Cylindrical Roller Bearings
ULTAGE Series

CAT.No.3037-3/E

ULTAGE™

Rating life +20 % (max.)

Basic dynamic load rating +7 % (max.)

Allowable speed +20 % (max.)

ULTAGE

Cylindrical Roller Bearings ULTAGE Series

Cylindrical roller bearings of ULTAGE series are products developed to provide longer service life, increase of load capability, and higher rotational speed required for any industrial machinery.

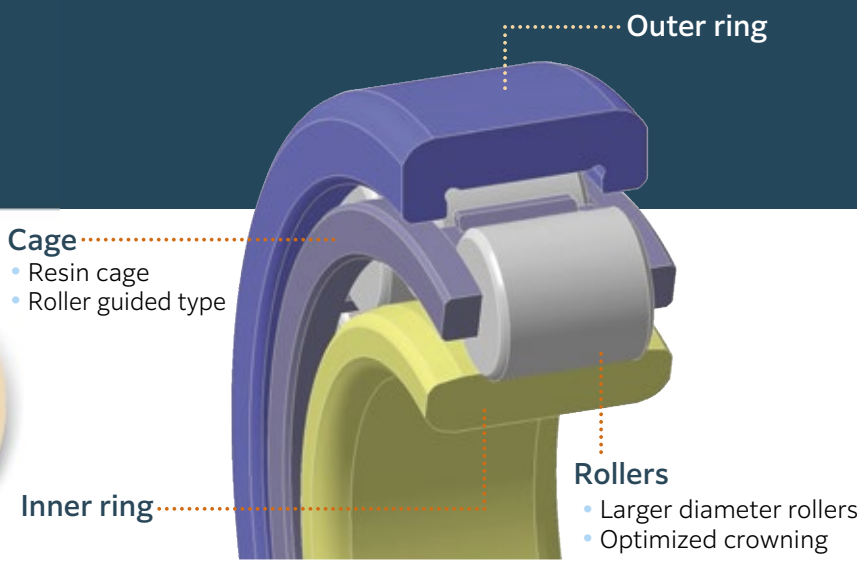
Higher Reliability
- Greater load capacity by optimizing internal specifications
- Extended maintenance intervals

Increase of Load Capability
- Allowable misalignment 1/500

※Under conditions of $F_r \leq 0.20\ C_r$
F_r : Radial load

Higher Limiting Speed
- max. 20 % increase of allowable speed by optimizing internal specifications

※With oil lubrication



Features

1. World's highest level load carrying capacity

Higher load carrying capacity and longer rating life by optimizing internal specifications

(1) Rating life : max. +20 % (compared to conventional NTN E type)

(2) Basic dynamic load rating : max. +7 % (compared to conventional NTN E type)

2. Allowable misalignment (see Fig. 1)

Allowable misalignment : 1/500

Optimized crowning allows combination of $0.20C_r$ and misalignment up to 1/500 to be used. When the radial load exceeds $0.20C_r$, please ask **NTN**. *Minimum required load: $0.04C_{0r}$.
C_r means basic dynamic load rating, and C_{0r} means basic static load rating listed in this catalog.

3. Allowable speed

max. +20 % with oil lubrication (compared to conventional **NTN** E type)

4. Adopted resin cage as standard (see Fig. 2)

(1) Standard use of integrated polyamide resin cage results in higher limiting speed and longer life of grease.

(2) Resin cage material: polyamide reinforced with glass fiber.

*If machined cage for high speed is required, please ask **NTN**.

5. Interchangeability

Boundary dimensions comply with ISO 15, JIS B 1533, DIN 5412, and the dimensions of these bearings are also same as conventional **NTN** E type.

6. Allowable axial load

Same as conventional **NTN** E type.

