



Cylindrical roller bearing



E Type cylindrical roller bearing



Double-row cylindrical roller bearing

Cylindrical Roller Bearings



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.

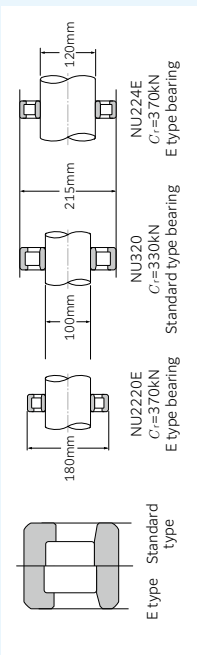
For extremely heavy load applications, the non-separable full complement SL type bearing offers special advantages. For SL type and four-row cylindrical roller bearings, see section “C. Special application bearings.”

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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> ● 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 series¹⁾.  <p>Note: In the dimension tables, both E type and EA type are listed.</p> <ul style="list-style-type: none"> ● 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. ● 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. <p>Remarks: For precision bearings for machine tools, see precision rolling bearings (CAT. No. 2260/E).</p>
Cylindrical roller bearing for axial loads (HT type)	<ul style="list-style-type: none"> ● 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. <p>Remarks: For precision bearings for machine tools, see precision rolling bearings (CAT. No. 2260/E).</p>
Double-row cylindrical roller bearing	<ul style="list-style-type: none"> ● 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. <p>Remarks: For precision bearings for machine tools, see precision rolling bearings (CAT. No. 2260/E).</p>

1) ULTAGE series cylindrical roller bearings has been developed for "longer life," "improved loading capability," and "higher speed," which are required for various types of industrial machinery. For details, see the **special catalog (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	Resin cage	Pressed cage	Machined cage	
			Single type	Studded double type
Bearing series				
NU10	—	—	—	1005 to 10/500
NU2	—	208 to 230	232 to 240	244 to 264
NU2E	—	—	220E to 240E	—
NU2EA	204EA to 219EA	—	—	—
NU22	—	2208 to 2230	2232 to 2240	2244 to 2264
NU22E	—	—	2219E to 2240E	—
NU22EA	2204EA to 2218EA	—	—	—
NU3	—	308 to 324	326 to 330	332 to 356
NU3E	—	—	316E to 332E	—
NU3EA	304EA to 315EA	—	—	—
NU23	—	2308 to 2320	2322 to 2330	2332 to 2356
NU23E	—	—	2316E to 2332E	—
NU23EA	2304EA to 2315EA	—	—	—
NU4	—	405 to 416	—	—

Note: 1. Within the same bearing series, cage type is constant regardless of the cylindrical roller bearing type (NU, NUP, NJ, 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 NJ and N types. For NU, 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.

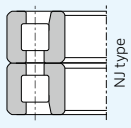
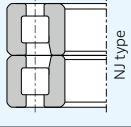
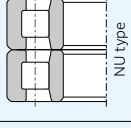
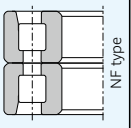
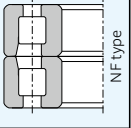
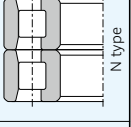
- Bearing series 0 or 1 1/1 000
- Bearing series 2 1/2 000
- Bearing series 0, 1, and 2 single-row ULTAGE 1/500
- Double-row cylindrical roller bearings¹⁾ 1/2 000

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.

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: 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%–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.

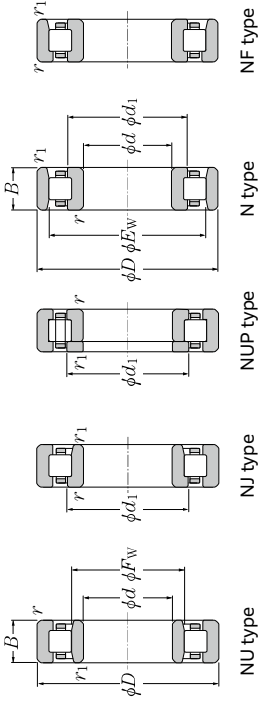
If 80% of the allowable speed specified in the dimension table is exceeded or the bearing is used under vibration or impact conditions, please consult NTN Engineering.

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.



