMK30D1
	620	224	6	33	20	4 950	8 000	585	490	630	23268B	23268BK
360	480	90	3	14	8	1 750	3 090	171	760	970	∗23972EMD1	∗23972EMKD1
	540	134	5	20	12	3 070	4 910	232	750	950	∗23072EMD1	∗23072EMKD1
	540	180	5	27	16	4 040	6 840	220	640	820	∗24072EMD1	∗24072EMK30D1
	600	192	5	27	16	4 200	7 050	530	490	630	23172B	23172BK
	600	243	5	33	20	5 100	9 150	470	490	630	24172B	24172BK30
	650	232	6	33	20	5 400	8 700	620	450	590	23272B	23272BK

1) Bearing numbers with "∗" are ULTAGE™ series and have outer ring oil inlets and oil grooves as standard. Bearing models having outside diameter D dimension of 440 mm or more are the type EM (large size). 2) Bearings appended with "K" have a tapered bore ratio of 1:12; bearings appended with "K30" have a tapered bore ratio of 1:30. 3) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

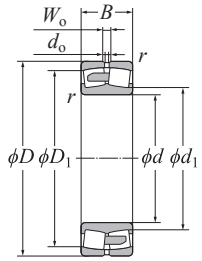
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

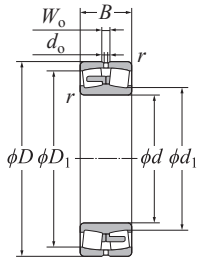
For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
306	295	405	376	4	0.29	2.30	3.42	2.25	67.3	66.3
322	300	440	403	5	0.30	2.23	3.32	2.18	98.4	95.3
316	300	440	394	5	0.38	1.78	2.65	1.74	118	117
333	300	480	437	5	0.25	2.69	4.00	2.63	113	111
331	300	480	426	5	0.35	1.95	2.90	1.91	152	148
349	306	554	489	6	0.31	2.18	3.24	2.13	228	223
329	313	407	387	3	0.20	3.42	5.09	3.34	40.1	39.2
338	315	445	413	4	0.24	2.81	4.19	2.75	72.9	70.9
332	315	445	401	4	0.33	2.04	3.04	2.00	98.0	96.9
345	320	480	436	5	0.31	2.20	3.27	2.15	129	125
340	320	480	425	5	0.39	1.74	2.59	1.70	159	157
358	320	520	469	5	0.25	2.69	4.00	2.63	134	131
352	320	520	461	5	0.35	1.92	2.86	1.88	194	188
381	336	584	522	6	0.32	2.13	3.17	2.08	270	265
350	333	427	407	3	0.19	3.62	5.39	3.54	42.1	40.8
360	335	465	433	4	0.23	2.92	4.35	2.86	78.9	76.6
352	335	465	423	4	0.31	2.15	3.20	2.10	104	102
373	340	520	468	5	0.31	2.15	3.20	2.10	169	164
363	340	520	457	5	0.39	1.71	2.54	1.67	204	201
383	340	560	510	5	0.25	2.69	4.00	2.63	177	174
376	340	560	493	5	0.35	1.91	2.85	1.87	245	238
370	353	447	427	3	0.18	3.80	5.66	3.72	44.5	43.1
384	358	502	466	5	0.24	2.87	4.27	2.80	98.5	95.5
377	358	502	456	5	0.33	2.06	3.06	2.01	140	137
393	360	560	500	5	0.32	2.12	3.15	2.07	213	206
385	360	560	486	5	0.41	1.65	2.46	1.61	266	262
410	368	592	598	5	0.37	1.84	2.75	1.80	300	291
390	373	467	447	3	0.17	4.00	5.96	3.91	46.2	44.8
405	378	522	488	5	0.23	2.98	4.44	2.92	111	108
398	378	522	478	5	0.31	2.16	3.22	2.12	147	145
417	382	578	520	4	0.32	2.11	3.15	2.07	222	215
414	382	578	507	4	0.40	1.67	2.48	1.63	281	277
429	388	622	551	5	0.36	1.87	2.78	1.83	339	329

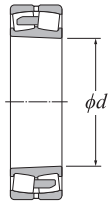
Note: Bearings other than the ULTAGE™ series with outside diameter D dimension of 320 mm or more are also provided with outer ring oil inlets and oil grooves.



Cylindrical bore
[Type EM (large size)]



Cylindrical bore

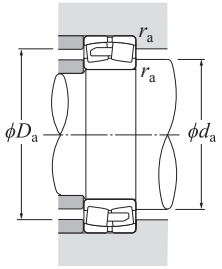


Tapered bore

d 380–480 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers [1]	
d	D	B	$r_{s\,min}$ [3]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [2]
380	520	106	4	16	10	2 340	4 000	205	710	910	*23976EMD1	*23976EMKD1
	560	135	5	20	12	3 230	5 270	247	720	910	*23076EMD1	*23076EMKD1
	560	180	5	27	16	4 140	7 280	240	610	780	*24076EMD1	*24076EMK30D1
	620	194	5	27	16	4 350	7 500	560	450	590	23176B	23176BK
	620	243	5	33	20	5 350	9 650	570	450	590	24176B	24176BK30
	680	240	6	33	20	5 800	9 650	665	430	550	23276B	23276BK
400	540	106	4	16	10	2 370	4 170	215	680	870	*23980EMD1	*23980EMKD1
	600	148	5	20	12	3 300	6 050	450	520	680	23080B	23080BK
	600	200	5	27	16	4 250	8 400	485	460	600	24080B	24080BK30
	650	200	6	27	16	4 650	8 050	630	430	560	23180B	23180BK
	650	250	6	33	20	5 650	10 300	585	430	560	24180B	24180BK30
	720	256	6	33	20	6 500	10 600	740	400	520	23280B	23280BK
420	560	106	4	16	10	2 390	4 320	230	650	830	*23984EMD1	*23984EMKD1
	620	150	5	20	12	3 450	6 400	475	490	640	23084B	23084BK
	620	200	5	27	16	4 300	8 450	470	440	570	24084B	24084BK30
	700	224	6	33	20	5 800	9 950	680	410	530	23184B	23184BK
	700	280	6	33	20	6 850	12 200	755	410	530	24184B	24184BK30
	760	272	7.5	33	20	7 300	12 000	820	380	490	23284B	23284BK
440	600	118	4	16	10	2 260	4 700	325	500	650	23988	23988K
	650	157	6	20	12	3 650	6 850	530	470	610	23088B	23088BK
	650	212	6	33	20	4 800	9 450	530	420	540	24088B	24088BK30
	720	226	6	33	20	5 800	10 100	685	390	500	23188B	23188BK
	720	280	6	33	20	7 200	13 100	715	390	500	24188B	24188BK30
	790	280	7.5	33	20	7 700	12 800	870	360	470	23288B	23288BK
460	620	118	4	16	10	2 340	4 950	325	480	620	23992	23992K
	680	163	6	27	16	4 000	7 450	560	450	580	23092B	23092BK
	680	218	6	33	20	5 100	10 200	590	390	510	24092B	24092BK30
	760	240	7.5	33	20	6 350	11 400	775	360	470	23192B	23192BK
	760	300	7.5	33	20	7 900	14 500	805	360	470	24192B	24192BK30
	830	296	7.5	33	20	8 650	14 500	925	340	440	23292B	23292BK
480	650	128	5	20	12	2 590	5 500	365	450	590	23996	23996K
	700	165	6	27	16	4 050	7 700	570	420	550	23096B	23096BK
	700	218	6	33	20	5 200	10 500	610	380	490	24096B	24096BK30

1) Bearing numbers with "*" are the ULTAGE™ series type EM (large size) and have outer ring oil inlets and oil grooves as standard.
2) Bearings appended with "K" have a tapered bore ratio of 1:12; bearings appended with "K30" have a tapered bore ratio of 1:30.
3) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

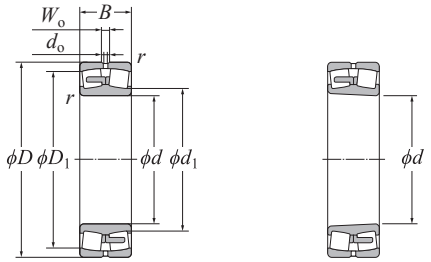
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
412	395	505	481	4	0.18	3.66	5.46	3.58	68.0	65.9
425	398	542	509	5	0.22	3.07	4.57	3.00	117	113
420	398	542	499	5	0.30	2.25	3.34	2.20	154	151
436	402	598	540	4	0.31	2.16	3.22	2.12	235	228
431	402	598	529	4	0.39	1.73	2.58	1.69	292	287
453	408	652	575	5	0.36	1.89	2.82	1.85	380	369
433	415	525	501	4	0.18	3.80	5.66	3.72	71.4	69.2
451	422	578	542	4	0.24	2.80	4.16	2.73	149	144
446	422	578	528	4	0.32	2.09	3.11	2.04	202	200
458	428	622	567	5	0.31	2.21	3.28	2.16	264	256
453	428	622	552	5	0.38	1.77	2.63	1.73	329	324
473	428	692	612	5	0.37	1.81	2.69	1.77	457	443
454	435	545	522	4	0.17	3.95	5.88	3.86	74.9	72.6
471	442	598	562	4	0.24	2.85	4.24	2.79	157	152
465	442	598	551	4	0.32	2.13	3.18	2.08	210	207
488	448	672	611	5	0.32	2.11	3.15	2.07	354	343
477	448	672	592	5	0.40	1.69	2.51	1.65	440	433
501	456	724	643	6	0.36	1.86	2.77	1.82	544	528
483	458	582	551	3	0.18	3.66	5.46	3.58	101	98
490	468	622	585	5	0.24	2.85	4.24	2.79	181	175
486	468	622	576	5	0.32	2.11	3.15	2.07	245	241
504	468	692	627	5	0.31	2.15	3.21	2.11	370	358
498	468	692	614	5	0.39	1.75	2.61	1.71	456	449
525	476	754	671	6	0.36	1.88	2.80	1.84	600	582
503	478	602	572	3	0.17	3.95	5.88	3.86	107	104
512	488	652	613	5	0.23	2.88	4.29	2.82	206	200
509	488	652	604	5	0.31	2.15	3.21	2.11	276	272
534	496	724	660	6	0.31	2.14	3.19	2.10	443	429
523	496	724	645	6	0.39	1.71	2.55	1.67	550	541
547	496	794	703	6	0.36	1.87	2.78	1.83	704	683
527	502	628	599	4	0.18	3.85	5.73	3.76	123	119
532	508	672	633	5	0.23	2.94	4.38	2.88	217	209
530	508	672	625	5	0.30	2.22	3.30	2.17	285	280

Note: Outer ring oil inlets and oil grooves are provided.



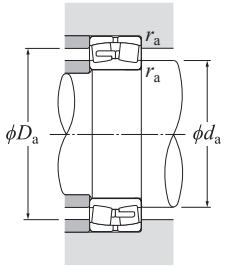
Cylindrical bore

Tapered bore

d 480–630 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [1]
480	790	248	7.5	33	20	6 900	12 300	860	350	450	**23196B**	**23196BK**
	790	308	7.5	33	20	8 250	15 300	860	350	450	**24196B**	**24196BK30**
	870	310	7.5	33	20	9 200	15 500	1 000	320	420	**23296B**	**23296BK**
500	670	128	5	20	12	2 640	5 600	460	430	560	**239/500**	**239/500K**
	720	167	6	27	16	4 250	8 300	645	410	530	**230/500B**	**230/500BK**
	720	218	6	33	20	5 300	10 900	640	350	460	**240/500B**	**240/500BK30**
	830	264	7.5	33	20	7 700	13 700	875	330	430	**231/500B**	**231/500BK**
	830	325	7.5	42	25	9 000	16 700	870	330	430	**241/500B**	**241/500BK30**
	920	336	7.5	42	25	10 500	17 800	1 100	310	400	**232/500B**	**232/500BK**
530	710	136	5	20	12	2 940	6 450	400	400	520	**239/530**	**239/530K**
	780	185	6	27	16	4 850	9 350	710	380	490	**230/530B**	**230/530BK**
	780	250	6	33	20	6 200	12 700	700	330	430	**240/530B**	**240/530BK30**
	870	272	7.5	33	20	7 800	14 200	920	310	400	**231/530B**	**231/530BK**
	870	335	7.5	42	25	9 250	17 400	910	310	400	**241/530B**	**241/530BK30**
	980	355	9.5	42	25	11 500	19 800	1 210	280	370	**232/530B**	**232/530BK**
560	750	140	5	20	12	3 200	6 900	525	380	490	**239/560**	**239/560K**
	820	195	6	27	16	5 350	10 500	800	350	450	**230/560B**	**230/560BK**
	820	258	6	33	20	6 750	14 100	750	310	400	**240/560B**	**240/560BK30**
	920	280	7.5	33	20	8 550	15 500	1 000	280	370	**231/560B**	**231/560BK**
	920	355	7.5	42	25	11 100	20 800	1 030	280	370	**241/560B**	**241/560BK30**
	1 030	365	9.5	42	25	12 300	21 100	1 320	260	340	**232/560B**	**232/560BK**
600	800	150	5	20	12	3 600	8 000	490	350	450	**239/600**	**239/600K**
	870	200	6	27	16	5 800	12 000	835	310	420	**230/600B**	**230/600BK**
	870	272	6	33	20	7 150	15 600	750	280	370	**240/600B**	**240/600BK30**
	980	300	7.5	33	20	10 000	18 400	1 160	260	340	**231/600B**	**231/600BK**
	980	375	7.5	42	25	11 900	23 200	1 130	260	340	**241/600B**	**241/600BK30**
	1 090	388	9.5	42	25	13 600	23 700	930	250	320	**232/600B**	**232/600BK**
630	850	165	6	27	16	4 100	9 250	545	320	420	**239/630**	**239/630K**
	920	212	7.5	33	20	6 550	13 000	950	310	400	**230/630B**	**230/630BK**
	920	290	7.5	33	20	8 400	17 900	915	270	350	**240/630B**	**240/630BK30**
	1 030	315	7.5	33	20	10 700	19 900	1 190	250	320	**231/630B**	**231/630BK**
	1 030	400	7.5	42	25	12 900	25 000	1 200	250	320	**241/630B**	**241/630BK30**
	1 150	412	12	42	25	15 200	26 800	1 540	230	300	**232/630B**	**232/630BK**