7. Allowable temperature

Allowable temperature of bearings : 120 ˚C (instantaneous), 100 ˚C (continuous)

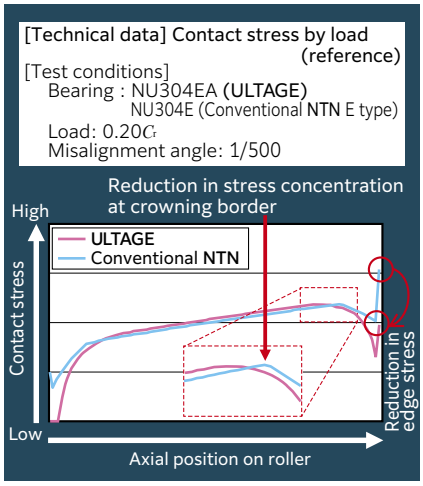


Fig. 1

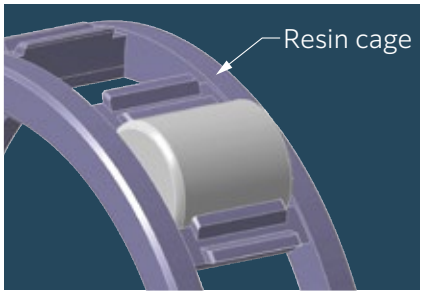


Fig. 2

ULTAGE "ULTAGE" (a name created from combination of "**Ultimate**", signifying refinement, and "**Stage**", signifying **NTN**'s intention that this series of products be employed in diverse applications) is the general name for **NTN**'s new generation of bearings that are noted for their industry leading performance.

Allowable axial load

Cylindrical roller bearings with ribs on the inner and outer rings are capable of simultaneously bearing a radial load (F_r) and a certain degree of axial load (F_a). Unlike basic dynamic load ratings based on rolling fatigue, allowable axial load ($F_{a\,max}$) is defined by the following two methods. When determining the actual allowable axial load, the smaller value out of P_t and F_{ar} determined with formula (1) and formula (2) is used.

① Allowable axial load P_t based on allowable surface pressure of rib

This is the allowable axial load that is determined by factors such as the amount of heat produced on the sliding surface between the ends of the rollers and rib, seizure and wear. The allowable axial load P_t based on allowable surface pressure of rib when center axial load is applied is approximately determined by formula (1), which is based upon experience and testing.

$$P_t = k_1 \cdot d^2 \cdot P_z \quad \cdots\cdots (1)$$

Where:

P_t : Allowable axial load based on allowable surface pressure of rib N
k_1 : Factor determined by internal design of bearing (see **Table 1**)
d : Bearing bore mm
P_z : Allowable surface pressure of rib MPa (see **Fig. 3**)

② Allowable axial load F_{ar} based on radial load

If the ratio of the axial load to the radial load is large, the rollers will not rotate properly. The allowable axial load F_{ar} based on the radial load is determined by formula (2) .

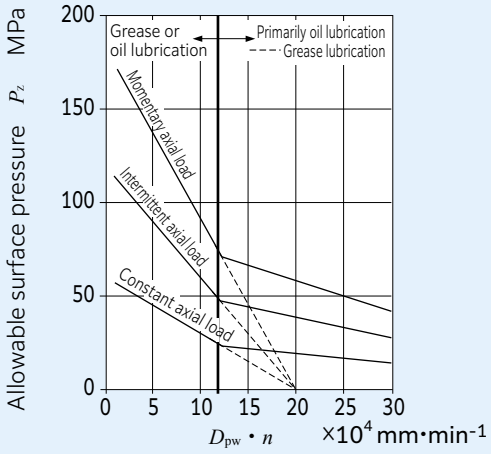
$$F_{ar} = k_2 \cdot F_r \quad \cdots\cdots (2)$$

Where:

F_{ar} : Allowable axial load based on radial load N
k_2 : Factor determined by internal design of bearing (see **Table 1**)
F_r : Radial load N

The following are also important to operate the bearing smoothly under axial load:

(1) Do not make the internal radial clearance any larger than necessary.
(2) Use lubricant with extreme pressure additive.
(3) Make the shoulder of the housing and shaft high enough for the rib of the bearing.
(4) If the bearing is to support an extreme axial load, mounting precision should be improved and the bearing should rotate slowly before actual use.