Cylindrical Roller Bearings

NTN



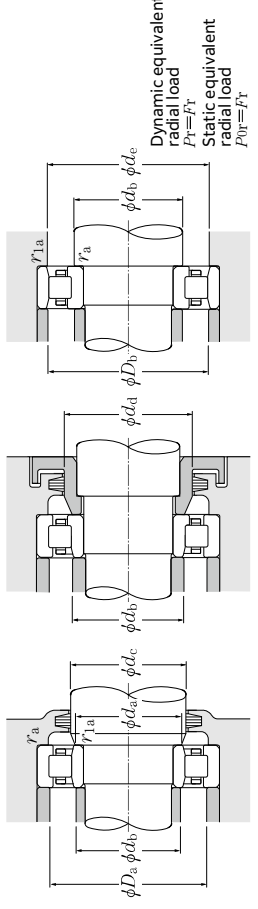
d 20 ~ 45mm

Boundary dimensions		Basic load rating		Fatigue load limit		Allowable speed ²⁾		Bearing number ²⁾				
mm	D	B	r_1 mm ¹⁾	r_2 mm ¹⁾	C_r	C_{10}	Grease lubrication	Oil lubrication	NU type	N type	NUP type	NF type
20	47	14	1	0.6	32.5	24.7	3.00	15 000	21 600	*NU204EA	NJ	NUP N
	47	18	1	0.6	38.5	31.0	3.75	14 000	19 200	*NU2204EA	NJ	NUP N
	52	15	1.1	0.6	37.5	26.9	3.25	13 000	18 000	*NU304EA	NJ	NUP N
	52	21	1.1	0.6	49.5	39.0	4.75	12 000	16 800	*NU2304EA	NJ	NUP N
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
	52	18	1	0.6	41.5	34.5	4.25	11 000	15 600	*NU2205EA	NJ	NUP N
	62	17	1.1	1.1	49.0	37.5	4.55	11 000	15 600	*NU305EA	NJ	NUP N
30	62	24	1.1	1.1	67.5	56.0	6.85	9 700	13 200	*NU2305EA	NJ	NUP N
	80	21	1.5	1.5	51.5	40.0	4.85	8 500	10 000	NU405	NJ	NUP N
	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
35	62	20	1	0.6	58.0	50.0	6.10	9 700	13 200	*NU2206EA	NJ	NUP N
	72	19	1.1	1.1	83.0	70.0	6.15	9 300	13 200	*NU306EA	NJ	NUP N
	72	27	1.1	1.1	88.0	77.5	9.45	8 300	11 600	*NU2306EA	NJ	NUP N
	90	23	1.5	1.5	69.5	55.0	6.70	7 300	8 500	NU406	NJ	NUP N
40	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
	72	23	1.1	0.6	73.0	65.5	7.95	8 500	12 000	*NU2207EA	NJ	NUP N
	80	21	1.5	1.1	83.5	71.0	8.65	8 100	11 500	*NU307EA	NJ	NUP N
45	80	31	1.5	1.1	117	109	13.3	7 200	10 200	*NU2307EA	NJ	NUP N
	100	25	1.5	1.5	83.5	69.0	8.40	6 400	7 500	NU407	NJ	NUP N
	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
50	80	18	1.1	1.1	66.0	55.5	6.75	8 500	12 000	*NU208EA	NJ	NUP N
	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
	90	23	1.5	1.5	65.0	57.0	6.95	9 400	10 900	*NU308	NJ	NUP N
55	90	23	1.5	1.5	98.5	81.5	9.95	7 200	10 200	*NU308EA	NJ	NUP N
	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	*NU308EA	NJ	NUP N
	110	27	2	2	106	89.0	10.9	6 000	6 000	NU408	NJ	NUP N
60	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 with "*" designate ULTLAGE series bearings. 4) Bearing marked with "*" are going to be integrated with ULTLAGE Series.
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Cylindrical Roller Bearings