1) Bearings appended with "K" have a tapered bore ratio of 1:12; bearings appended with "K30" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

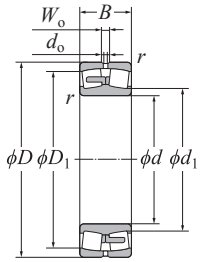
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

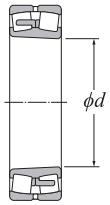
For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
554	516	754	687	6	0.31	2.15	3.21	2.11	492	477
546	516	754	671	6	0.39	1.74	2.59	1.70	608	600
574	516	834	737	6	0.36	1.87	2.78	1.83	814	790
547	522	648	621	4	0.17	4.02	5.98	3.93	131	127
552	528	692	653	5	0.23	2.98	4.44	2.92	226	218
550	528	692	646	5	0.30	2.28	3.40	2.23	295	290
580	536	794	724	6	0.32	2.12	3.16	2.08	584	566
572	536	794	703	6	0.39	1.72	2.57	1.69	716	705
600	536	884	773	6	0.39	1.74	2.59	1.70	1 000	971
579	552	688	654	4	0.17	3.95	5.88	3.86	157	152
594	558	752	704	5	0.22	3.03	4.52	2.97	306	295
586	558	752	689	5	0.30	2.24	3.33	2.19	413	406
617	566	834	757	6	0.30	2.22	3.30	2.17	653	633
605	566	834	737	6	0.38	1.79	2.67	1.75	800	788
600	574	936	723	8	0.39	1.74	2.59	1.70	1 200	1 170
547	582	728	621	4	0.16	4.09	6.09	4.00	182	176
627	588	792	741	5	0.22	3.03	4.51	2.96	353	340
620	588	792	726	5	0.30	2.29	3.40	2.24	467	459
650	596	884	801	6	0.30	2.27	3.38	2.22	752	729
638	596	884	787	6	0.39	1.75	2.61	1.71	948	934
677	604	986	867	8	0.36	1.88	2.80	1.84	1 360	1 320
654	622	778	739	4	0.18	3.85	5.73	3.76	218	211
672	628	842	785	5	0.21	3.17	4.72	3.10	400	386
667	628	842	770	5	0.29	2.33	3.47	2.28	544	535
694	636	944	860	6	0.30	2.22	3.30	2.17	908	880
685	636	944	832	6	0.37	1.81	2.70	1.77	1 130	1 110
722	644	1 046	919	8	0.36	1.86	2.77	1.82	1 540	1 490
690	658	822	781	5	0.18	3.66	5.46	3.58	277	268
704	666	884	834	6	0.22	3.14	4.67	3.07	481	464
697	666	884	815	6	0.30	2.28	3.40	2.23	657	646
731	666	994	899	6	0.30	2.27	3.38	2.22	1 050	1 020
718	666	994	872	6	0.38	1.78	2.66	1.74	1 330	1 310
760	684	1 096	969	10	0.36	1.87	2.78	1.83	1 900	1 840

Note: Outer ring oil inlets and oil grooves are provided.



Cylindrical bore

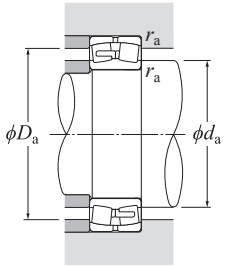


Tapered bore

d 670–950 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [1]
670	900	170	6	27	16	4 550	10 300	795	300	390	**239/670**	**239/670K**
	980	230	7.5	33	20	7 300	14 600	1 000	280	360	**230/670B**	**230/670BK**
	980	308	7.5	33	20	9 650	20 600	1 040	250	320	**240/670B**	**240/670BK30**
	1 090	336	7.5	42	25	12 500	23 600	1 400	230	300	**231/670B**	**231/670BK**
	1 090	412	7.5	42	25	14 100	28 000	1 340	230	300	**241/670B**	**241/670BK30**
	1 220	438	12	42	25	17 900	32 000	1 770	220	280	**232/670B**	**232/670BK**
710	950	180	6	27	16	4 950	11 500	665	280	370	**239/710**	**239/710K**
	1 030	236	7.5	33	20	8 000	16 200	1 140	260	340	**230/710B**	**230/710BK**
	1 030	315	7.5	33	20	10 300	22 500	1 150	230	300	**240/710B**	**240/710BK30**
	1 150	345	9.5	42	25	13 000	24 900	1 470	220	280	**231/710B**	**231/710BK**
	1 150	438	9.5	42	25	16 100	32 000	1 190	220	280	**241/710B**	**241/710BK30**
	1 280	450	12	42	25	18 100	32 500	1 200	200	260	**232/710B**	**232/710BK**
750	1 000	185	6	27	16	5 600	13 000	990	260	340	**239/750**	**239/750K**
	1 090	250	7.5	33	20	9 100	18 300	1 290	250	320	**230/750B**	**230/750BK**
	1 090	335	7.5	42	25	11 300	24 600	1 230	220	280	**240/750B**	**240/750BK30**
	1 220	365	9.5	42	25	14 300	27 200	1 130	200	260	**231/750B**	**231/750BK**
	1 360	475	15	42	25	20 300	36 500	1 980	180	240	**232/750B**	**232/750BK**
800	1 060	195	6	27	16	6 000	13 700	1 040	240	310	**239/800**	**239/800K**
	1 150	258	7.5	33	20	9 350	19 500	1 340	220	290	**230/800B**	**230/800BK**
	1 150	345	7.5	42	25	12 400	27 800	1 360	200	260	**240/800B**	**240/800BK30**
	1 280	375	9.5	42	25	16 000	31 000	1 780	180	240	**231/800B**	**231/800BK**
850	1 120	200	6	27	16	6 500	15 100	1 080	220	290	**239/850**	**239/850K**
	1 220	272	7.5	33	20	10 900	22 700	1 510	210	270	**230/850B**	**230/850BK**
	1 220	365	7.5	42	25	13 900	31 500	1 490	180	240	**240/850B**	**240/850BK30**
	1 360	400	12	42	25	17 300	34 000	1 380	170	220	**231/850B**	**231/850BK**
900	1 180	206	6	33	20	7 400	17 300	1 230	210	270	**239/900**	**239/900K**
	1 280	280	7.5	33	20	11 400	24 700	1 580	190	250	**230/900B**	**230/900BK**
	1 280	375	7.5	42	25	14 700	33 500	1 580	170	220	**240/900B**	**240/900BK30**
	1 420	412	12	42	25	18 700	38 000	2 030	150	200	**231/900B**	**231/900BK**
950	1 250	224	7.5	33	20	8 650	20 500	1 390	190	250	**239/950**	**239/950K**
	1 360	300	7.5	33	20	12 800	28 400	1 750	180	230	**230/950B**	**230/950BK**
	1 360	412	7.5	42	25	17 200	40 000	1 780	160	210	**240/950B**	**240/950BK30**

1) Bearings appended with "K" have a tapered bore ratio of 1:12; bearings appended with "K30" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

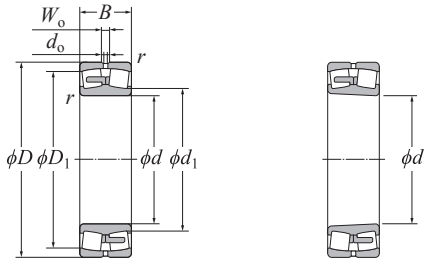
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
733	698	872	830	5	0.18	3.76	5.59	3.67	317	307
750	706	944	886	6	0.22	3.07	4.57	3.00	594	573
741	706	944	870	6	0.29	2.29	3.41	2.24	794	781
773	706	1 054	956	6	0.30	2.22	3.30	2.17	1 250	1 210
764	706	1 054	926	6	0.37	1.83	2.73	1.79	1 530	1 510
807	724	1 166	1 034	10	0.36	1.89	2.81	1.85	2 270	2 200
778	738	922	876	5	0.18	3.85	5.73	3.76	375	363
792	746	994	937	6	0.22	3.02	4.50	2.96	663	640
783	746	994	916	6	0.29	2.36	3.51	2.31	884	870
822	754	1 106	1 005	8	0.29	2.32	3.45	2.27	1 420	1 380
805	754	1 106	979	8	0.37	1.83	2.72	1.79	1 800	1 770
851	764	1 226	1 081	10	0.35	1.91	2.84	1.87	2 540	2 470
818	778	972	924	5	0.17	3.90	5.81	3.81	412	399
834	786	1 054	991	6	0.21	3.20	4.76	3.13	790	763
828	786	1 054	969	6	0.29	2.35	3.49	2.29	1 060	1 040
868	794	1 176	1 066	8	0.29	2.32	3.45	2.27	1 700	1 650
903	814	1 296	1 149	12	0.35	1.92	2.86	1.88	3 050	2 960
868	828	1 032	983	5	0.17	4.05	6.04	3.96	487	471
893	836	1 114	1 049	6	0.21	3.15	4.69	3.08	890	859
881	836	1 114	1 026	6	0.28	2.41	3.59	2.36	1 190	1 170
912	844	1 236	1 122	8	0.29	2.32	3.45	2.27	1 890	1 830
924	878	1 092	1 043	5	0.16	4.25	6.32	4.15	550	532
945	886	1 184	1 114	6	0.20	3.32	4.95	3.25	1 050	1 010
936	886	1 184	1 089	6	0.28	2.42	3.61	2.37	1 410	1 390
979	904	1 306	1 194	10	0.28	2.37	3.54	2.32	2 270	2 200
974	928	1 152	1 101	5	0.16	4.32	6.44	4.23	623	603
999	936	1 244	1 167	6	0.20	3.32	4.95	3.25	1 170	1 130
988	936	1 244	1 147	6	0.27	2.48	3.70	2.43	1 570	1 540
1 031	954	1 366	1 251	10	0.28	2.42	3.60	2.36	2 500	2 420
1 029	986	1 214	1 165	6	0.16	4.20	6.26	4.11	774	749
1 063	986	1 324	1 239	6	0.21	3.26	4.85	3.18	1 430	1 380
1 044	986	1 324	1 213	6	0.28	2.39	3.56	2.34	1 970	1 940

Note: Outer ring oil inlets and oil grooves are provided.



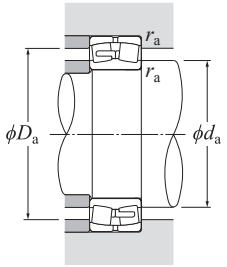
Cylindrical bore

Tapered bore

d 1 000–1 400 mm

Boundary dimensions mm						Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	W_o	d_o	dynamic C_r	static C_{0r}	C_u	Grease lubrication	Oil lubrication	Cylindrical bore	Tapered bore [1]
	1 320	236	7.5	33	20	9 550	22 700	1 520	180	230	**239/1000**	**239/1000K**
1 000	1 420	308	7.5	33	20	13 800	30 000	1 460	170	220	**230/1000B**	**230/1000BK**
	1 420	412	7.5	42	25	17 800	42 000	1 890	150	190	**240/1000B**	**240/1000BK30**
	1 400	250	7.5	33	20	10 400	24 700	1 670	160	210	**239/1060**	**239/1060K**
1 060	1 500	325	9.5	42	25	15 100	33 500	1 610	150	200	**230/1060B**	**230/1060BK**
	1 500	438	9.5	42	25	19 800	47 000	2 060	140	180	**240/1060B**	**240/1060BK30**
	1 460	250	7.5	33	20	10 900	26 700	1 470	150	200	**239/1120**	**239/1120K**
1 120	1 580	345	9.5	42	25	17 400	39 000	2 310	150	190	**230/1120B**	**230/1120BK**
	1 580	462	9.5	42	25	21 700	52 500	2 230	120	160	**240/1120B**	**240/1120BK30**
1 180	1 540	272	7.5	33	20	12 200	29 800	1 650	140	180	**239/1180**	**239/1180K**
1 250	1 630	280	7.5	33	20	13 400	33 500	1 810	120	160	**239/1250**	**239/1250K**
1 320	1 720	300	7.5	33	20	15 100	38 000	1 930	120	150	**239/1320**	**239/1320K**
1 400	1 820	315	9.5	33	20	16 800	43 000	2 570	100	130	**239/1400**	**239/1400K**

1) Bearings appended with "K" have a tapered bore ratio of 1:12; bearings appended with "K30" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

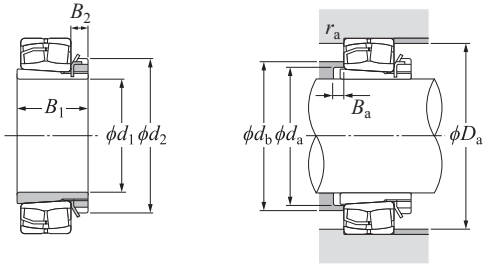
For values of e, Y_1, Y_2 and Y_0 see the table below.

Installation-related dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
d_1	d_a Min.	D_a Max.	D_1	r_{as} Max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
1 084	1 036	1 284	1 230	6	0.16	4.21	6.26	4.11	916	887
1 107	1 036	1 384	1 294	6	0.20	3.37	5.02	3.29	1 580	1 520
1 097	1 036	1 384	1 272	6	0.27	2.51	3.73	2.45	2 110	2 080
1 153	1 096	1 364	1 400	6	0.16	4.20	6.26	4.11	1 090	1 060
1 172	1 104	1 456	1 368	8	0.20	3.36	5.00	3.28	1 850	1 790
1 160	1 104	1 456	1 343	8	0.27	2.49	3.71	2.44	2 450	2 140
1 208	1 156	1 424	1 362	6	0.15	4.42	6.58	4.32	1 140	1 100
1 234	1 164	1 536	1 442	8	0.21	3.19	4.75	3.12	2 160	2 090
1 227	1 164	1 536	1 418	8	0.27	2.50	3.72	2.44	2 890	2 840
1 271	1 216	1 504	1 437	6	0.15	4.40	6.55	4.31	1 390	1 340
1 352	1 286	1 594	1 525	6	0.15	4.42	6.58	4.32	1 600	1 550
1 423	1 356	1 684	1 605	6	0.16	4.34	6.46	4.24	1 900	1 840
1 513	1 444	1 776	1 703	8	0.15	4.39	6.54	4.29	2 230	2 160

Note: Outer ring oil inlets and oil grooves are provided.