D_{pw} : Roller pitch diameter mm
$D_{pw} \approx$ (bearing bore + bearing outside diameter)/2 mm
n : Rotational speed min^{-1}

Fig. 3 Allowable surface pressure of rib

Table 1 Factors k_1 and k_2

Bearing series	k_1	k_2
NJ, NUP, NF2EA	0.050	0.4
NJ, NUP, NF22EA		
NJ, NUP, NF3EA	0.080	0.4
NJ, NUP, NF23EA		

Fatigue Load Limit(C_u)

The fatigue load limit is the applied load on a bearing that results in just reaching the fatigue stress limit at the maximum loaded raceway contact. This depends on the bearing type, internal specifications, quality, and material strength. In ISO 281:2007, 1.5 GPa is recommended as the fatigue stress limit corresponding to C_u for bearings made of commonly used high quality material and good manufacturing quality. Values for the fatigue load limit with respect to the **NTN** bearing numbers are provided in the dimensional table. The life modification factor, a_{ISO}, should be evaluated considering the fatigue load limit. For details see catalog "Ball and Roller Bearings (CAT. No.2203/E) section 3.4 Modified rating life".

Allowable speed

Higher bearing speeds result in higher bearing temperatures caused by friction. When the bearing temperature exceeds a specific limit, the lubricant performance deteriorates significantly, leading to abnormally high temperature and bearing seizure. The factors that affect the allowable bearing speed include the followings:

(1) Bearing type
(2) Bearing size
(3) Lubrication system (grease, circulating lubrication, oil bath, etc.)
(4) Bearing internal clearance (internal clearance of running bearing)
(5) Bearing load
(6) Dimensional accuracy with shaft, housing, etc.

The allowable speeds indicated in the bearing dimension table are for reference only and apply only when bearings are lubricated and heat is efficiently draw away from the bearing. The allowable speeds in this catalog are categorized as follows:

【Oil-lubricated bearings】

The bearing speed at which the outer ring temperature reaches 80 ˚C when the bearing is allowed to run at 5 % basic static load rating C_{0r} while lubricated with oil (viscosity ISO VG32) which is assimilated to room temperature and fed at a rate of 1 liter/min (circulating lubrication)

【Grease-lubricated bearings】

The bearing speed at which the outer ring temperature reaches 80 ˚C when the bearing, which has undergone running-in operation, is allowed to run at 5 % basic static load rating C_{0r} with the bearing's internal free volume 20 to 30 % pre-filled with lithium grease (consistency: NLGI3)

With either lubrication system, the bearing temperature rise profile varies with the operating conditions (operating load, running speed pattern, lubricating conditions, etc.) in which the bearing is used. Therefore, select the optimal bearing by allowing sufficient margin for the allowable speed for that particular bearing as indicated in the catalog. Contact **NTN** for technical assistance if the bearing speed in the intended application exceeds 80 % of the allowable speed indicated in the bearing dimension table, or if the intended bearing is to be used under severe operating conditions involving vibration and impact.

Allowable misalignment

Allowable misalignment : 1/500

∗Under conditions of : $F_r \leq 0.20C_r$ C_r means basic dynamic load rating listed in this catalog.

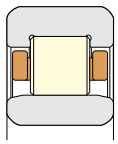
Bearing number

NU 22 04 EA T2X C3

- C3 — Radial internal clearance : C3
- T2X — Cage code : resin cage
- EA — Type code : ULTAGE
- 04 — Nominal bore diameter : 20 mm
- 22 — Dimension series : 22
- NU — Bearing series : cylindrical roller bearing NU type

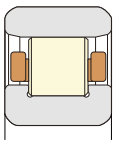
* Suffix "U" is added at the end of bearing number for NUP type.

Bearing series



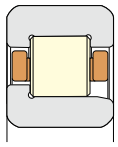
Components of NU type
- Outer ring (with double ribs)
- Rollers
- Cage
- Inner ring

Assembly of outer ring, rollers and cage can be separated from inner ring.



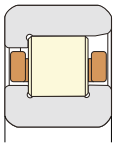
Components of N type
- Outer ring
- Rollers
- Cage
- Inner ring (with double ribs)

Assembly of inner ring, rollers and cage can be separated from outer ring.



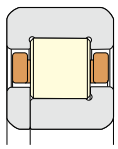
Components of NJ type
- Outer ring (with double ribs)
- Rollers
- Cage
- Inner ring (with single rib)

Assembly of outer ring, rollers and cage can be separated from inner ring.