NTN

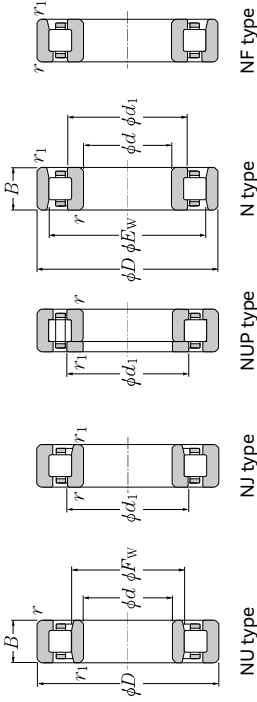


Dimension		Installation-related dimensions								Mass		
mm	mm	d_a Min.	d_e Min.	d_b Max.	d_c Min.	d_d Min.	D_a Max.	D_b Max.	r_{as} Max.	r_{is} Max.	kg	N type (approx.)
NF type	F_w	d_1	d_a	d_e	d_b	d_c	d_d	D_a	D_b	r_{as}	r_{is}	N type
												(approx.)
NF	26.5	41.5	29.5	24	25	26	29	32	42	42.5	1	0.6
NF	26.5	41.5	29.5	24	25	26	29	32	42	42.5	1	0.6
NF	27.5	45.5	31.1	24	26.5	27	30	33	45.5	45.5	1	0.6
NF	27.5	45.5	31.1	24	26.5	27	30	33	45.5	45.5	1	0.6
—	30.5	41.5	32.7	27	29	30	32	33	43	45	0.6	0.3
NF	31.5	46.5	34.5	29	30	31	34	37	47	47.5	1	0.6
NF	31.5	46.5	34.5	29	30	31	34	37	47	47.5	1	0.6
NF	34	54	38	31.5	31.5	33	37	40	55.5	55.5	1	1
NF	34	54	38	31.5	31.5	33	37	40	55.5	55.5	1	1
NF	38.8	62.8	43.6	33	33	38	41	46	72	64	1.5	1.5
—	36.5	48.5	38.9	34	35	35	38	39.5	51	49.5	1	0.6
NF	37.5	55.5	41.1	34	35	37	40	44	57	57	1	0.6
NF	37.5	55.5	41.1	34	35	37	40	44	57	57	1	0.6
NF	40.5	62.5	44.9	36.5	36.5	40	44	48	65.5	65.5	1	1
NF	40.5	62.5	44.9	36.5	36.5	40	44	48	65.5	65.5	1	1
NF	45	73	50.5	38	38	44	47	52	82	74	1.5	1.5
—	42	55	44.6	39	40	41	44	45	57	58	1	0.6
NF	44	64	48	39	41.5	43	46	50	65.5	65.5	1	0.6
NF	44	64	48	39	41.5	43	46	50	65.5	65.5	1	0.6
NF	46.2	70.2	51	41.5	43	45	48	53	72	71.5	1.5	1.5
NF	46.2	70.2	51	41.5	43	45	48	53	72	71.5	1.5	1.5
NF	53	83	59	43	43	52	55	61	92	84	1.5	1.5
—	47	61	49.8	44	45	46	49	50.5	63	64	1	0.6
NF	50	70	54.2	46.5	46.5	49	52	56	73.5	73.5	1	1
NF	49.5	71.5	53.9	46.5	46.5	49	52	56	73.5	73.5	1	1
NF	50	70	54.2	46.5	46.5	49	52	56	73.5	73.5	1	1
NF	49.5	71.5	53.9	46.5	46.5	49	52	56	73.5	73.5	1	1
NF	53.5	77.5	58.4	48	48	51	55	60	82	80	1.5	1.5
NF	52	80	57.6	48	48	51	55	60	82	81.5	1.5	1.5
—	53.5	77.5	58.4	48	48	51	55	60	82	80	1.5	1.5
NF	52	80	57.6	48	48	51	55	60	82	81.5	1.5	1.5
NF	58	92	64.8	49	49	57	60	67	101	101	2	2
—	52.5	67.5	55.5	49	50	52	54	56	70	71	0.6	0.28

5) Bearing numbers having no standard form are switched to type E or ULTLAGE Series.
 6) Does not apply to the sides of the outer ring rib of type NF bearings.
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● Cylindrical Roller Bearings