Adapters

(For spherical roller bearings)



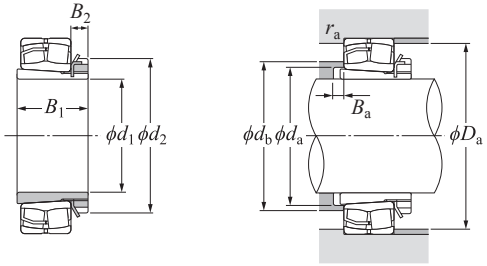
d_1 25–70 mm

Boundary dimensions mm				Numbers [1]		Installation-related dimensions mm						Mass [2] kg
				Bearing	Adapter	d_a	d_b	B_a	D_a		r_{as}	
d_1	B_1	d_2	B_2			Min.	Max.	Min.	Min.	Max.	Max.	(approx.)
25	31	45	8	*22206EAKW33	**;H 306X**	33	37	5	55	56	1	0.109
30	35	52	9	*22207EAKW33	**;H 307X**	38	45	5	63	65	1.1	0.142
	36	58	10	*22208EAKD1	**;H 308X**	44	50	5	71	73	1.1	0.189
35	36	58	10	21308CK	**;H 308X**	44	52	5	76	81.5	1.5	0.189
	46	58	10	*22308EAKD1	**;H2308X**	45	52	5	78	81	1.5	0.224
	39	65	11	*22209EAKD1	**;H 309X**	49	54	8	76	78	1.1	0.248
40	39	65	11	21309CK	**;H 309X**	49	57	5	85	91.5	1.5	0.248
	50	65	11	*22309EAKD1	**;H2309X**	50	58	5	87	91	1.5	0.280
	42	70	12	*22210EAKD1	**;H 310X**	54	59	10	81	83	1.1	0.303
45	42	70	12	21310CK	**;H 310X**	54	65	5	93	100	2	0.303
	55	70	12	*22310EAKD1	**;H2310X**	56	63	5	95	99	2	0.362
	45	75	12	*22211EAKD1	**;H 311X**	60	66	11	90	91	1.5	0.345
50	45	75	12	121311K	**;H 311X**	60	73	6	102	110	2	0.345
	59	75	12	*22311EAKD1	**;H2311X**	61	68	6	104	109	2	0.420
	47	80	13	*22212EAKD1	**;H 312X**	65	71	9	99	101	1.5	0.394
55	47	80	13	21312K	**;H 312X**	65	78	5	109	118	2	0.394
	62	80	13	*22312EAKD1	**;H2312X**	66	75	5	113	118	2.1	0.481
	50	85	14	*22213EAKD1	**;H 313X**	70	78	8	107	111	1.5	0.458
60	50	85	14	21313K	**;H 313X**	70	85	5	119	128	2	0.458
	65	85	14	*22313EAKD1	**;H2313X**	72	81	5	122	128	2.1	0.557
	55	98	15	*22215EAKD1	**;H 315X**	80	88	12	118	121	1.5	0.831
65	55	98	15	21315K	**;H 315X**	80	99	5	136	148	2	0.831
	73	98	15	*22315EAKD1	**;H2315X**	82	91	5	139	148	2.1	1.05
	59	105	17	*22216EAKD1	**;H 316X**	86	94	12	127	129	2	1.03
70	59	105	17	21316K	**;H 316X**	86	105	5	144	158	2	1.03
	78	105	17	*22316EAKD1	**;H2316X**	87	98	5	148	158	2.1	1.28

1) Bearing numbers marked "∗" designate **ULTAGE™ series**. 2) Indicates the adapter mass.
Note: 1. Refer to page **B-218** through page **B-221** for bearing dimensions, basic rated loads, and mass.
2. Refer to page **D-2** through page **D-7** and page **D-12** through page **D-14** for adapter locknut and washer dimensions.
3. Adapter numbers which are appended with the code "**X**" indicate narrow slit type adapters which use washers with straight inner tabs.

Adapters

(For spherical roller bearings)



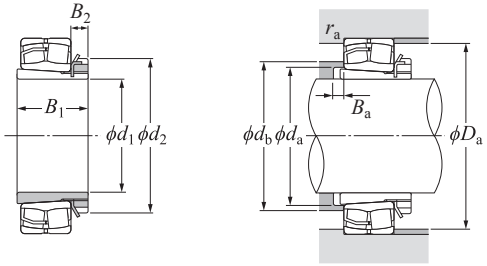
d_1 75–115 mm

Boundary dimensions mm				Numbers [1]		Installation-related dimensions mm						Mass [2] kg
				Bearing	Adapter	d_a	d_b	B_a	D_a		r_{as}	
d_1	B_1	d_2	B_2			Min.	Max.	Min.	Min.	Max.	Max.	(approx.)
	63	110	18	*22217EAKD1	**;H 317X**	91	100	12	137	139	2	1.18
75	63	110	18	21317K	**;H 317X**	91	111	6	152	166	2.5	1.18
	82	110	18	*22317EAKD1	**;H2317X**	94	107	6	157	166	3	1.45
	65	120	18	*22218EAKD1	**;H 318X**	96	105	10	144	149	2	1.37
80	86	120	18	*23218EMKD1	**;H2318X**	99	104	18	141	149	2	1.69
	65	120	18	21318K	**;H 318X**	96	119	6	162	176	2.5	1.37
	86	120	18	*22318EAKD1	**;H2318X**	99	110	6	166	176	3	1.69
	68	125	19	*22219EAKD1	**;H 319X**	102	110	9	153	158	2.1	1.56
85	68	125	19	21319K	**;H 319X**	102	127	7	171	186	2.5	1.56
	90	125	19	*22319EAKD1	**;H2319X**	105	120	7	174	186	3	1.92
	71	130	20	*22220EAKD1	**;H 320X**	107	118	8	161	168	2.1	1.69
90	97	130	20	*23220EMKD1	**;H2320X**	110	118	19	159	168	2.1	2.15
	71	130	20	21320K	**;H 320X**	107	133	7	179	201	2.5	1.69
	97	130	20	*22320EAKD1	**;H2320X**	110	127	7	187	201	3	2.15
	81	145	21	*23122EAKD1	**;H3122X**	117	125	7	161	169	2	2.25
	77	145	21	*22222EAKD1	**;H 322X**	117	130	6	179	188	2.1	2.18
100	105	145	21	*23222EMKD1	**;H2322X**	121	130	17	176	188	2.1	2.74
	77	145	21	21322K	**;H 322X**	117	146	9	203	226	2.5	2.18
	105	145	21	*22322EAKD1	**;H2322X**	121	139	7	209	226	3	2.74
	72	145	22	*23024EAKD1	**;H3024X**	127	134	7	165	171	2	1.93
	88	155	22	*23124EAKD1	**;H3124X**	128	138	7	179	189	2	2.64
110	88	155	22	*22224EAKD1	**;H3124X**	128	141	11	193	203	2.1	2.64
	112	155	22	*23224EMKD1	**;H2324X**	131	139	17	190	203	2.1	3.19
	112	155	22	*22324EAKD1	**;H2324X**	131	156	7	225	246	3	3.19
	80	155	23	*23026EAKD1	**;H3026**	137	145	8	183	191	2	2.85
	92	165	23	*23126EAKD1	**;H3126**	138	148	8	189	199	2	3.66
115	92	165	23	*22226EAKD1	**;H3126**	138	151	8	206	216	3	3.66
	121	165	23	*23226EMKD1	**;H2326**	142	150	21	203	216	3	4.6
	121	165	23	*22326EAKD1	**;H2326**	142	164	8	243	263	4	4.6

1) Bearing numbers marked "∗" designate **ULTAGE™ series**. 2) Indicates the adapter mass.
Note: 1. Refer to page **B-220** through page **B-225** for bearing dimensions, basic rated loads, and mass.
2. Refer to page **D-2** through page **D-7** and page **D-12** through page **D-14** for adapter locknut and washer dimensions.
3. Adapter numbers which are appended with the code "**X**" indicate narrow slit type adapters which use washers with straight inner tabs.

Adapters

(For spherical roller bearings)



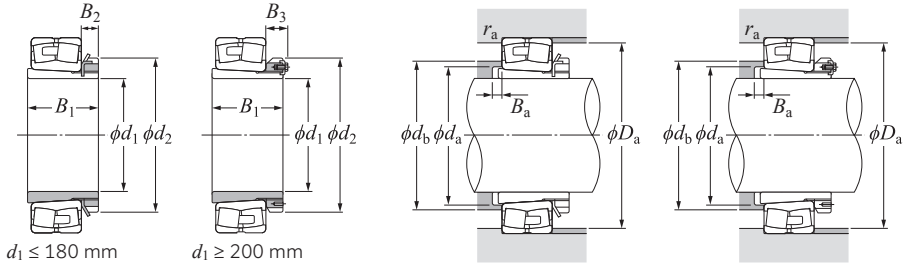
d_1 125–170 mm

Boundary dimensions mm				Numbers [1]		Installation-related dimensions mm						Mass [2] kg
				Bearing	Adapter							
d_1	B_1	d_2	B_2			d_a Min.	d_b Max.	B_a Min.	D_a Min.	D_a Max.	r_{as} Max.	(approx.)
125	82	165	24	*23028EAKD1	;H3028	147	155	8	193	201	2	3.16
	97	180	24	*23128EAKD1	;H3128	149	159	8	203	213	2.1	4.34
	97	180	24	*22228EAKD1	;H3128	149	163	8	224	236	3	4.34
	131	180	24	*23228EMKD1	;H2328	152	162	22	220	236	3	5.55
	131	180	24	*22328EAKD1	;H2328	152	181	8	261	283	4	5.55
135	87	180	26	*23030EAKD1	;H3030	158	167	8	207	214	2.1	3.89
	111	195	26	*23130EAKD1	;H3130	160	171	8	223	238	2.1	5.52
	111	195	26	*22230EAKD1	;H3130	160	177	15	242	256	3	5.52
	139	195	26	*23230EMKD1	;H2330	163	174	20	237	256	3	6.63
	139	195	26	*22330EMKD1	;H2330	163	188	8	279	303	4	6.63
140	93	190	28	*23032EAKD1	;H3032	168	177	8	221	229	2.1	5.21
	119	210	28	*23132EAKD1	;H3132	170	185	8	240	258	2.1	7.67
	119	210	28	*22232EAKD1	;H3132	170	190	14	260	276	3	7.67
	147	210	28	*23232EMKD1	;H2332	174	187	18	254	276	3	9.14
	147	210	28	*22332EMKD1	;H2332	174	205	8	296	323	4	9.14
150	101	200	29	*23034EAKD1	;H3034	179	190	8	238	249	2.1	5.99
	122	220	29	*23134EAKD1	;H3134	180	195	8	250	268	2.1	8.38
	122	220	29	*22234EAKD1	;H3134	180	201	10	277	293	4	8.38
	154	220	29	*23234EMKD1	;H2334	185	199	18	272	293	4	10.2
	154	220	29	*22334EMKD1	;H2334	185	223	8	313	343	4	10.2
160	109	210	30	*23036EAKD1	;H3036	189	201	8	255	269	2.1	6.83
	131	230	30	*23136EAKD1	;H3136	191	205	8	267	286	3	9.5
	131	230	30	*22236EMKD1	;H3136	191	209	18	287	303	4	9.5
	161	230	30	*23236EMKD1	;H2336	195	210	22	282	303	4	11.3
	161	230	30	*22336EMKD1	;H2336	195	229	8	329	363	4	11.3
170	112	220	31	*23038EAKD1	;H3038	199	213	9	266	279	2.1	7.45
	141	240	31	*23138EMKD1	;H3138	202	221	9	284	306	3	10.8
	141	240	31	*22238EMKD1	;H3138	202	222	21	305	323	4	10.8
	169	240	31	*23238EMKD1	;H2338	206	220	21	299	323	4	12.6
	169	240	31	*22338EMKD1	;H2338	206	247	9	346	380	5	12.6

1) Bearing numbers marked "*" designate ULTAGE™ series. 2) Indicates the adapter mass.
Note: 1. Refer to page B-224 through page B-227 for bearing dimensions, basic rated loads, and mass.
2. Refer to page D-2 through page D-7 and page D-12 through page D-14 for adapter locknut and washer dimensions.

Adapters

(For spherical roller bearings)



$d_1 \leq 180$ mm $\quad$ $d_1 \geq 200$ mm

d_1 180–300 mm

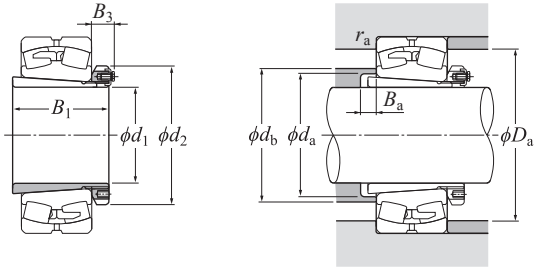
Boundary dimensions mm					Numbers [1]		Installation-related dimensions mm						Mass [2] kg
					Bearing	Adapter							
d_1	B_1	d_2	B_2	B_3			d_a Min.	d_b Max.	B_a Min.	D_a Min.	D_a Max.	r_{as} Max.	(approx.)
180	120	240	32	—	*23040EMKD1	;H3040	210	223	10	283	299	2.1	9.19
	150	250	32	—	*23140EMKD1	;H3140	212	231	10	301	326	3	12.1
	150	250	32	—	*22240EMKD1	;H3140	212	234	24	323	343	4	12.1
	176	250	32	—	*23240EMKD1	;H2340	216	232	20	315	343	4	13.9
	176	250	32	—	*22340EMKD1	;H2340	216	265	10	364	400	5	13.9
200	126	260	—	41	*23044EMKD1	;H3044	231	246	12	310	327	3	10.3
	158	280	—	44	*23144EMKD1	;H3144	233	252	10	328	353	4	14.7
	158	280	—	44	*22244EMKD1	;H3144	233	264	22	358	383	4	14.7
	183	280	—	44	*23244EMKD1	;H2344	236	261	11	349	383	4	16.7
	183	280	—	44	*22344EMKD1	;H2344	236	277	10	388	440	5	16.7
220	133	290	—	46	*23048EMKD1	;H3048	251	267	11	329	347	3	13.2
	169	300	—	46	*23148EMKD1	;H3148	254	276	11	356	383	4	17.3
	169	300	—	46	*22248EMKD1	;H3148	254	288	19	383	423	4	17.3
	196	300	—	46	*23248EMKD1	;H2348	257	284	6	372	423	4	19.7
	196	300	—	46	*22348EMKD1	;H2348	257	299	11	421	480	5	19.7
240	145	310	—	46	*23052EMKD1	;H3052	272	291	13	366	385	4	15.3
	187	330	—	49	*23152EMKD1	;H3152	276	302	11	380	423	4	22
	187	330	—	49	*22252EMKD1	;H3152	276	312	25	415	460	5	22
	208	330	—	49	*23252EMKD1	;H2352	278	310	2	405	460	5	24.2
	208	330	—	49	*22352EMKD1	;H2352	278	324	11	456	514	6	24.2
260	152	330	—	50	*23056EMKD1	;H3056	292	310	12	386	405	4	17.7
	192	350	—	51	*23156EMKD1	;H3156	296	322	12	403	440	5	24.5
	192	350	—	51	*22256EMKD1	;H3156	296	333	28	437	480	5	24.5
	221	350	—	51	*23256EMKD1	;H2356	299	331	11	426	480	5	27.8
	221	350	—	51	*22356EMKD1	;H2356	299	349	12	489	554	6	27.8
280	168	360	—	54	*23060EMKD1	;H3060	313	338	12	413	445	4	22.8
	208	380	—	53	*23160EMKD1	;H3160	317	345	12	436	480	5	30.2
	208	380	—	53	*22260EMKD1	;H3160	317	358	32	469	520	5	30.2
	240	380	—	53	*23260EMKD1	;H3260	321	352	12	461	520	5	34.1
300	171	380	—	55	*23064EMKD1	;H3064	334	360	13	433	465	4	24.6
	226	400	—	56	*23164EMKD1	;H3164	339	373	13	468	520	5	34.9
	226	400	—	56	*22264EMKD1	;H3164	339	383	39	510	560	5	34.9

1) Bearing numbers marked "*" designate ULTAGE™ series. 2) Indicates the adapter mass.
Note: 1. Refer to page B-228 through page B-231 for bearing dimensions, basic rated loads, and mass.
2. Refer to page D-2 through page D-7 and page D-12 through page D-15 for adapter locknut, washer, and locking clip dimensions.