Components of NF type
- Outer ring (with single rib)
- Rollers
- Cage
- Inner ring (with double ribs)

Assembly of inner ring, rollers and cage can be separated from outer ring.



Components of NUP type
- Outer ring (with double ribs)
- Rollers
- Cage
- Inner ring (with single rib)
- Inner ring collar ring

Assembly of outer ring, rollers and cage can be separated from inner ring and collar ring.

Accuracy

Table 2 Inner rings

Unit: μm

Nominal bore diameter d mm		Dimensional tolerance of mean bore diameter within plane Δ_{dmp}				Bore diameter variation within plane V_{dsp}		Mean bore diameter variation V_{dmp}		Inner ring radial runout K_{ia}		Inner ring width deviation Δ_{Bs}		Inner ring width variation V_{Bs}
		class 0		class 6		class 0	class 6	class 0	class 6	class 0	class 6	class 0	class 6	class 0, class 6
over	incl.	high	low	high	low	max.		max.		max.		high	low	max.
18	30	0	-10	0	-8	8	6	8	6	13	8	0	-120	20
30	50	0	-12	0	-10	9	8	9	8	15	10	0	-120	20
50	80	0	-15	0	-12	11	9	11	9	20	10	0	-150	25
80	120	0	-20	0	-15	15	11	15	11	25	13	0	-200	25

Table 3 Outer rings

Unit: μm

Nominal outside diameter D mm		Dimensional tolerance of mean outside diameter within plane Δ_{Dmp}				Outside diameter variation within plane V_{Dsp}		Mean outside diameter variation V_{Dmp}		Outer ring radial runout K_{ea}		Outer ring width deviation Δ_{Cs}	Outer ring width variation V_{Cs}
		class 0		class 6		class 0	class 6	class 0	class 6	class 0	class 6	all type	
over	incl.	high	low	high	low	max.		max.		max.			max.
30	50	0	-11	0	-9	8	7	8	7	20	10	Depends on tolerance of Δ_{Bs} in relation to d of same bearing	Depends on tolerance of V_{Bs} in relation to d of same bearing
50	80	0	-13	0	-11	10	8	10	8	25	13		
80	120	0	-15	0	-13	11	10	11	10	35	18		
120	150	0	-18	0	-15	14	11	14	11	40	20		
150	180	0	-25	0	-18	19	14	19	14	45	23		
180	250	0	-30	0	-20	23	15	23	15	50	25		

Chamfer measurements

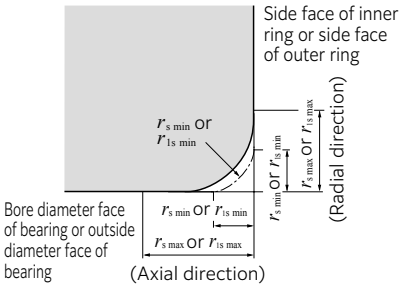


Table 4 Allowable critical-value of bearing chamfer

Unit:mm

$r_{s\,min}$ [1] or $r_{1s\,min}$	Nominal bore diameter d		$r_{s\,max}$ or $r_{1s\,max}$	
	over	incl.	Radial direction	Axial direction
0.6	–	40	1	2
1	–	50	1.5	3
1.1	–	120	2	3.5
1.5	–	120	2.3	4
2	–	80	3	4.5
	80	220	3.5	5
2.1	–	280	4	6.5

Note 1) These are the allowable minimum dimensions of the chamfer dimension"r" or"r_1" and are described in the dimensional table.