NTN



d 45 ~ 60mm

Boundary dimensions		Basic load rating	Fatigue load limit	Allowable speed ²⁾	Bearing number ³⁾⁴⁾				
mm	B	dynamic, kN	static, kN	min ⁻¹	Oil lubrication	Grease lubrication	Oil lubrication		
d	D	$r_1 \text{ (mm)}^3$	C_r	C_u	NU type	N type	NF type		
85	19	1.1	51.0	47.0	5.70	8 400	9 900	** NU209	NJ NUP N
85	19	1.1	74.5	66.5	8.10	7 600	10 800	** NU209EA	NJ NUP N
85	23	1.1	68.0	84.5	8.25	7 600	9 000	** NU2209	NJ NUP N
85	23	1.1	90.0	10.3	6.800	9 600	** NU2209EA	NJ NUP N	
100	25	1.5	82.0	71.0	8.65	7 200	8 400	** NU309	NJ NUP N
100	25	1.5	115	98.5	12.0	6 500	9 100	** NU309EA	NJ NUP N
100	36	1.5	110	104	12.7	6 300	7 400	** NU2309	NJ NUP N
100	36	1.5	162	153	18.7	5 700	8 200	** NU2309EA	NJ NUP N
120	29	2	119	102	12.4	5 100	6 000	NU409	NJ NUP N
80	16	1	35.5	36.0	4.40	8 900	11 000	NU1010	NJ NUP N
90	20	1.1	53.5	51.0	6.20	7 600	9 000	** NU210	NJ NUP N
90	20	1.1	81.5	76.5	9.30	6 900	9 700	** NU210EA	NJ NUP N
90	23	1.1	71.0	73.5	9.00	6 900	8 100	** NU2210	NJ NUP N
90	23	1.1	98.5	97.0	11.9	6 200	8 800	** NU2210EA	NJ NUP N
110	27	2	96.5	86.0	10.5	6 500	7 700	** NU310	NJ NUP N
110	27	2	130	113	13.8	5 900	8 300	** NU310EA	NJ NUP N
110	40	2	134	131	16.0	5 700	6 700	** NU2310	NJ NUP N
110	40	2	192	187	22.7	5 200	7 300	** NU2310EA	NJ NUP N
130	31	2.1	143	124	15.1	4 700	5 500	NU410	NJ NUP N
90	18	1.1	42.0	44.0	5.35	8 200	9 700	NU1011	NJ NUP N
100	21	1.5	64.5	62.5	7.60	6 900	8 200	** NU211	NJ NUP N
100	21	1.5	102	98.5	12.0	6 300	8 900	** NU211EA	NJ NUP N
100	25	1.5	83.5	87.0	10.6	6 300	7 400	** NU2211	NJ NUP N
100	25	1.5	120	122	14.8	5 600	7 900	** NU2211EA	NJ NUP N
120	29	2	123	111	13.6	5 900	7 000	** NU311	NJ NUP N
120	29	2	162	143	17.4	5 300	7 600	** NU311EA	NJ NUP N
120	43	2	164	162	19.8	5 200	6 100	** NU2311	NJ NUP N
120	43	2	238	233	28.4	4 700	6 700	** NU2311EA	NJ NUP N
140	33	2.1	154	138	16.9	4 300	5 000	NU411	NJ NUP N
95	18	1.1	44.5	48.5	5.95	7 500	8 800	NU1012	NJ NUP N
110	22	1.5	76.0	75.0	9.15	6 400	7 600	** NU212	NJ NUP N
110	22	1.5	115	107	13.1	5 800	8 200	** NU212EA	NJ NUP N
110	28	1.5	107	116	14.1	5 800	6 800	** NU2212	NJ NUP N
110	28	1.5	155	157	19.1	5 200	7 300	** NU2212EA	NJ NUP N

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

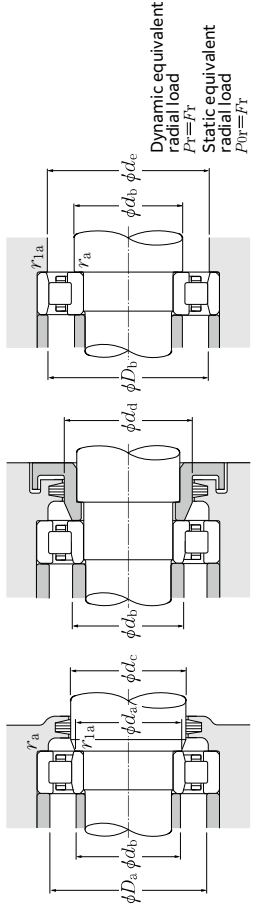
2) This value is for machined cages, when pressed cages are used, 80% of this value is acceptable.

3) Bearing numbers marked “*” designate ULTRAGE series bearings. 4) Bearing marked “*” are going to be integrated with ULTRAGE Series.