Adapters

NTN

(For spherical roller bearings)



d_1 300–470 mm

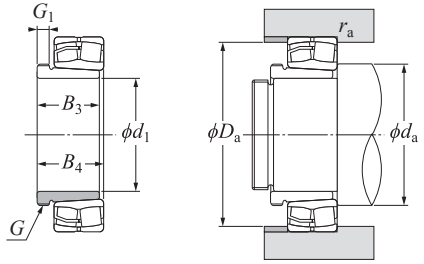
Boundary dimensions mm				Numbers [1]		Installation-related dimensions mm						Mass [2] kg
				Bearing	Adapter	d_a	d_b	B_a	D_a		r_{as}	
d_1	B_1	d_2	B_3			Min.	Max.	Min.	Min.	Max.	Max.	(approx.)
300	258	400	56	*23264EMKD1	**;H3264**	343	376	13	493	560	5	39.3
	187	400	58	*23068EMKD1	**;H3068**	355	384	14	466	502	5	28.7
320	254	440	72	*23168EMKD1	**;H3168**	360	393	14	500	560	5	49.5
	288	440	72	23268BK	**;H3268**	364	410	14	524	592	5	54.6
	188	420	58	*23072EMKD1	**;H3072**	375	405	14	488	522	5	30.5
340	259	460	75	23172BK	**;H3172**	380	417	14	520	578	4	54.2
	299	460	75	23272BK	**;H3272**	385	429	14	551	622	5	60.2
	193	450	62	*23076EMKD1	**;H3076**	396	425	15	509	542	5	35.8
360	264	490	77	23176BK	**;H3176**	401	436	15	540	598	4	61.7
	310	490	77	23276BK	**;H3276**	405	453	15	575	652	5	69.6
	210	470	66	23080BK	**;H3080**	417	451	15	542	578	4	41.3
380	272	520	82	23180BK	**;H3180**	421	458	15	568	622	5	70.6
	328	520	82	23280BK	**;H3280**	427	473	15	612	692	5	81
400	212	490	66	23084BK	**;H3084**	437	471	16	562	598	4	43.7
	304	540	90	23184BK	**;H3184**	443	488	16	611	672	5	84.2
410	228	520	77	23088BK	**;H3088**	458	490	17	585	622	5	65.2
	307	560	90	23188BK	**;H3188**	464	504	17	627	692	5	104
430	234	540	77	23092BK	**;H3092**	478	512	17	613	652	5	69.5
	326	580	95	23192BK	**;H3192**	485	534	17	660	724	6	116
450	237	560	77	23096BK	**;H3096**	499	532	18	633	672	5	73.3
	335	620	95	23196BK	**;H3196**	505	554	18	687	754	6	133
470	247	580	85	230/500BK	**;H30/500**	519	552	18	653	692	5	81.8
	356	630	100	231/500BK	**;H31/500**	527	580	18	724	794	6	143

1) Bearing numbers marked "*" designate **ULTAGE™ series**. 2) Indicates the adapter mass.
Note: 1. Refer to page **B-230** through page **B-235** for bearing dimensions, basic rated loads, and mass.
2. Refer to page **D-2** through page **D-7** and page **D-12** through page **D-15** for adapter locknut and locking clip dimensions.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



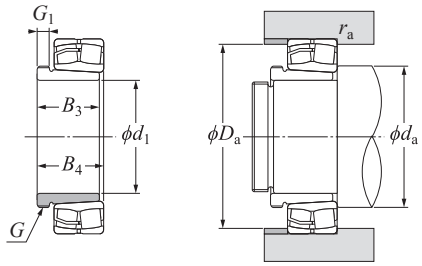
d_1 35–70 mm

Boundary dimensions mm					Numbers [3]		Installation-related dimensions mm					Mass [4] kg	Applied nut number [5]
	Thread nominal dimension [1]				Bearing	Withdrawal sleeve	d_a		D_a		r_{as}		
d_1	G	B_3	G_1	B_4 [2]			Min.	Max.	Min.	Max.	Max.	(approx.)	
	M45×1.5	29	6	32	*22208EAKD1	**;AH 308**	47	50	71	73	1.1	0.09	AN09
35	M45×1.5	29	6	32	21308CK	**;AH 308**	48.5	52	76	81.5	1.5	0.09	AN09
	M45×1.5	40	7	43	*22308EAKD1	**;AH 2308**	49	52	78	81	1.5	0.128	AN09
	M50×1.5	31	6	34	*22209EAKD1	**;AH 309**	52	54	76	78	1.1	0.109	AN10
40	M50×1.5	31	6	34	21309CK	**;AH 309**	53.5	57	85	91.5	1.5	0.109	AN10
	M50×1.5	44	7	47	*22309EAKD1	**;AH 2309**	54	58	87	91	1.5	0.164	AN10
	M55×2	35	7	38	*22210EAKD1	**;AHX 310**	57	59	81	83	1.1	0.137	AN11
45	M55×2	35	7	38	21310CK	**;AHX 310**	60	65	93	100	2	0.137	AN11
	M55×2	50	9	53	*22310EAKD1	**;AHX2310**	61	63	95	99	2	0.209	AN11
	M60×2	37	7	40	*22211EAKD1	**;AHX 311**	64	66	90	91	1.5	0.161	AN12
50	M60×2	37	7	40	21311K	**;AHX 311**	65	73	102	110	2	0.161	AN12
	M60×2	54	10	57	*22311EAKD1	**;AHX2311**	66	68	104	109	2	0.253	AN12
	M65×2	40	8	43	*22212EAKD1	**;AHX 312**	69	71	99	101	1.5	0.189	AN13
55	M65×2	40	8	43	21312K	**;AHX 312**	72	78	109	118	2.1	0.189	AN13
	M65×2	58	11	61	*22312EAKD1	**;AHX2312**	72	75	113	118	2.1	0.297	AN13
	M75×2	42	8	45	*22213EAKD1	**;AH 313**	74	78	107	111	1.5	0.253	AN15
60	M75×2	42	8	45	21313K	**;AH 313**	77	85	119	128	2.1	0.253	AN15
	M75×2	61	12	64	*22313EAKD1	**;AH 2313**	77	81	122	128	2.1	0.395	AN15
	M80×2	43	8	47	*22214EAKD1	**;AH 314**	79	84	113	116	1.5	0.28	AN16
65	M80×2	43	8	47	21314K	**;AH 314**	82	91	126	138	2.1	0.28	AN16
	M80×2	64	12	68	*22314EAKD1	**;AHX2314**	82	85	131	138	2.1	0.466	AN16
	M85×2	45	8	49	*22215EAKD1	**;AH 315**	84	88	118	121	1.5	0.313	AN17
70	M85×2	45	8	49	21315K	**;AH 315**	87	99	136	148	2.1	0.313	AN17
	M85×2	68	12	72	*22315EAKD1	**;AHX2315**	87	91	139	148	2.1	0.534	AN17

1) Standard thread shapes and dimensions are as per **JIS B 0205-1** and **JIS B 0205-4** (general metric thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Bearing numbers marked "*" designate **ULTAGE™ series**.
4) Indicates withdrawal sleeve mass.
5) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-218** through page **B-221** for bearing dimensions, basic rated loads, and mass.

Withdrawal Sleeves

(For spherical roller bearings)



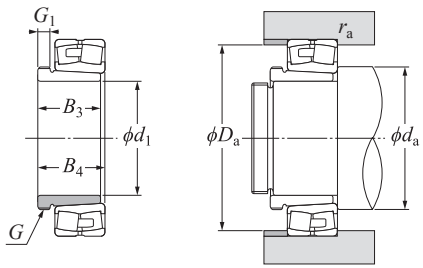
d_1 75–115 mm

d_1	Thread nominal dimension [1] G	B_3	G_1	B_4 [2]	Bearing	Withdrawal sleeve	d_a Min.	d_a Max.	D_a Min.	D_a Max.	r_{as} Max.	Mass [4] (approx.) kg	Applied nut number [5]
		mm			Numbers [3]		mm						
	Boundary dimensions mm					Installation-related dimensions							
75	M90×2	48	8	52	∗22216EAKD1	**;AH 316**	91	94	127	129	2	0.365	AN18
	M90×2	48	8	52	21316K	**;AH 316**	92	105	144	158	2	0.365	AN18
	M90×2	71	12	75	∗22316EAKD1	**;AHX2316**	92	98	148	158	2.1	0.597	AN18
80	M95×2	52	9	56	∗22217EAKD1	**;AHX 317**	96	100	137	139	2	0.429	AN19
	M95×2	52	9	56	21317K	**;AHX 317**	99	111	152	166	2.5	0.429	AN19
	M95×2	74	13	78	∗22317EAKD1	**;AHX2317**	99	107	157	166	3.0	0.67	AN19
85	M100×2	53	9	57	∗22218EAKD1	**;AHX 318**	101	105	144	149	2	0.461	AN20
	M100×2	63	10	67	∗23218EMKD1	**;AHX3218**	101	104	141	149	2	0.576	AN20
	M100×2	53	9	57	21318K	**;AHX 318**	104	119	162	176	2.5	0.461	AN20
	M100×2	79	14	83	∗22318EAKD1	**;AHX2318**	104	110	166	176	3	0.779	AN20
90	M105×2	57	10	61	∗22219EAKD1	**;AHX 319**	107	110	153	158	2.1	0.532	AN21
	M105×2	57	10	61	21319K	**;AHX 319**	109	127	171	186	2.5	0.532	AN21
	M105×2	85	16	89	∗22319EAKD1	**;AHX2319**	109	120	174	186	3	0.886	AN21
95	M110×2	59	10	63	∗22220EAKD1	**;AHX 320**	112	118	161	168	2.1	0.582	AN22
	M110×2	73	11	77	∗23220EMKD1	**;AHX3220**	112	118	159	168	2.1	0.767	AN22
	M110×2	59	10	63	21320K	**;AHX 320**	114	133	179	201	2.5	0.582	AN22
	M110×2	90	16	94	∗22320EAKD1	**;AHX2320**	114	127	187	201	3	0.998	AN22
105	M120×2	68	11	72	∗23122EAKD1	**;AHX3122**	121	125	161	169	2	0.76	AN24
	M115×2	82	13	91	∗24122EMK30D1	**;AH24122**	121	121	158	169	2	0.73	AN23
	M120×2	68	11	72	∗22222EAKD1	**;AHX3122**	122	130	179	188	2.1	0.76	AN24
	M125×2	82	11	86	∗23222EMKD1	**;AHX3222**	122	130	176	188	2.1	1.04	AN25
	M120×2	63	12	67	21322K	**;AHX 322**	124	146	203	226	2.5	0.663	AN24
	M125×2	98	16	102	∗22322EAKD1	**;AHX2322**	124	139	209	226	3	1.35	AN25
115	M130×2	60	13	64	∗23024EAKD1	**;AHX3024**	129	134	165	171	2	0.75	AN26
	M125×2	73	13	82	∗24024EMK30D1	**;AH24024**	129	132	161	171	2	0.65	AN25
	M130×2	75	12	79	∗23124EAKD1	**;AHX3124**	131	138	179	189	2	0.95	AN26
	M130×2	93	13	102	∗24124EMK30D1	**;AH24124**	131	136	173	189	2	1	AN26

1) Standard thread shapes and dimensions are as per **JIS B 0205-1** and **JIS B 0205-4** (general metric thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Bearing numbers marked "∗" designate **ULTAGE™ series**.
4) Indicates withdrawal sleeve mass.
5) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-220** through page **B-223** for bearing dimensions, basic rated loads, and mass.