Radial internal clearance

Table 5 interchangeable radial internal clearance

Unit: μm

Nominal bore diameter d mm		C2		(CN)[1]		C3		C4		C5	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
10	24	0	25	20	45	35	60	50	75	65	90
24	30	0	25	20	45	35	60	50	75	70	95
30	40	5	30	25	50	45	70	60	85	80	105
40	50	5	35	30	60	50	80	70	100	95	125
50	65	10	40	40	70	60	90	80	110	110	140
65	80	10	45	40	75	65	100	90	125	130	165
80	100	15	50	50	85	75	110	105	140	155	190
100	120	15	55	50	90	85	125	125	165	180	220

Table 6 Radial internal clearance for electric motor

Unit: μm

Nominal bore diameter d mm		CM[2]	
over	incl.	min.	max.
24	30	15	30
30	40	15	30
40	50	20	35
50	65	25	40
65	80	30	45
80	100	35	55
100	120	35	60

Table 7 Non-interchangeable radial internal clearance

Unit: μm

Nominal bore diameter d mm		C1NA		C2NA		NA[3]		C3NA		C4NA		C5NA	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	5	10	10	20	20	30	35	45	45	55	65	75
24	30	5	10	10	25	25	35	40	50	50	60	70	80
30	40	5	12	12	25	25	40	45	55	55	70	80	95
40	50	5	15	15	30	30	45	50	65	65	80	95	110
50	65	5	15	15	35	35	50	55	75	75	90	110	130
65	80	10	20	20	40	40	60	70	90	90	110	130	150
80	100	10	25	25	45	45	70	80	105	105	125	155	180
100	120	10	25	25	50	50	80	95	120	120	145	180	205

Note 1) "CN" is not indicated on bearing number
2) Non-interchangeable clearance
3) For bearings with normal clearance, only NA is added to bearing numbers. Example: NU310EAT2XNA

Bearing Fits

General standards of bearing fits for each condition of use are shown in **Table 8** to **Table 10**.

Table 8 Tolerance class of shafts commonly used for cylindrical roller bearings (classes 0 and 6)

Conditions		Shaft diameter (mm) over	incl.	Shaft tolerance class	Remarks
Inner ring rotational load or load of undermind direction	Light load[1] or fluctuating load	—	40	js6	When greater accuracy is required js5, k5, and m5 may be substituted for js6, k6, and m6.
		40	140	k6	
	Ordinary load[1]	—	40	k5	—
		40	100	m5	
		100	140	m6	
	Heavy load[1] or impact load	50	140	n6	Use bearings with larger internal clearances than CN clearance bearings.
Inner ring static load	Inner ring must move easily over shaft	Overall shaft diameter		g6	When greater accuracy is required use g5. For large bearings, f6 will suffice for to facilitate movement.
	Inner does not have to move easily over shaft	Overall shaft diameter		h6	When greater accuracy is required use h5.
Center axial load		Overall shaft diameter		js6	Generally, shaft and inner rings are not fixed using interference.

Note All values and fits listed in the above tables are for solid steel shafts.

Table 9 Tolerance class of housing bore commonly used for cylindrical roller bearings (classes 0 and 6)

Conditions				Tolerance class of housing bore	Remarks
Housing	Types of load		Outer ring axial direction movement[2]		
Single housing or split housing	Outer ring static load	All types of loads	Yes	H7	G7 can be used for large bearings or bearings with large temperature differential between the outer ring and housing.
		Light load[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 large temperature differential between the outer ring and housing.
Single housing		Requires precise rotation under light or ordinary loads	As a rule, cannot move.	K6	Primarily applies to roller bearings.
			Yes	JS6	—
		Requires low noise operation	Yes	H6	—
	Indeterminate load	Light or ordinary load	Yes	JS7	If high accuracy is required, JS6 and K6 are used in place of JS7 and K7
		Ordinary load or heavy load[1]	As a rule, cannot move.	K7	
		High impact load	No	M7	—
	Outer ring rotational 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	Primarily applies to roller bearings.

Remarks ● All values and fits listed in the above tables are for cast iron or steel housings.
● If only center axial load is applied of the bearings, select a tolerance class provides clearance for the outer ring in the axial direction.