B-100

● Cylindrical Roller Bearings

NTN



Dimension

Installation-related dimensions

Mass

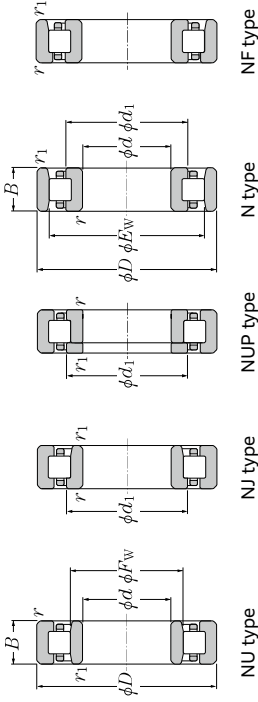
mm	mm	E_w	d_1	Min.	Max.	mm	Min.	Max.	mm	Min.	Max.	mm	Min.	Max.	kg
NF type	F_w	r_{1a}	d_e	d_b	d_c	d_a	d_d	D_a	D_b	r_{as}	r_{1as}	NU type	N	type	N
NF	55	75	59	51.5	54	57	61	78.5	78.5	77	1	1	0.432	0.423	0.423
NF	54.5	76.5	58.9	51.5	54	57	61	78.5	78.5	77.5	1	1	0.495	0.486	0.486
—	55	75	59	51.5	54	57	61	78.5	78.5	77.5	1	1	0.53	0.52	0.52
NF	54.5	76.5	58.9	51.5	54	57	61	78.5	78.5	77.5	1	1	0.6	0.533	0.533
NF	58.5	86.5	64	53	57	60	66	92	92	89	1.5	1.5	0.877	0.857	0.857
NF	58.5	88.5	64.5	53	57	60	66	92	92	90.5	1.5	1.5	0.996	0.865	0.865
—	58.5	86.5	64	53	57	60	66	92	92	89	1.5	1.5	1.27	1.24	1.24
NF	58.5	88.5	64.5	53	57	60	66	92	92	90.5	1.5	1.5	1.41	1.3	1.3
NF	64.5	100.5	71.8	54	63	66	74	111	111	102	2	2	1.62	1.58	1.58
—	57.5	72.5	60.5	54	57	59	61	75	76	73.5	1	1	0.295	0.291	0.291
NF	60.4	80.4	64.6	56.5	58	62	67	83.5	83.5	83	1	1	0.47	0.46	0.46
NF	59.5	81.5	63.9	56.5	58	62	67	83.5	83.5	82.5	1	1	0.503	0.47	0.47
—	60.4	80.4	64.6	56.5	58	62	67	83.5	83.5	83	1	1	0.571	0.56	0.56
NF	59.5	81.5	63.9	56.5	58	62	67	83.5	83.5	82.5	1	1	0.587	—	—
NF	65	95	71	59	63	67	73	101	101	98	2	2	1.14	1.11	1.11
NF	65	97	71.4	59	63	67	73	101	101	99	2	2	1.3	1.12	1.12
—	65	95	71	59	63	67	73	101	101	98	2	2	1.7	1.67	1.67
NF	65	97	71.4	59	63	67	73	101	101	99	2	2	1.9	1.75	1.75
NF	70.8	110.8	78.8	61	69	73	81	119	119	112	2	2	2.02	1.97	1.97
—	64.5	80.5	67.7	60	63	66	68.5	83.5	85	81.5	1	1	0.442	0.435	0.435
NF	66.5	88.5	70.8	61.5	65	68	73	92	93.5	91	1.5	1.5	0.638	0.626	0.626
NF	66	90	70.8	61.5	65	68	73	92	92	91	1.5	1.5	0.675	0.635	0.635
—	66.5	88.5	70.8	61.5	65	68	73	92	93.5	91	1.5	1.5	0.773	0.758	0.758
NF	66	90	70.8	61.5	65	68	73	92	92	91	1.5	1.5	0.807	—	—
NF	70.5	104.5	77.2	64	69	72	80	111	111	107	2	2	1.45	1.42	1.42
NF	70.5	106.5	77.7	64	69	72	80	111	111	108.5	2	2	1.65	1.43	1.43
—	70.5	104.5	77.2	64	69	72	80	111	111	107	2	2	2.17	2.13	2.13
NF	70.5	106.5	77.7	64	69	72	80	111	111	108.5	2	2	2.37	2.23	2.23
NF	77.2	117.2	85.2	66	76	79	87	129	129	119	2	2	2.48	2.42	2.42
—	69.5	85.5	72.7	65	68	71	73.5	88.5	90	86.5	1	1	0.474	0.467	0.467
NF	73.5	97.5	78.4	68	71	75	80	102	102	100	1.5	1.5	0.818	0.802	0.802
NF	72	100	77.6	68	71	75	80	102	102	101	1.5	1.5	0.923	0.798	0.798
—	73.5	97.5	78.4	68	71	75	80	102	102	100	1.5	1.5	1.06	1.04	1.04
NF	72	100	77.6	68	71	75	80	102	102	101	1.5	1.5	1.21	1.08	1.08