Withdrawal Sleeves

(For spherical roller bearings)



d_1 115–150 mm

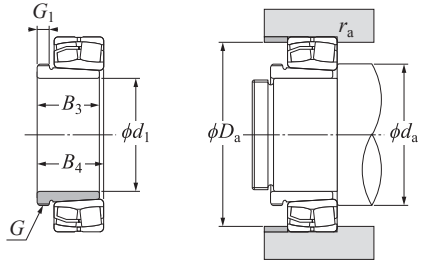
d_1	Thread nominal dimension [1] G	B_3	G_1	B_4 [2]	Bearing	Withdrawal sleeve	d_a Min.	d_a Max.	D_a Min.	D_a Max.	r_{as} Max.	Mass [4] (approx.) kg	Applied nut number [5]
		mm			Numbers [3]		mm						
	Boundary dimensions mm					Installation-related dimensions							
115	M130×2	75	12	79	∗22224EAKD1	**;AHX3124**	132	141	193	203	2.1	0.95	AN26
	M135×2	90	13	94	∗23224EMKD1	**;AHX3224**	132	139	190	203	2.1	1.3	AN27
	M135×2	105	17	109	∗22324EAKD1	**;AHX2324**	134	156	225	246	3	1.6	AN27
125	M140×2	67	14	71	∗23026EAKD1	**;AHX3026**	139	145	183	191	2	0.93	AN28
	M135×2	83	14	93	∗24026EMK30D1	**;AH24026**	139	143	178	191	2	0.84	AN27
	M140×2	78	12	82	∗23126EAKD1	**;AHX3126**	141	148	189	199	2	1.08	AN28
	M140×2	94	14	104	∗24126EMK30D1	**;AH24126**	141	146	183	199	2	1.11	AN28
	M140×2	78	12	82	∗22226EAKD1	**;AHX3126**	144	151	206	216	3	1.08	AN28
	M145×2	98	15	102	∗23226EMKD1	**;AHX3226**	144	150	203	216	3	1.58	AN29
	M145×2	115	19	119	∗22326EAKD1	**;AHX2326**	147	164	243	263	4	1.97	AN29
135	M150×2	68	14	73	∗23028EAKD1	**;AHX3028**	149	155	193	201	2	1.01	AN30
	M145×2	83	14	93	∗24028EMK30D1	**;AH24028**	149	153	188	201	2	0.91	AN29
	M150×2	83	14	88	∗23128EAKD1	**;AHX3128**	152	159	203	213	2.1	1.28	AN30
	M150×2	99	14	109	∗24128EMK30D1	**;AH24128**	152	156	198	213	2.1	1.25	AN30
	M150×2	83	14	88	∗22228EAKD1	**;AHX3128**	154	163	224	236	3	1.28	AN30
	M155×3	104	15	109	∗23228EMKD1	**;AHX3228**	154	162	220	236	3	1.84	AN31
	M155×3	125	20	130	∗22328EAKD1	**;AHX2328**	157	181	261	283	4	2.33	AN31
145	M160×3	72	15	77	∗23030EAKD1	**;AHX3030**	161	167	207	214	2.1	1.15	AN32
	M155×3	90	15	101	∗24030EMK30D1	**;AH24030**	161	165	202	214	2.1	1.04	AN31
	M165×3	96	15	101	∗23130EAKD1	**;AHX3130**	162	171	223	238	2.1	1.79	AN33
	M160×3	115	15	126	∗24130EMK30D1	**;AH24130**	162	168	216	238	2.1	1.56	AN32
	M165×3	96	15	101	∗22230EAKD1	**;AHX3130**	164	177	242	256	3	1.79	AN33
	M165×3	114	17	119	∗23230EMKD1	**;AHX3230**	164	174	237	256	3	2.22	AN33
	M165×3	135	24	140	∗22330EMKD1	**;AHX2330**	167	188	279	303	4	2.82	AN33
150	M170×3	77	16	82	∗23032EAKD1	**;AH 3032**	171	177	221	229	2.1	2.06	AN34
	M170×3	95	15	106	∗24032EMK30D1	**;AH24032**	171	175	215	229	2.1	2.33	AN34
	M180×3	103	16	108	∗23132EAKD1	**;AH 3132**	172	185	240	258	2.1	3.21	AN36
	M170×3	124	15	135	∗24132EMK30D1	**;AH24132**	172	181	232	258	2.1	3	AN34
	M180×3	103	16	108	∗22232EAKD1	**;AH 3132**	174	190	260	276	3	3.21	AN36

1) Standard thread shapes and dimensions are as per **JIS B 0205-1** and **JIS B 0205-4** (metric trapezoidal screw thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Bearing numbers marked "∗" designate **ULTAGE™ series**.
4) Indicates withdrawal sleeve mass.
5) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-222** through page **B-227** for bearing dimensions, basic rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 150–190 mm

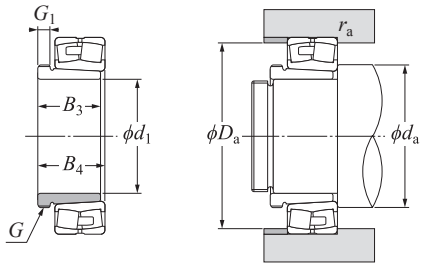
d_1	Boundary dimensions mm: Thread nominal dimension [1] G	B_3	G_1	B_4 [2]	Numbers [3]: Bearing	Withdrawal sleeve	Installation-related dimensions mm: d_a Min.	d_a Max.	D_a Min.	D_a Max.	r_{as} Max.	Mass [4] kg (approx.)	Applied nut number [5]
150	M180×3	124	20	130	*23232EMKD1	**;AH 3232**	174	187	254	276	3	4.08	AN36
	M180×3	140	24	146	*22332EMKD1	**;AH 2332**	177	205	296	323	4	4.72	AN36
160	M180×3	85	17	90	*23034EAKD1	**;AH 3034**	181	190	238	249	2.1	2.43	AN36
	M180×3	106	16	117	*24034EMK30D1	**;AH24034**	181	186	231	249	2.1	2.8	AN36
	M190×3	104	16	109	*23134EAKD1	**;AH 3134**	182	195	250	268	2.1	3.4	AN38
	M180×3	125	16	136	*24134EMK30D1	**;AH24134**	182	193	243	268	2.1	3.21	AN36
	M190×3	104	16	109	*22234EMKD1	**;AH 3134**	187	201	277	293	4	3.4	AN38
	M190×3	134	24	140	*23234EMKD1	**;AH 3234**	187	199	272	293	4	4.8	AN38
	M190×3	146	24	152	*22334EMKD1	**;AH 2334**	187	223	313	343	4	5.25	AN38
170	M190×3	92	17	98	*23036EAKD1	**;AH 3036**	191	201	255	269	2.1	2.81	AN38
	M190×3	116	16	127	*24036EMK30D1	**;AH24036**	191	199	248	269	2.1	3.1	AN38
	M200×3	116	19	122	*23136EAKD1	**;AH 3136**	194	205	267	286	3	4.22	AN40
	M190×3	134	16	145	*24136EMK30D1	**;AH24136**	194	202	254	286	3	3.68	AN38
	M200×3	105	17	110	*22236EMKD1	**;AH 2236**	197	209	287	303	4	3.73	AN40
	M200×3	140	24	146	*23236EMKD1	**;AH 3236**	197	210	282	303	4	5.32	AN40
	M200×3	154	26	160	*22336EMKD1	**;AH 2336**	197	229	324	363	4	5.83	AN40
180	Tr205×4	96	18	102	*23038EAKD1	**;AH 3038**	201	213	266	279	2.1	3.32	HNL41
	M200×3	118	18	131	*24038EMK30D1	**;AH24038**	201	209	258	279	2.1	3.5	AN40
	Tr210×4	125	20	131	*23138EMKD1	**;AH 3138**	204	221	284	306	3	4.89	HN42
	M200×3	146	18	159	*24138EMK30D1	**;AH24138**	204	216	275	306	3	4.28	AN40
	Tr210×4	112	18	117	*22238EMKD1	**;AH 2238**	207	222	305	323	4	4.25	HN42
	Tr210×4	145	25	152	*23238EMKD1	**;AH 3238**	207	220	299	323	4	5.9	HN42
	Tr210×4	160	26	167	*22338EMKD1	**;AH 2338**	210	247	346	380	5	6.63	HN42
190	Tr215×4	102	19	108	*23040EMKD1	**;AH 3040**	211	223	283	299	2.1	3.8	HNL43
	Tr210×4	127	18	140	*24040EMK30D1	**;AH24040**	211	221	275	299	2.1	3.93	HN42
	Tr220×4	134	21	140	*23140EMKD1	**;AH 3140**	214	231	301	326	3	5.49	HN44
	Tr210×4	158	18	171	*24140EMK30D1	**;AH24140**	214	224	291	326	3	5.1	HN42

1) Standard thread shapes and dimensions are as per **JIS B 0205-1** and **JIS B 0205-4** (general metric thread), and **JIS B 0206** (metric trapezoidal screw thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Bearing numbers marked "*" designate **ULTAGE™ series**.
4) Indicates withdrawal sleeve mass.
5) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-226** through page **B-229** for bearing dimensions, basic rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 190–260 mm

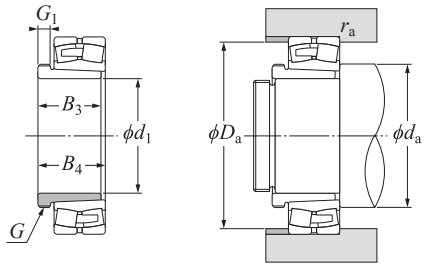
d_1	Boundary dimensions mm: Thread nominal dimension [1] G	B_3	G_1	B_4 [2]	Numbers [3][4]: Bearing	Withdrawal sleeve	Installation-related dimensions mm: d_a Min.	d_a Max.	D_a Min.	D_a Max.	r_{as} Max.	Mass [5] kg (approx.)	Applied nut number [6]
190	Tr220×4	118	19	123	*22240EMKD1	**;AH 2240**	217	234	323	343	4	4.68	HN44
	Tr220×4	153	25	160	*23240EMKD1	**;AH 3240**	217	232	315	343	4	6.68	HN44
	Tr220×4	170	30	177	*22340EMKD1	**;AH 2340**	220	265	364	400	5	7.54	HN44
200	Tr235×4	111	20	117	*23044EMKD1	**;AH 3044**	233	246	310	327	3	7.4	HNL47
	Tr230×4	138	20	152	*24044EMK30D1	**;AH24044H**	233	243	302	327	3	8.25	HN46
	Tr240×4	145	23	151	*23144EMKD1	**;AH 3144**	237	252	328	353	4	10.4	HN48
	Tr230×4	170	20	184	*24144EMK30D1	**;AH24144H**	237	247	317	353	4	10.2	HN46
	Tr240×4	130	20	136	*22244EMKD1	**;AH 2244**	237	264	358	383	4	9.1	HN48
	Tr240×4	181	30	189	*23244EMKD1	**;AH 2344**	237	261	349	383	4	13.5	HN48
	Tr240×4	181	30	189	*22344EMKD1	**;AH 2344**	240	277	388	440	5	13.5	HN48
220	Tr260×4	116	21	123	*23048EMKD1	**;AH 3048**	253	267	329	347	3	8.75	HNL52
	Tr250×4	138	20	153	*24048EMK30D1	**;AH24048H**	253	264	322	347	3	8.98	HN50
	Tr260×4	154	25	161	*23148EMKD1	**;AH 3148**	257	276	356	383	4	12	HN52
	Tr260×4	180	20	195	*24148EMK30D1	**;AH24148H**	257	270	344	383	4	12.5	HN52
	Tr260×4	144	21	150	*22248EMKD1	**;AH 2248**	257	288	383	423	4	11.1	HN52
	Tr260×4	189	30	197	*23248EMKD1	**;AH 3248**	257	284	372	423	4	15.5	HN52
	Tr260×4	189	30	197	*22348EMKD1	**;AH 2348**	260	299	421	480	5	15.5	HN52
240	Tr280×4	128	23	135	*23052EMKD1	**;AH 3052**	275	291	366	385	4	10.7	HNL56
	Tr270×4	162	22	178	*24052EMK30D1	**;AH24052**	275	286	354	385	4	11.8	HN54
	Tr290×4	172	26	179	*23152EMKD1	**;AH 3152**	277	302	380	423	4	16.2	HN58
	Tr280×4	202	22	218	*24152EMK30D1	**;AH24152H**	277	295	371	423	4	15.4	HN56
	Tr290×4	155	23	161	*22252EMKD1	**;AH 2252**	280	312	415	460	5	14	HN58
	Tr290×4	205	30	213	*23252EMKD1	**;AH 2352**	280	310	405	460	5	19.6	HN58
	Tr290×4	205	30	213	*22352EMKD1	**;AH 2352**	286	324	458	514	6	19.6	HN58
260	Tr300×4	131	24	139	*23056EMKD1	**;AH 3056**	295	310	386	405	4	12	HNL60
	Tr290×4	162	22	179	*24056EMK30D1	**;AH24056H**	295	306	376	405	4	12.8	HN58
	Tr310×5	175	28	183	*23156EMKD1	**;AH 3156**	300	322	403	440	5	17.5	HN62

1) Standard thread shapes and dimensions are as per **JIS B 0206** (metric trapezoidal screw thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Bearing numbers marked "*" designate **ULTAGE™ series**.
4) Withdrawal sleeve numbers appended with the suffix "**H**" signify the high pressure oil (hydraulic) design.
5) Indicates withdrawal sleeve mass.
6) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-228** through page **B-231** for bearing dimensions, basic rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 260–360 mm