Note 1) Standards for light loads, normal loads, and heavy loads

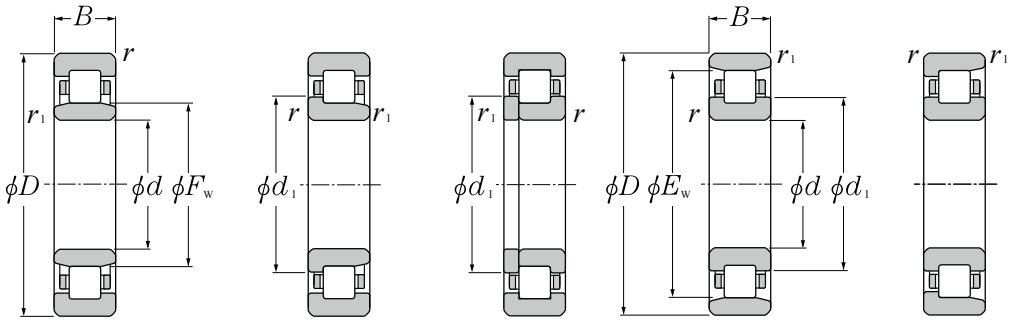
- Light loads : equivalent radial load $\leq 0.05\ C_r$
- Normal loads : $0.05\ C_r <$ equivalent radial load $\leq 0.10\ C_r$
- Heavy loads : $0.10\ C_r <$ equivalent radial load

2) Indicates whether or not outer ring axial movement is possible with non-separable type bearings.

Table 10 Fits for electric motor bearings

Bearing Type	Shaft fits			Housing fits	
	Shaft diameter mm over	incl.	Tolerance class	Housing bore diameter	Tolerance class
Cylindrical roller bearings	—	40	k5	All sizes	H6 or J6
	40	160	m5		

Dimension table

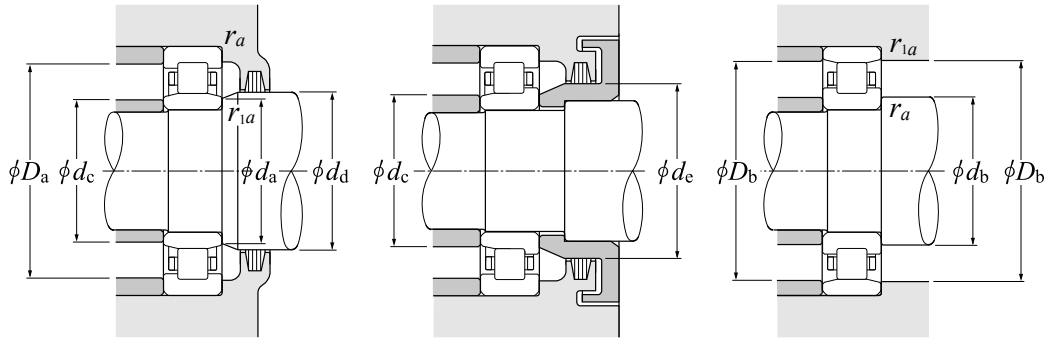


NU type　NJ type　NUP type　N type　NF type

d 20-50 mm

Boundary dimensions mm					Basic load rating dynamic kN		Fatigue load limit kN	Allowable speed 2) min-1		Bearing number				
d	*D*	*B*	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	C_r	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	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
30	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
35	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
40	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	85.5	77.5	9.45	7 600	10 700	NU2208EA	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	135	122	14.9	6 400	9 000	NU2308EA	NJ	NUP	N	NF
45	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	90.0	84.5	10.3	6 800	9 600	NU2209EA	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	162	153	18.7	5 700	8 200	NU2309EA	NJ	NUP	N	NF
50	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	98.5	97.0	11.9	6 200	8 800	NU2210EA	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	192	187	22.7	5 200	7 300	NU2310EA	NJ	NUP	N	NF

Note 1) Smallest allowable dimension for chamfer dimension *r* or r_1.
2) The value for standard type cage
3) Does not apply to the sides of the outer ring rib of NF type bearings.