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

B-101

Cylindrical Roller Bearings

NTN



d 130 ~ 160mm

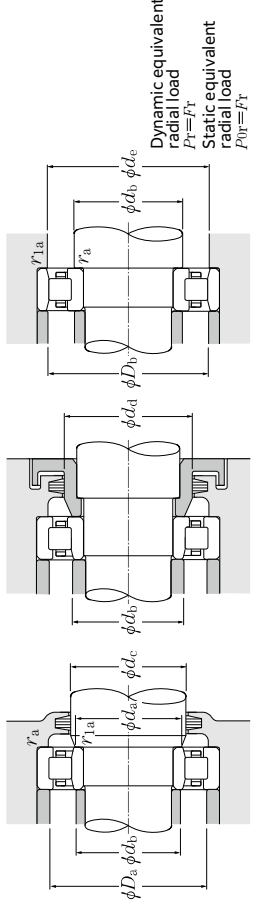
Boundary dimensions		Basic load rating		Fatigue load limit		Allowable speed ²⁾		Bearing number		
mm	mm	dynamic	static	kN	min ⁻¹	Grease lubrication	Oil lubrication	NU type	N type	
<i>d</i>	<i>D</i>	<i>C_r</i>	<i>C_{0r}</i>	<i>C_u</i>	<i>C_u</i>			NU type	N type	
230	40	3	300	340	35.0	2 900	3 400	NU226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

1) Smallest allowable dimension for chamfer dimension *r* or *r₁*.
2) This value is for machined cages; when pressed cages are used, 80% of this value is acceptable.

B-108

Cylindrical Roller Bearings

NTN



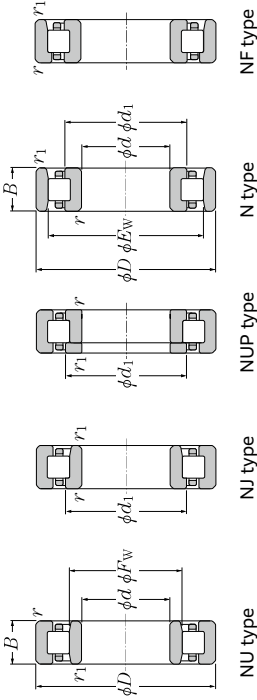
Dimension		Installation-related dimensions							Mass	
mm	mm	<i>d_a</i>	<i>d_b</i>	<i>d_c</i>	<i>d_d</i>	<i>D_a</i>	<i>D_b</i>	<i>r_{as}</i>	<i>r_{1as}</i>	kg
NF type	<i>F_w</i>	Min.	Max.	Min.	Min.	Max.	Max.	Max.	Max.	N type
<i>E_w</i>	<i>d₁</i>	Min.	Max.	Min.	Min.	Max.	Max.	Max.	Max.	(approx.)
156	204	165.5	143	151	158	168	217	208	2.5	2.5
153.5	—	164.7	143	151	158	168	217	—	2.5	2.5
156	204	165.5	143	151	158	168	217	208	2.5	2.5
153.5	—	164.7	143	151	158	168	217	—	2.5	2.5
167	243	183	146	164	169	184	264	247	3	3
167	243	183	146	164	169	184	264	—	3	3
167	243	182	146	164	169	184	264	247	3	3
167	243	183	146	164	169	184	264	—	3	3
158	192	164.8	149	156	161	166	201	203.5	1.5	1.5
169	221	179.5	153	166	171	182	237	237	2.5	2.5
169	221	180.2	153	166	171	182	237	—	2.5	2.5
169	221	179.5	153	166	171	182	237	237	2.5	2.5
169	221	180.2	153	166	171	182	237	—	2.5	2.5
180	260	196	156	176	182	198	284	284	3	3
180	260	196.8	156	176	182	198	284	—	3	3
180	260	196.8	156	176	182	198	284	284	3	3
180	260	196.8	156	176	182	198	284	—	3	3
169.5	205.5	176.7	158	167	173	178	214	217	207.5	2
182	238	193	163	179	184	196	257	257	242	2.5
182	238	194	163	179	184	196	257	—	2.5	2.5
182	238	193	163	179	184	196	257	257	242	2.5
182	238	194	163	179	184	196	257	—	2.5	2.5
193	277	210	166	190	195	213	304	304	282	3
193	277	211	166	190	195	213	304	—	3	3
193	277	210	166	190	195	213	304	304	282	3
193	277	211	166	190	195	213	304	—	3	3
180	220	188	171	178	184	189	229	232	222	2
195	255	207	173	173	192	197	210	277	277	259
195	255	207.8	173	192	197	210	277	—	2.5	2.5
195	255	207	173	173	192	197	210	277	259	2.5
193	206.6	173	173	192	197	210	277	—	2.5	2.5
208	292	225.2	176	176	200	211	228	324	297	3
208	292	225	176	176	200	211	228	324	—	3
204	223.2	176	176	200	211	228	324	—	3	3
204	223.2	176	176	200	211	228	324	—	3	3