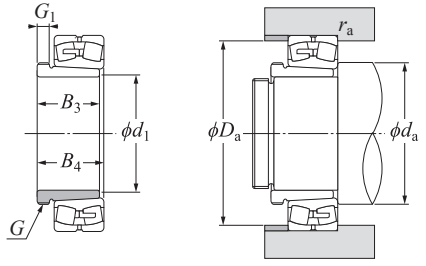
d_1	Boundary dimensions mm: Thread nominal dimension [1] G	B_3	G_1	B_4 [2]	Numbers [3][4]: Bearing	Withdrawal sleeve	Installation-related dimensions mm: d_a Min.	d_a Max.	D_a Min.	D_a Max.	r_{as} Max.	Mass [5] kg (approx.)	Applied nut number [6]
260	Tr300×4	202	22	219	*24156EMK30D1	**;AH24156H**	300	316	394	440	5	16.3	HN60
	Tr310×5	155	24	163	*22256EMKD1	**;AH 2256**	300	333	437	480	5	15.2	HN62
	Tr310×5	212	30	220	*23256EMKD1	**;AH 2356**	300	331	426	480	5	21.6	HN62
	Tr310×5	212	30	220	*22356EMKD1	**;AH 2356**	306	349	489	554	6	21.6	HN62
280	Tr320×5	145	26	153	*23060EMKD1	**;AH 3060**	315	338	413	445	4	14.4	HNL64
	Tr310×5	184	24	202	*24060EMK30D1	**;AH24060H**	315	332	401	445	4	15.5	HN62
	Tr330×5	192	30	200	*23160EMKD1	**;AH 3160**	320	345	436	480	5	20.8	HN66
	Tr320×5	224	24	242	*24160EMK30D1	**;AH24160H**	320	340	425	480	5	19.5	HN64
	Tr330×5	170	26	178	*22260EMKD1	**;AH 2260**	320	358	469	520	5	18.1	HN66
	Tr330×5	228	34	236	*23260EMKD1	**;AH 3260**	320	352	461	520	5	26	HN66
300	Tr345×5	149	27	157	*23064EMKD1	**;AH 3064**	335	360	433	465	4	16	HNL69
	Tr340×5	184	24	202	*24064EMK30D1	**;AH24064H**	335	352	423	465	4	16.6	HN68
	Tr350×5	209	31	217	*23164EMKD1	**;AH 3164**	340	373	468	520	5	24.5	HN70
	Tr340×5	242	24	260	*24164EMK30D1	**;AH24164H**	340	363	457	520	5	21.4	HN68
	Tr350×5	180	27	190	*22264EMKD1	**;AH 2264**	340	383	510	560	5	20.2	HN70
	Tr350×5	246	36	254	*23264EMKD1	**;AH 3264**	340	376	493	560	5	30.6	HN70
320	Tr365×5	162	28	171	*23068EMKD1	**;AH 3068**	358	384	466	502	5	19.5	HNL73
	Tr360×5	206	26	225	*24068EMK30D1	**;AH24068H**	358	377	456	502	5	21.7	HNL72
	Tr370×5	225	33	234	*23168EMKD1	**;AH 3168**	360	393	500	560	5	29	HN74
	Tr360×5	269	26	288	*24168EMK30D1	**;AH24168H**	360	385	486	560	5	27.1	HNL72
340	Tr385×5	167	30	176	*23072EMKD1	**;AH 3072**	378	405	488	522	5	21	HNL77
	Tr380×5	206	26	226	*24072EMK30D1	**;AH24072H**	378	398	478	522	5	22.7	HNL76
	Tr400×5	229	35	238	23172BK	**;AH 3172**	382	417	520	578	5	33	HN80
	Tr380×5	269	26	289	24172BK30	**;AH24172H**	382	414	507	578	5	29.6	HNL76
360	Tr410×5	170	31	180	*23076EMKD1	**;AH 3076**	398	425	509	542	5	23.2	HNL82
	Tr400×5	208	28	228	*24076EMK30D1	**;AH24076H**	398	420	499	542	5	23.7	HNL80
	Tr420×5	232	36	242	23176BK	**;AH 3176**	402	436	540	598	5	35.7	HN84
	Tr400×5	271	28	291	24176BK30	**;AH24176H**	402	431	529	598	5	31.3	HNL80

1) Standard thread shapes and dimensions are as per **JIS B 0216** (metric trapezoidal screw thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Bearing numbers marked "**∗**" designate **ULTAGE™ series**.
4) Withdrawal sleeve numbers appended with the suffix "**H**" signify the high pressure oil (hydraulic) design.
5) Indicates withdrawal sleeve mass.
6) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-230** through page **B-233** for bearing dimensions, basic rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



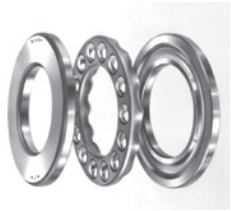
d_1 380–460 mm

d_1	Boundary dimensions mm: Thread nominal dimension [1] G	B_3	G_1	B_4 [2]	Numbers [3]: Bearing	Withdrawal sleeve	Installation-related dimensions mm: d_a Min.	d_a Max.	D_a Min.	D_a Max.	r_{as} Max.	Mass [4] kg (approx.)	Applied nut number [5]
380	Tr430×5	183	33	193	23080BK	**;AH 3080**	422	451	542	578	5	27.3	HNL86
	Tr420×5	228	28	248	24080BK30	**;AH24080H**	422	446	528	578	5	27.1	HNL84
	Tr440×5	240	38	250	23180BK	**;AH 3180**	428	458	568	622	6	39.5	HN88
	Tr420×5	278	28	298	24180BK30	**;AH24180H**	428	452	552	622	6	34.4	HNL84
400	Tr450×5	186	34	196	23084BK	**;AH 3084**	442	471	562	598	5	29	HNL90
	Tr440×5	230	30	252	24084BK30	**;AH24084H**	442	465	551	598	5	29	HNL88
	Tr460×5	266	40	276	23184BK	**;AH 3184**	448	488	611	672	6	46.5	HN92
	Tr440×5	310	30	332	24184BK30	**;AH24184H**	448	477	592	672	6	40.3	HNL88
420	Tr470×5	194	35	205	23088BK	**;AHX3088**	468	490	585	622	6	32	HNL94
	Tr460×5	242	30	264	24088BK30	**;AH24088H**	468	485	576	622	6	31.9	HNL92
	Tr480×5	270	42	281	23188BK	**;AHX3188**	468	504	627	692	6	49.8	HN96
	Tr460×5	310	30	332	24188BK30	**;AH24188H**	468	498	614	692	6	42.3	HN92
440	Tr490×5	202	37	213	23092BK	**;AHX3092**	488	512	613	652	6	35.2	HNL98
	Tr510×6	285	43	296	23192BK	**;AHX3192**	496	534	660	724	7.5	57.9	HN102
	Tr480×5	332	32	355	24192BK30	**;AH24192H**	496	523	645	724	7.5	47.4	HNL96
460	Tr520×6	205	38	217	23096BK	**;AHX3096**	508	532	633	672	6	39.2	HNL104
	Tr530×6	295	45	307	23196BK	**;AHX3196**	516	554	687	754	7.5	63.1	HN106

1) Standard thread shapes and dimensions are as per **JIS B 0216** (metric trapezoidal screw thread).
2) Indicates reference dimensions before withdrawal sleeves are attached.
3) Withdrawal sleeve numbers appended with the suffix "**H**" signify the high pressure oil (hydraulic) design.
4) Indicates withdrawal sleeve mass.
5) Indicates the number of nuts to be used at the time of disassembly. Refer to page **D-2** through page **D-10** for nut dimensions.
Note: Refer to page **B-232** through page **B-235** for bearing dimensions, basic rated loads, and mass.

Thrust Bearings





Single direction thrust ball bearings



Thrust spherical roller bearings

Thrust bearings are designed primarily to support axial loads at contact angles between 45° and 90°. Similar to radial bearings, thrust bearing designs may incorporate balls or rollers as rolling elements.

The configuration and characteristics of each type of bearing are given below.

With thrust bearings, it is necessary to supply an axial load in order to prevent slipping between the bearing's rolling elements and raceways.

For more detailed information, please refer to the section "8.3 Preload".

1. Single direction thrust ball bearings

As shown in **Fig. 1**, the steel balls of single direction thrust ball bearings are arranged between a pair of a pair of raceway washers (shaft raceway washer and housing raceway washer), and the normal contact angle is 90°. Axial loads can be supported in only one direction, and radial loads cannot be accommodated. These bearings are not suitable for high speed operation.

Table 1 lists the standard cage types for single direction thrust ball bearings.

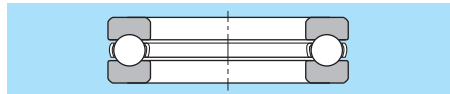
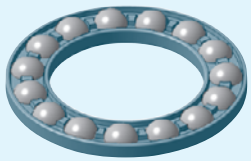
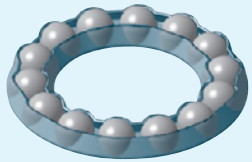
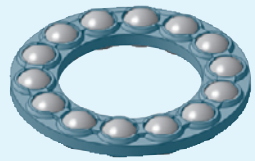


Fig. 1 Single direction thrust ball bearing (example of pressed cage)

Table 1 Standard cage types for single direction thrust ball bearings

Cage type / Bearing series	Resin cage	Pressed cage	Machined cage
			
511	51100 to 51107	51108 to 51152	51156 to 511/530
512	51200 to 51207	51208 to 51224	51226 to 51260
513	—	51305 to 51320	51322 to 51340
514	—	51405 to 51415	51416 to 51420

Note: Due to their material properties, resin cages can not be used in applications where temperatures exceed 120 °C.

2. Thrust spherical roller bearings

Just like spherical roller bearings, the center of the spherical surface for thrust spherical roller bearings is the point where the raceway surface of the housing raceway washer meets the center axis of the bearing. Since thrust spherical roller bearings incorporate barrel-shaped rollers as rolling elements, they also have self-aligning properties (see **Fig. 2**). Under normal load conditions, the allowable misalignment is 1/60 to 1/30, although this will vary depending upon the bearing's dimension series.

These bearings use machined copper alloy cages and a guide sleeve for the cage is attached to the shaft raceway washer. These bearings have a high axial load capacity, and can accommodate some radial load when the ring is axially loaded. It is necessary to operate these bearings where the load condition meets $F_r / F_a \leq 0.55$.

The design for spherical thrust bearings is such that lubricant cannot enter the gap between the cage and the guide sleeve. Therefore, oil lubrication should be used, even in low speed operation.

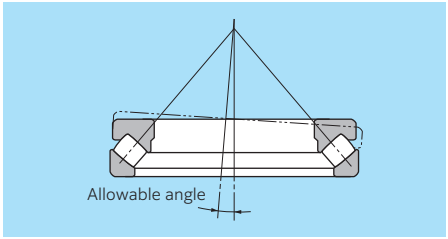


Fig. 2 Thrust spherical roller bearings

3. Thrust cylindrical roller bearings

Thrust bearings incorporating cylindrical rollers are available in single row, double row, triple row, and four row varieties (see **Fig. 3**). **NTN** Engineering offers the 811, 812 and 893 series that conform to dimension series 11, 12 and 93 prescribed in JIS, as well as other special dimensions.

While thrust cylindrical roller bearings are only able to receive axial loads, the axial loads can be heavy due to the high axial rigidity of the bearing. For series 811, 812, and 893, the dimension tables are listed section "E. Needle roller bearings". Bearings with dimensions not listed in the dimension tables are also manufactured. Contact **NTN** Engineering for more detailed information.

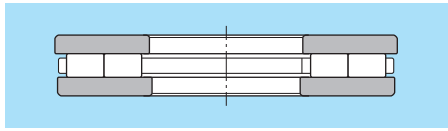


Fig. 3 Double row thrust cylindrical roller bearings

4. Thrust tapered roller bearings

Although not listed in the dimension tables, tapered roller bearings like those in **Fig. 4** are also manufactured. Contact **NTN** Engineering for more detailed information.

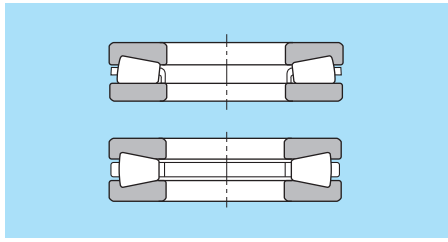
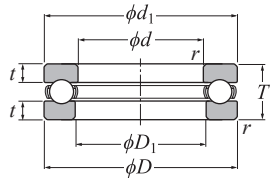
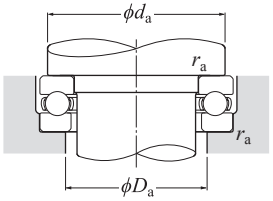


Fig. 4 Thrust tapered roller bearings





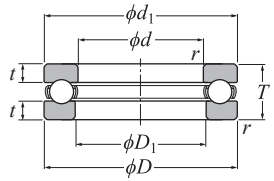
Dynamic equivalent axial load
$P_a = F_a$

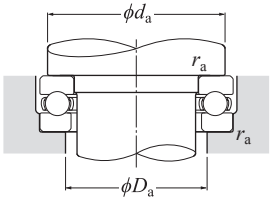
Static equivalent axial load
$P_{0a} = F_a$

d 10–50 mm

Boundary dimensions mm				Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number	Dimensions mm			Installation-related dimensions mm			Mass kg
d	D	T	$r_{s\,min}$ [1]	dynamic C_a	static C_{0a}	C_u	Grease lubrication	Oil lubrication		$d_{1s\,max}$ [2]	$D_{1s\,min}$ [3]	t	d_a Min.	D_a Max.	r_{as} Max.	(approx.)
10	24	9	0.3	10.0	14.0	0.630	6 700	9 500	**51100**	24	11	2.5	18	16	0.3	0.021
	26	11	0.6	12.7	17.1	0.770	5 800	8 300	**51200**	26	12	3.3	20	16	0.6	0.03
12	26	9	0.3	10.3	15.4	0.695	6 400	9 200	**51101**	26	13	2.5	20	18	0.3	0.023
	28	11	0.6	13.2	19.0	0.860	5 600	8 000	**51201**	28	14	3.3	22	18	0.6	0.034
15	28	9	0.3	10.5	16.8	0.755	6 200	8 800	**51102**	28	16	2.5	23	20	0.3	0.024
	32	12	0.6	16.6	24.8	1.12	5 000	7 100	**51202**	32	17	3.5	25	22	0.6	0.046
17	30	9	0.3	10.8	18.2	0.820	6 000	8 500	**51103**	30	18	2.5	25	22	0.3	0.026
	35	12	0.6	17.2	27.3	1.23	4 800	6 800	**51203**	35	19	3.5	28	24	0.6	0.054
20	35	10	0.3	14.2	24.7	1.12	5 200	7 500	**51104**	35	21	2.5	29	26	0.3	0.04
	40	14	0.6	22.3	37.5	1.70	4 100	5 900	**51204**	40	22	4.1	32	28	0.6	0.081
25	42	11	0.6	19.6	37.0	1.68	4 600	6 500	**51105**	42	26	3	35	32	0.6	0.06
	47	15	0.6	27.8	50.5	2.28	3 700	5 300	**51205**	47	27	4.3	38	34	0.6	0.111
	52	18	1	35.5	61.5	2.77	3 200	4 600	**51305**	52	27	5	41	36	1	0.176
	60	24	1	55.5	89.5	4.05	2 600	3 700	**51405**	60	27	6.9	46	39	1	0.33
30	47	11	0.6	20.4	42.0	1.90	4 300	6 200	**51106**	47	32	3	40	37	0.6	0.069
	52	16	0.6	29.3	58.0	2.63	3 400	4 900	**51206**	52	32	5	43	39	0.6	0.139
	60	21	1	43.0	78.5	3.55	2 800	3 900	**51306**	60	32	6.4	48	42	1	0.269
	70	28	1	72.5	126	5.65	2 200	3 200	**51406**	70	32	8.3	54	46	1	0.516
35	52	12	0.6	20.4	44.5	2.02	3 900	5 600	**51107**	52	37	3.5	45	42	0.6	0.085
	62	18	1	39.0	78.0	3.55	2 900	4 200	**51207**	62	37	5.2	51	46	1	0.215
	68	24	1	55.5	105	4.75	2 400	3 500	**51307**	68	37	7.2	55	48	1	0.383
	80	32	1.1	87.0	155	7.00	1 900	2 800	**51407**	80	37	9.6	62	53	1	0.759
40	60	13	0.6	26.9	63.0	2.84	3 500	5 000	**51108**	60	42	3.8	52	48	0.6	0.125
	68	19	1	47.0	98.5	4.45	2 700	3 900	**51208**	68	42	5.5	57	51	1	0.276
	78	26	1	69.0	135	6.05	2 200	3 100	**51308**	78	42	7.6	63	55	1	0.548
	90	36	1.1	112	205	9.25	1 700	2 500	**51408**	90	42	10.7	70	60	1	1.08
45	65	14	0.6	27.9	69.0	3.10	3 200	4 600	**51109**	65	47	4	57	53	0.6	0.148
	73	20	1	47.5	105	4.75	2 600	3 700	**51209**	73	47	6	62	56	1	0.317
	85	28	1	80.0	163	7.35	2 000	2 900	**51309**	85	47	8.3	69	61	1	0.684
	100	39	1.1	130	242	10.9	1 600	2 200	**51409**	100	47	11.6	78	67	1	1.43
50	70	14	0.6	28.8	75.5	3.40	3 100	4 500	**51110**	70	52	4	62	58	0.6	0.161
	78	22	1	48.5	111	5.05	2 400	3 400	**51210**	78	52	7	67	61	1	0.378