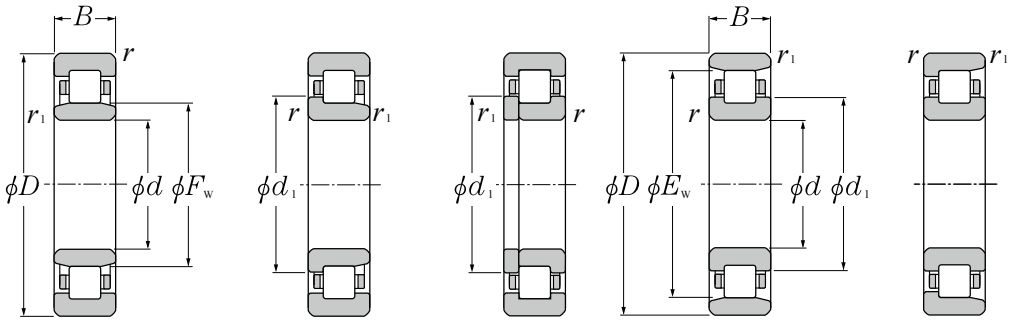


Dynamic equivalent radial load
$P_r = F_r$

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

Dimensions			Abutment and fillet dimensions										Mass (approx.)	
mm			mm										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	N type
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
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
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
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
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
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
52	80	57.6	48	48	51	55	60	82	82	81.5	1.5	1.5	0.754	0.658
52	80	57.6	48	48	51	55	60	82	82	81.5	1.5	1.5	1.06	0.952
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
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	88.5	64.5	53	53	57	60	66	92	92	90.5	1.5	1.5	0.996	0.865
58.5	88.5	64.5	53	53	57	60	66	92	92	90.5	1.5	1.5	1.41	1.3
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
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	97	71.4	59	59	63	67	73	101	101	99	2	2	1.3	1.12
65	97	71.4	59	59	63	67	73	101	101	99	2	2	1.9	1.75

Dimension table

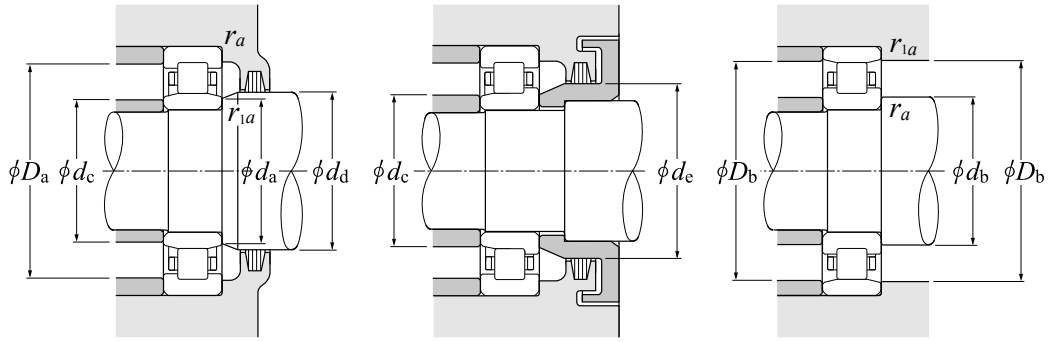


NU type NJ type NUP type N type NF type

d 55-110 mm

Boundary dimensions mm					Basic load rating dynamic kN		Fatigue load limit kN	Allowable speed 2) min-1		Bearing number				
d	*D*	*B*	$r_{s\,min}$ 1)	$r_{1s\,min}$ 1)	C_r	C_{0r}	C_u	Grease lubrication	Oil lubrication	NU type	NJ type	NUP type	N type	NF type
55	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	120	122	14.8	5 600	7 900	NU2211EA	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	238	233	28.4	4 700	6 700	NU2311EA	NJ	NUP	N	NF
60	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	155	157	19.1	5 200	7 300	NU2212EA	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	263	262	32.0	4 400	6 200	NU2312EA	NJ	NUP	N	NF
65	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	176	181	22.1	4 800	6 700	NU2213EA	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	293	287	34.5	4 100	5 800	NU2313EA	NJ	NUP	N	NF
70	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	184	194	23.7	4 500	6 200	NU2214EA	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	325	325	38.0	3 800	5 300	NU2314EA	NJ	NUP	N	NF
75	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	191	207	25.0	4 200	5 900	NU2215EA	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	390	395	45.5	3 500	4 900	NU2315EA	NJ	NUP	N	NF
80	140	26	2	2	165	167	19.7	4 400	6 100	NU216EA	NJ	NUP	N	NF
	140	33	2	2	220	243	28.7	3 900	5 500	NU2216EA	NJ	NUP	N	NF
85	150	28	2	2	198	199	23.0	4 100	5 800	NU217EA	NJ	NUP	N	NF
	150	36	2	2	257	279	32.5	3 700	5 200	NU2217EA	NJ	NUP	N	NF
90	160	30	2	2	215	217	24.7	3 900	5 500	NU218EA	NJ	NUP	N	NF
	160	40	2	2	286	315	35.5	3 500	4 900	NU2218EA	NJ	NUP	N	NF
95	170	32	2.1	2.1	260	265	29.6	3 600	5 200	NU219EA	NJ	NUP	N	NF
100	180	34	2.1	2.1	295	305	33.5	3 500	4 900	NU220EA	NJ	NUP	-	-
	180	36	2.1	2.1	395	445	49.0	3 100	4 300	NU2220EA	NJ	NUP	-	-
110	200	38	2.1	2.1	345	365	39.0	3 100	4 400	NU222EA	NJ	NUP	-	-