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

B-109

Cylindrical Roller Bearings

NTN



d 240 ~ 440mm

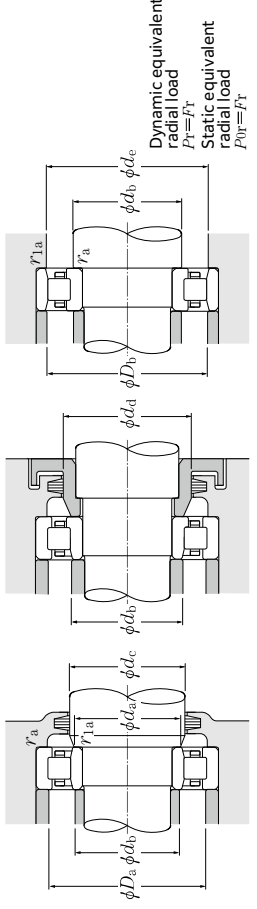
Boundary dimensions		Basic load rating		Fatigue load limit		Allowable speed ²⁾		Bearing number					
mm		dynamic, kN	static, kN	limit, kN	C _u	min ⁻¹	Oil lubrication	min ⁻¹	Grease lubrication				
d	D	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	r_1	ϕd_1	ϕD	ϕE_{W1}	ϕd	ϕd_1				
360	56	3	3	585	820	72.0	1 800	2 100	1 800	NU1048	NJ	NUP	N
440	72	4	4	1 040	1 340	113	1 500	1 700	1 500	NU248	NJ	NUP	N
240	440	120	4	1 590	2 320	196	1 300	1 600	1 300	NU2248	NJ	NUP	N
500	95	5	5	1 590	1 950	160	1 300	1 500	1 300	NU348	NJ	NUP	N
500	155	5	5	2 330	3 200	262	1 100	1 300	1 100	NU2348	NJ	NUP	N
400	65	4	4	715	1 000	85.0	1 600	1 900	1 600	NU1052	NJ	NUP	N
480	80	5	5	1 270	1 660	137	1 300	1 600	1 300	NU252	NJ	NUP	N
260	480	130	5	1 980	2 930	241	1 200	1 400	1 200	NU2252	NJ	NUP	N
540	102	6	6	1 790	2 230	180	1 200	1 400	1 200	NU352	NJ	NUP	N
540	165	6	6	2 600	3 600	289	1 000	1 200	1 000	NU2352	NJ	NUP	N
420	65	4	4	730	1 050	88.0	1 500	1 800	1 500	NU1056	NJ	NUP	N
500	80	5	5	1 320	1 760	143	1 200	1 400	1 200	NU256	NJ	NUP	N
280	500	130	5	2 050	3 100	252	1 100	1 300	1 100	NU2256	NJ	NUP	N
580	108	6	6	2 010	2 540	200	1 100	1 200	1 100	NU356	NJ	NUP	N
580	175	6	6	3 000	4 250	335	920	1 100	920	NU2356	NJ	NUP	N
460	74	4	4	950	1 340	109	1 400	1 600	1 400	NU1060	NJ	NUP	N
300	540	85	5	1 560	2 070	164	1 100	1 300	1 100	NU260	NJ	NUP	N
540	140	5	5	2 420	3 650	290	1 000	1 200	1 000	NU2260	NJ	NUP	N
480	74	4	4	970	1 410	113	1 300	1 500	1 300	NU1064	NJ	NUP	N
320	580	92	5	1 780	2 390	186	1 000	1 200	1 000	NU264	NJ	NUP	N
580	150	5	5	2 830	4 350	340	950	1 100	950	NU2264	NJ	NUP	N
340	520	82	5	1 160	1 670	132	1 200	1 400	1 200	NU1068	NJ	NUP	N
360	540	82	5	1 190	1 750	136	1 100	1 300	1 100	NU1072	NJ	NUP	N
380	560	82	5	1 220	1 840	141	1 100	1 200	1 100	NU1076	NJ	NUP	N
400	600	90	5	1 460	2 190	164	990	1 200	990	NU1080	NJ	NUP	N
420	620	90	5	1 500	2 290	170	950	1 100	950	NU1084	NJ	NUP	N
440	650	94	6	1 590	2 430	178	900	1 100	900	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.