1) Smallest allowable dimension for chamfer dimension r.
2) Maximum allowable dimension for shaft raceway washer outside dimension d_1.
3) Smallest allowable dimension for housing raceway washer bore dimension D_1.





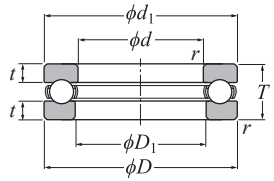
Dynamic equivalent axial load
$P_a = F_a$

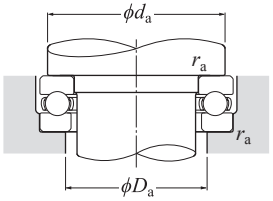
Static equivalent axial load
$P_{0a} = F_a$

d 50–90 mm

Boundary dimensions mm				Basic load rating kN		Fatigue load limit kN	Allowable speed min^{-1}		Bearing number [4]	Dimensions mm			Installation-related dimensions mm			Mass kg
d	D	T	$r_{s\,min}$ [1]	dynamic C_a	static C_{0a}	C_u	Grease lubrication	Oil lubrication		$d_{1s\,max}$ [2]	$D_{1s\,min}$ [3]	t	d_a Min.	D_a Max.	r_{as} Max.	(approx.)
50	95	31	1.1	96.5	202	9.10	1 800	2 600	**51310**	95	52	9.2	77	68	1	0.951
	110	43	1.5	148	283	12.8	1 400	2 000	**51410A**	110	52	12.9	86	74	1.5	1.9
55	78	16	0.6	35.0	93.0	4.20	2 800	4 000	**51111**	78	57	5	69	64	0.6	0.226
	90	25	1	69.5	159	7.15	2 100	3 000	**51211**	90	57	7.5	76	69	1	0.608
	105	35	1.1	119	246	11.1	1 600	2 300	**51311**	105	57	10.2	85	75	1	1.29
	120	48	1.5	178	360	16.2	1 300	1 800	**51411**	120	57	14.8	94	81	1.5	2.52
60	85	17	1	41.5	113	5.10	2 600	3 700	**51112**	85	62	5	75	70	1	0.296
	95	26	1	73.5	179	8.05	2 000	2 800	**51212**	95	62	8	81	74	1	0.676
	110	35	1.1	123	267	12.0	1 600	2 300	**51312**	110	62	10.2	90	80	1	1.37
	130	51	1.5	214	435	19.7	1 200	1 700	**51412**	130	62	15.3	102	88	1.5	3.12
65	90	18	1	41.5	117	5.30	2 400	3 500	**51113**	90	67	5.5	80	75	1	0.338
	100	27	1	75.0	189	8.50	1 900	2 700	**51213**	100	67	8.4	86	79	1	0.767
	115	36	1.1	128	287	13.0	1 500	2 200	**51313**	115	67	10.7	95	85	1	1.51
	140	56	2	232	495	22.0	1 100	1 600	**51413**	140	68	17.2	110	95	2	3.96
70	95	18	1	43.0	127	5.70	2 400	3 400	**51114**	95	72	5.5	85	80	1	0.356
	105	27	1	76.0	199	8.95	1 800	2 600	**51214**	105	72	8.4	91	84	1	0.793
	125	40	1.1	148	340	15.3	1 400	2 000	**51314**	125	72	12	103	92	1	2.01
	150	60	2	250	555	23.8	1 000	1 500	**51414**	150	73	18.6	118	102	2	4.86
75	100	19	1	44.5	136	6.15	2 200	3 200	**51115**	100	77	6	90	85	1	0.399
	110	27	1	77.5	209	9.40	1 800	2 600	**51215**	110	77	8.4	96	89	1	0.874
	135	44	1.5	171	395	17.4	1 300	1 800	**51315**	135	77	13.4	111	99	1.5	2.61
	160	65	2	269	615	25.6	940	1 400	**51415**	160	78	20.4	125	110	2	5.97
80	105	19	1	44.5	141	6.35	2 200	3 100	**51116**	105	82	6	95	90	1	0.422
	115	28	1	78.5	218	9.85	1 700	2 400	**51216**	115	82	8.9	101	94	1	0.916
	140	44	1.5	176	425	18.2	1 200	1 800	**51316**	140	82	13.4	116	104	1.5	2.72
	170	68	2.1	270	620	25.0	890	1 300	**51416**	170	83	21.3	133	117	2	7.77
85	110	19	1	46.0	150	6.80	2 100	3 000	**51117**	110	87	6	100	95	1	0.444
	125	31	1	95.5	264	11.6	1 600	2 200	**51217**	125	88	9.8	109	101	1	1.25
	150	49	1.5	206	490	20.3	1 100	1 600	**51317**	150	88	15	124	111	1.5	3.52
	180	72	2.1	288	685	26.8	840	1 200	∗**51417**	177	88	22.7	141	124	2	9.17
90	120	22	1	59.5	190	8.35	1 900	2 700	**51118**	120	92	7	108	102	1	0.687
	135	35	1.1	117	325	13.9	1 400	2 000	**51218**	135	93	11.2	117	108	1	1.7
	155	50	1.5	213	525	21.3	1 100	1 600	**51318**	155	93	15.5	129	116	1.5	3.74
	190	77	2.1	305	750	28.6	790	1 100	∗**51418**	187	93	24.5	149	131	2	11

1) Smallest allowable dimension for chamfer dimension r. 2) Maximum allowable dimension for shaft raceway washer outside dimension d_1. 3) Smallest allowable dimension for housing raceway washer bore dimension D_1. 4) Bearing number marked "∗" signify where the shaft raceway washer outside diameter is smaller than the housing raceway washer outside diameter. Therefore when using these bearings, it is possible to use the housing bore as is, without providing a ground undercut on the outside diameter section of the shaft raceway washer as shown in the drawing.





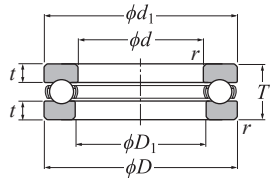
Dynamic equivalent axial load
$P_a = F_a$

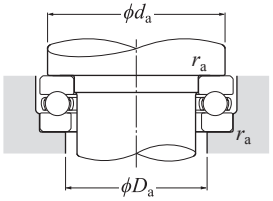
Static equivalent axial load
$P_{0a} = F_a$

d 100–200 mm

d	D	T	$r_{s\,min}$ [1]	Basic load rating dynamic C_a kN	Basic load rating static C_{0a} kN	Fatigue load limit C_u kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number [4]	$d_{1s\,max}$ [2]	$D_{1s\,min}$ [3]	t	Installation-related dimensions mm d_a Min.	D_a Max.	r_{as} Max.	Mass kg (approx.)
100	135	25	1	85.0	268	11.2	1 700	2 400	**51120**	135	102	7.5	121	114	1	0.987
	150	38	1.1	147	410	16.6	1 300	1 800	**51220**	150	103	11.7	130	120	1	2.29
	170	55	1.5	237	595	23.1	990	1 400	**51320**	170	103	17.3	142	128	1.5	4.88
	210	85	3	370	970	35.0	710	1 000	∗**51420**	205	103	26.6	165	145	2.5	14.7
110	145	25	1	87.0	288	11.5	1 600	2 300	**51122**	145	112	7.5	131	124	1	1.07
	160	38	1.1	153	450	17.5	1 200	1 800	**51222**	160	113	11.7	140	130	1	2.46
	190	63	2	267	705	25.9	870	1 200	∗**51322**	187	113	20	158	142	2	7.67
120	155	25	1	89.0	310	11.8	1 500	2 200	**51124**	155	122	7.5	141	134	1	1.11
	170	39	1.1	154	470	17.7	1 200	1 700	**51224**	170	123	12.2	150	140	1	2.71
	210	70	2.1	296	805	28.3	780	1 100	∗**51324**	205	123	22.3	173	157	2	10.8
130	170	30	1	104	350	13.0	1 300	1 900	**51126**	170	132	9	154	146	1	1.73
	190	45	1.5	191	565	20.2	1 000	1 500	∗**51226**	187	133	13.9	166	154	1.5	4.22
	225	75	2.1	330	960	32.5	720	1 000	∗**51326**	220	134	24.2	186	169	2	12.7
140	180	31	1	107	375	13.4	1 300	1 800	∗**51128**	178	142	9.5	164	156	1	1.9
	200	46	1.5	193	595	20.6	980	1 400	∗**51228**	197	143	14.4	176	164	1.5	4.77
	240	80	2.1	350	1 050	34.5	670	960	∗**51328**	235	144	26	199	181	2	15.3
150	190	31	1	109	400	13.9	1 200	1 800	∗**51130**	188	152	10	174	166	1	2
	215	50	1.5	227	720	24.0	900	1 300	∗**51230**	212	153	15.8	189	176	1.5	5.87
	250	80	2.1	360	1 130	36.0	660	940	∗**51330**	245	154	26	209	191	2	16.1
160	200	31	1	112	425	14.4	1 200	1 700	∗**51132**	198	162	10	184	176	1	2.1
	225	51	1.5	223	720	23.3	870	1 200	∗**51232**	222	163	16.3	199	186	1.5	6.32
	270	87	3	450	1 470	45.0	600	860	∗**51332**	265	164	27	225	205	2.5	20.7
170	215	34	1.1	134	510	16.7	1 100	1 600	∗**51134**	213	172	10.5	197	188	1	2.77
	240	55	1.5	261	835	26.3	810	1 200	∗**51234**	237	173	17.3	212	198	1.5	7.81
	280	87	3	465	1 570	47.5	590	840	∗**51334**	275	174	27	235	215	2.5	21.6
180	225	34	1.1	135	525	16.7	1 100	1 500	∗**51136**	222	183	10.5	207	198	1	2.92
	250	56	1.5	266	875	26.9	780	1 100	∗**51236**	247	183	17.8	222	208	1.5	8.34
	300	95	3	490	1 700	49.5	540	780	∗**51336**	295	184	29.7	251	229	2.5	27.5
190	240	37	1.1	170	655	20.2	980	1 400	∗**51138**	237	193	11	220	210	1	3.75
	270	62	2	310	1 060	31.5	710	1 000	∗**51238**	267	194	19.6	238	222	2	11.3
	320	105	4	545	1 950	55.0	500	710	∗**51338**	315	195	33.5	266	244	3	35
200	250	37	1.1	172	675	20.4	960	1 400	∗**51140**	247	203	11.5	230	220	1	3.92

1) Smallest allowable dimension for chamfer dimension r. 2) Maximum allowable dimension for shaft raceway washer outside dimension d_1. 3) Smallest allowable dimension for housing raceway washer bore dimension D_1. 4) Bearing number marked "∗" signify where the shaft raceway washer outside diameter is smaller than the housing raceway washer outside diameter. Therefore when using these bearings, it is possible to use the housing bore as is, without providing a ground undercut on the outside diameter section of the shaft raceway washer as shown in the drawing.





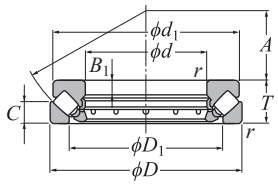
Dynamic equivalent axial load
$P_a = F_a$

Static equivalent axial load
$P_{0a} = F_a$

d 200–530 mm

d	D	T	$r_{s\,min}$ [1]	Basic load rating dynamic C_a kN	Basic load rating static C_{0a} kN	Fatigue load limit C_u kN	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number [4]	$d_{1s\,max}$ [2]	$D_{1s\,min}$ [3]	t	Installation-related dimensions mm d_a Min.	D_a Max.	r_{as} Max.	Mass kg (approx.)
200	280	62	2	315	1 110	32.0	700	990	∗**51240**	277	204	19.6	248	232	2	11.8
	340	110	4	595	2 220	61.0	470	670	∗**51340**	335	205	34.7	282	258	3	41.8
220	270	37	1.1	177	740	21.3	920	1 300	∗**51144**	267	223	11.5	250	240	1	4.27
	300	63	2	325	1 210	34.0	660	950	∗**51244**	297	224	20.1	268	252	2	13
240	300	45	1.5	228	935	25.6	780	1 100	∗**51148**	297	243	14	276	264	1.5	6.87
	340	78	2.1	415	1 650	44.0	550	790	∗**51248**	335	244	25	299	281	2	22.4
260	320	45	1.5	232	990	26.2	750	1 100	∗**51152**	317	263	14	296	284	1.5	7.38
	360	79	2.1	440	1 810	46.5	530	760	∗**51252**	355	264	24.9	319	301	2	24.2
280	350	53	1.5	305	1 270	32.5	650	940	∗**51156**	347	283	16	322	308	1.5	11.8
	380	80	2.1	460	1 970	49.0	510	730	∗**51256**	375	284	25.4	339	321	2	26.1
300	380	62	2	355	1 560	38.0	580	820	∗**51160**	376	304	19.5	348	332	2	17.2
	420	95	3	590	2 680	63.5	440	630	∗**51260**	415	304	29.7	371	349	2.5	40.6
320	400	63	2	365	1 660	39.5	550	790	∗**51164**	396	324	20	368	352	2	18.4
340	420	64	2	375	1 760	40.5	530	760	∗**51168**	416	344	20.5	388	372	2	19.7
360	440	65	2	380	1 860	42.0	510	730	∗**51172**	436	364	21	408	392	2	21.1
380	460	65	2	380	1 910	42.0	500	710	∗**51176**	456	384	21	428	412	2	22.3
400	480	65	2	390	2 010	43.5	480	690	∗**51180**	476	404	21	448	432	2	23.3
420	500	65	2	395	2 110	44.5	470	670	∗**51184**	495	424	21	468	452	2	24.4
440	540	80	2.1	515	2 850	58.0	400	580	∗**51188**	535	444	26	499	481	2	40
460	560	80	2.1	525	3 000	60.0	390	560	∗**51192**	555	464	26	519	501	2	41.6
480	580	80	2.1	525	3 100	60.5	380	550	∗**51196**	575	484	29.5	539	521	2	43.3
500	600	80	2.1	575	3 400	65.5	370	540	∗**511/500**	595	504	25	559	541	2	45
530	640	85	3	645	4 000	74.5	350	500	∗**511/530**	635	534	26	595	575	2.5	55.8

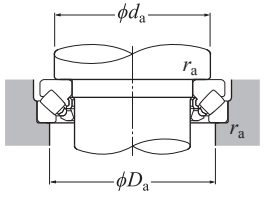
1) Smallest allowable dimension for chamfer dimension r.
2) Maximum allowable dimension for shaft raceway washer outside dimension d_1.
3) Smallest allowable dimension for housing raceway washer bore dimension D_1.
4) Bearing number marked "∗" signify where the shaft raceway washer outside diameter is smaller than the housing raceway washer outside diameter. Therefore when using these bearings, it is possible to use the housing bore as is, without providing a ground undercut on the outside diameter section of the shaft raceway washer as shown in the drawing.



d 60–160 mm

Boundary dimensions mm				Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed min^{-1} Oil lubrication	Bearing number	Dimensions mm				
d	D	T	$r_{s\,min}$[1]	C_a	C_{0a}	C_u			D_1	d_1	B_1	C	A
60	130	42	1.5	315	805	68.5	2 600	**29412**	89	123	15	20	38
65	140	45	2	370	945	75.5	2 400	**29413**	96	133	16	21	42
70	150	48	2	405	1 040	87.5	2 200	**29414**	103	142	17	23	44
75	160	51	2	465	1 190	102	2 100	**29415**	109	152	18	24	47
80	170	54	2.1	510	1 380	102	1 900	**29416**	117	162	19	26	50
85	150	39	1.5	295	820	78.5	2 300	**29317**	114	143.5	13	19	50
	180	58	2.1	545	1 480	118	1 800	**29417**	125	170	21	28	54
90	155	39	1.5	320	915	84.0	2 300	**29318**	117	148.5	13	19	52
	190	60	2.1	610	1 680	121	1 700	**29418**	132	180	22	29	56
100	170	42	1.5	385	1 160	96.0	2 100	**29320**	129	163	14	20.8	58
	210	67	3	760	2 130	156	1 500	**29420**	146	200	24	32	62
110	190	48	2	495	1 500	120	1 800	**29322**	143	182	16	23	64
	230	73	3	940	2 620	193	1 400	**29422**	162	220	26	35	69
120	210	54	2.1	595	1 770	151	1 600	**29324**	159	200	18	26	70
	250	78	4	1 080	3 050	212	1 300	**29424**	174	236	29	37	74
130	225	58	2.1	685	2 100	168	1 500	**29326**	171	215	19	28	76
	270	85	4	1 200	3 550	232	1 200	**29426**	189	255	31	41	81
140	240	60	2.1	760	2 360	182	1 400	**29328**	183	230	20	29	82
	280	85	4	1 240	3 750	252	1 200	**29428**	199	268	31	41	86
150	215	39	1.5	380	1 340	122	1 800	**29230**	178	208	14	19	82
	250	60	2.1	750	2 390	191	1 400	**29330**	194	240	20	29	87
	300	90	4	1 430	4 350	280	1 100	**29430**	214	285	32	44	92
160	225	39	1.5	400	1 460	126	1 700	**29232**	188	219	14	19	86
	270	67	3	915	2 860	223	1 300	**29332**	208	260	24	32	92
	320	95	5	1 670	5 150	320	1 000	**29432**	229	306	34	45	99

1) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent axial load

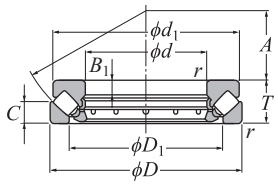
$P_a = F_a + 1.2F_r$

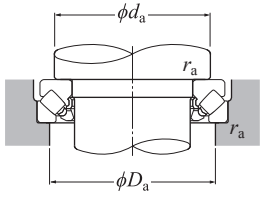
Static equivalent axial load

$P_{0a} = F_a + 2.7F_r$

Provided that, $\frac{F_r}{F_a} \leq 0.55$ only.

Installation-related dimensions mm			Mass kg
d_a Min.	D_a Max.	r_{as} Max.	(approx.)
90	108	1.5	2.78
100	115	2	3.44
105	125	2	4.19
115	132	2	5.07
120	140	2	6.09
115	135	1.5	2.94
130	150	2	7.2
120	140	1.5	3.08
135	157	2	8.38
130	150	1.5	3.94
150	175	2.5	11.5
145	165	2	5.78
165	190	2.5	15
160	180	2	7.92
180	205	3	18.6
170	195	2	9.76
195	225	3	23.7
185	205	2	11.4
205	235	3	25.2
179	196	1.5	4.56
195	215	2	12
220	250	3	30.5
189	206	1.5	4.88
210	235	2.5	15.9
230	265	4	37





Dynamic equivalent axial load
$P_a = F_a + 1.2F_r$

Static equivalent axial load
$P_{0a} = F_a + 2.7F_r$

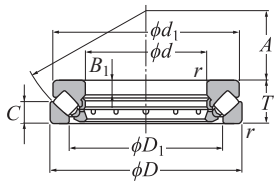
Provided that, $\frac{F_r}{F_a} \leq 0.55$ only.

d 170–320 mm

Boundary dimensions mm				Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed min^{-1} Oil lubrication	Bearing number	Dimensions mm				Installation-related dimensions mm			Mass kg
d	D	T	$r_{s\,min}$[1]	C_a	C_{0a}	C_u			D_1	d_1	B_1	C	A	d_a Min.	D_a Max.	r_{as} Max.	(approx.)
	240	42	1.5	475	1 770	146	1 600	**29234**	198	233	15	20	92	201	218	1.5	6.02
170	280	67	3	950	3 050	238	1 200	**29334**	216	270	23	32	96	220	245	2.5	16.6
	340	103	5	1840	5 750	345	940	**29434**	243	324	37	50	104	245	285	4	45
	250	42	1.5	500	1 920	160	1 600	**29236**	208	243	15	20	97	211	228	1.5	6.27
180	300	73	3	1 110	3 600	272	1 100	**29336**	232	290	25	35	103	235	260	2.5	21.2
	360	109	5	2 050	6 200	400	890	**29436**	255	342	39	52	110	260	300	4	52.9
	270	48	2	585	2 230	184	1 400	**29238**	223	262	15	24	104	225	245	2	8.8
190	320	78	4	1 280	4 250	294	1 100	**29338**	246	308	27	38	110	250	275	3	26
	380	115	5	2 230	6 800	430	840	**29438**	271	360	41	55	117	275	320	4	62
	280	48	2	595	2 300	183	1 400	**29240**	236	271	15	24	108	235	255	2	9.14
200	340	85	4	1 420	4 600	330	980	**29340**	261	325	29	41	116	265	295	3	31.9
	400	122	5	2 490	7 650	465	790	**29440**	286	380	43	59	122	290	335	4	73.3
	300	48	2	620	2 480	198	1 300	**29244**	254	292	15	24	117	260	275	2	9.94
220	360	85	4	1 540	5 200	360	940	**29344**	280	345	29	41	125	285	315	3	34.5
	420	122	6	2 560	8 100	505	760	**29444**	308	400	43	58	132	310	355	5	77.8
	340	60	2.1	890	3 600	271	1 100	**29248**	283	330	19	30	130	285	305	2	17.5
240	380	85	4	1 530	5 250	390	910	**29348**	300	365	29	41	135	300	330	3	36.6
	440	122	6	2 680	8 700	530	740	**29448**	326	420	43	59	142	330	375	5	82.6
	360	60	2.1	960	3 950	296	1 100	**29252**	302	350	19	30	139	305	325	2	18.6
260	420	95	5	1 910	6 800	445	810	**29352**	329	405	32	45	148	330	365	4	52
	480	132	6	3 050	10 000	610	670	**29452**	357	460	48	64	154	360	405	5	108
	380	60	2.1	975	4 050	245	1 000	**29256**	323	370	19	30	150	325	345	2	19.8
280	440	95	5	2 010	7 250	480	790	**29356**	348	423	32	46	158	350	390	4	54.6
	520	145	6	3 700	12 400	710	610	**29456**	387	495	52	68	166	390	440	5	140
	420	73	3	1 330	5 350	385	870	**29260**	353	405	21	38	162	355	380	2.5	30.9
300	480	109	5	2 380	8 250	580	700	**29360**	379	460	37	50	168	380	420	4	75.8
	540	145	6	3 850	13 200	735	590	**29460**	402	515	52	70	175	410	460	5	147
	440	73	3	1 400	5 800	415	840	**29264**	372	430	21	38	172	375	400	2.5	33.5
320	500	109	5	2 470	8 800	605	680	**29364**	399	482	37	53	180	400	440	4	79.9
	580	155	7.5	4 100	14 200	820	550	**29464**	435	555	55	75	191	435	495	6	181

1) Smallest allowable dimension for chamfer dimension r.

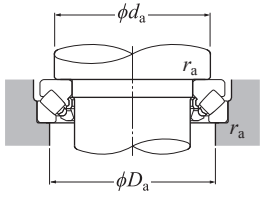
Thrust Spherical Roller Bearings NTN



d 340–500 mm

Boundary dimensions mm				Basic load rating dynamic kN	static kN	Fatigue load limit kN	Allowable speed min^{-1} Oil lubrication	Bearing number	Dimensions mm				
d	D	T	$r_{s\,min}$[1]	C_a	C_{0a}	C_u			D_1	d_1	B_1	C	A
	460	73	3	1 380	5 800	395	820	**29268**	395	445	21	37	183
340	540	122	5	2 950	10 700	695	610	**29368**	428	520	41	59	192
	620	170	7.5	4 900	17 500	925	500	**29468**	462	590	61	82	201
	500	85	4	1 680	7 050	480	720	**29272**	423	485	25	44	194
360	560	122	5	3 000	11 100	915	590	**29372**	448	540	41	59	202
	640	170	7.5	5 000	18 500	950	490	**29472**	480	610	61	82	210
	520	85	4	1 770	7 650	505	700	**29276**	441	505	27	42	202
380	600	132	6	3 550	13 300	835	550	**29376**	477	580	44	63	216
	670	175	7.5	5 450	19 700	1 060	470	**29476**	504	640	63	85	230
	540	85	4	1 800	7 950	525	680	**29280**	460	526	27	42	212
400	620	132	6	3 750	14 500	865	530	**29380**	494	596	44	64	225
	710	185	7.5	6 050	22 100	1 140	440	**29480**	534	680	67	89	236
	580	95	5	2 330	10 400	670	620	**29284**	489	564	30	46	225
420	650	140	6	4 000	15 500	925	500	**29384**	520	626	48	68	235
	730	185	7.5	6 100	22 800	1 190	430	**29484**	556	700	67	89	244
	600	95	5	2 390	10 900	695	600	**29288**	508	585	30	49	235
440	680	145	6	4 200	16 400	965	480	**29388**	548	655	49	70	245
	780	206	9.5	7 100	26 200	1 340	390	**29488**	588	745	74	100	260
	620	95	5	2 390	11 000	900	590	**29292**	530	605	30	46	245
460	710	150	6	4 700	18 500	1 060	460	**29392**	567	685	51	72	257
	800	206	9.5	7 350	27 900	1 390	380	**29492**	608	765	74	100	272
	650	103	5	2 670	12 000	760	550	**29296**	556	635	33	55	259
480	730	150	6	4 700	18 700	1 100	450	**29396**	590	705	51	72	270
	850	224	9.5	8 350	31 500	1 490	350	**29496**	638	810	81	108	280
	670	103	5	2 830	13 000	810	530	**292/500**	574	654	33	55	268
500	750	150	6	4 750	19 300	1 140	440	**293/500**	611	725	51	74	280
	870	224	9.5	8 450	33 000	1 610	340	**294/500**	661	830	81	107	290

1) Smallest allowable dimension for chamfer dimension r.



Dynamic equivalent axial load

$P_a = F_a + 1.2F_r$

Static equivalent axial load

$P_{0a} = F_a + 2.7F_r$

Provided that, $\frac{F_r}{F_a} \leq 0.55$ only.

Installation-related dimensions mm			Mass kg
d_a Min.	D_a Max.	r_{as} Max.	(approx.)
395	420	2.5	34.4
430	470	4	107
465	530	6	230
420	455	3	50.5
450	495	4	112
485	550	6	240
440	475	3	53.4
480	525	5	143
510	575	6	267
460	490	3	55.8
500	550	5	148
540	610	6	321
490	525	4	76.6
525	575	5	172
560	630	6	333
510	545	4	79.6
550	600	5	195
595	670	8	428
530	570	4	82.8
575	630	5	221
615	690	8	443
555	595	4	98.6
595	650	5	228
645	730	8	552
575	615	4	102
615	670	5	235
670	750	8	569