B-112

Cylindrical Roller Bearings

NTN

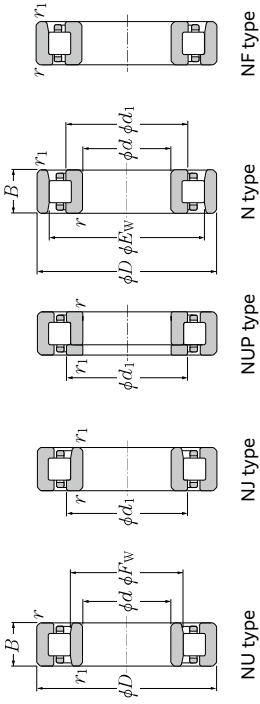


Dimension		Installation-related dimensions						Mass					
mm		d_a	d_e	d_b	d_c	d_d	D_a	D_b	r_{1as}	r_{1as}	kg	kg	
NF type	F_w	Min.	Min.	Max.	Min.	Min.	Max.	Max.	Max.	Max.	N type	N type	
—	270	330	282	253	268	275	284	347	333	2.5	2.5	19.6	19.3
NF	295	385	313	256	293	298	316	424	390	3	3	50.2	49.2
—	295	385	313	256	293	298	316	424	390	3	3	80	78.4
NF	310	430	335	260	305	313	333	480	436	4	4	93.4	91.3
—	310	430	335	260	305	313	333	480	436	4	4	147	144
—	296	364	309.6	276	292	300	312	384	367	3	3	29.1	28.7
NF	320	420	340	280	318	323	343	460	426	4	4	66.9	65.6
—	320	420	340	280	318	323	343	460	426	4	4	104	102
NF	336	464	362	284	331	339	359	516	471	5	5	117	114
—	336	464	362	284	331	339	359	516	471	5	5	182	178
—	316	384	329.6	296	312	320	332	404	387	3	3	30.9	30.4
NF	340	440	360	300	336	343	365	480	446	4	4	70.8	69.4
—	340	440	360	300	336	343	365	480	446	4	4	109	107
NF	362	498	390	304	356	366	386	556	505	5	5	142	139
—	362	498	390	304	356	366	386	556	505	5	5	222	218
—	340	420	356	316	336	344	358	444	423	3	3	43.6	42.9
NF	364	476	387	320	361	368	392	520	482	4	4	88.2	86.4
—	364	476	387	320	361	368	392	520	482	4	4	138	135
—	360	440	376	336	356	364	378	464	443	3	3	46	45.3
NF	390	510	415	340	386	393	419	560	516	4	4	111	109
—	390	510	415	340	386	393	419	560	516	4	4	172	168
—	385	475	403	360	381	390	405	500	479	4	4	61.8	60.8
—	405	495	423	380	401	410	425	520	499	4	4	64.7	63.7
—	425	515	443	400	421	430	445	540	519	4	4	67.5	66.5
—	450	550	470	420	446	455	473	580	554	4	4	87.6	86.3
—	470	570	490	440	466	475	493	600	574	4	4	91	89.6
—	493	597	513.8	464	488	499	517	626	602	5	5	105	103

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

B-113

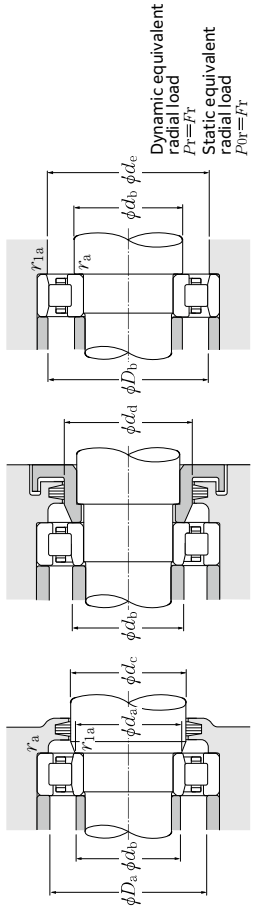
Cylindrical Roller Bearings



d 460 ~ 500mm

Boundary dimensions		Basic load rating		Fatigue load limit		Allowable speed ²⁾		Bearing number				
mm		dynamic	static	GN	GN	min ⁻¹	Oil lubrication	min ⁻¹	Oil lubrication			
d	D	C_r	C_{br}	C_u	C_{10}		lubrication		lubrication			
460	680	100	6	1 710	2 630	191	850	1 000	NU1092	NJ	NUP	N
480	700	100	6	1 750	2 750	197	810	960	NU1096	NJ	NUP	N
500	720	100	6	1 790	2 870	203	770	910	NU1010	NJ	NUP	N

Cylindrical Roller Bearings



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

1) Smallest allowable dimension for chamfer dimension r or r1.
 2) This value is for machined cages; when pressed cages are used, 80% of this value is acceptable.