Note 1) Smallest allowable dimension for chamfer dimension *r* or r_1.
2) The value for standard type cage
3) Does not apply to the sides of the outer ring rib of NF type bearings.



Dynamic equivalent radial load
$P_r = F_r$

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

Dimensions			Abutment and fillet dimensions										Mass (approx.)	
mm			mm										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	N type
66	90	70.8	61.5	63	65	68	73	92	92	91	1.5	1	0.675	0.635
66	90	70.8	61.5	63	65	68	73	92	92	91	1.5	1	0.807	0.805
70.5	106.5	77.7	64	64	69	72	80	111	111	108.5	2	2	1.65	1.43
70.5	106.5	77.7	64	64	69	72	80	111	111	108.5	2	2	2.37	2.23
72	100	77.6	68	68	71	75	80	102	102	101	1.5	1.5	0.923	0.798
72	100	77.6	68	68	71	75	80	102	102	101	1.5	1.5	1.21	1.08
77	115	84.6	71	71	75	79	86	119	119	117	2	2	2.05	1.77
77	115	84.6	71	71	75	79	86	119	119	117	2	2	2.96	2.73
78.5	108.5	84.5	73	73	77	81	87	112	112	110	1.5	1.5	1.21	1.01
78.5	108.5	84.5	73	73	77	81	87	112	112	110	1.5	1.5	1.6	1.44
82.5	124.5	91	76	76	81	85	93	129	129	127	2	2	2.54	2.2
82.5	124.5	91	76	76	81	85	93	129	129	127	2	2	3.48	3.25
83.5	113.5	89.5	78	78	82	86	92	117	117	115	1.5	1.5	1.3	1.13
83.5	113.5	89.5	78	78	82	86	92	117	117	115	1.5	1.5	1.7	1.52
89	133	98	81	81	87	92	100	139	139	136	2	2	3.1	2.75
89	133	98	81	81	87	92	100	139	139	136	2	2	4.25	3.95
88.5	118.5	94.5	83	83	87	90	96	122	122	120	1.5	1.5	1.41	1.28
88.5	118.5	94.5	83	83	87	90	96	122	122	120	1.5	1.5	1.79	1.61
95	143	104.6	86	86	93	97	106	149	149	146	2	2	3.74	3.28
95	143	104.6	86	86	93	97	106	149	149	146	2	2	5.25	4.85
95.3	127.3	101.7	89	89	94	97	104	131	131	128.5	2	2	1.67	1.56
95.3	127.3	101.7	89	89	94	97	104	131	131	128.5	2	2	2.12	2.02
100.5	136.5	107.7	94	94	99	104	110	141	141	138	2	2	2.11	1.93
100.5	136.5	107.7	94	94	99	104	110	141	141	138	2	2	2.68	2.52
107	145	114.6	99	99	105	109	116	151	151	147	2	2	2.44	2.37
107	145	114.6	99	99	105	109	116	151	151	147	2	2	3.33	3.2
112.5	154.5	121	106	106	111	116	123	159	159	156.5	2	2	3.02	2.85
119	-	128	111	-	117	122	130	169	-	-	2	2	3.66	-
119	-	128	111	-	117	122	130	169	-	-	2	2	5.01	-
132.5	-	142.1	121	-	130	135	144	189	-	-	2	2	4.27	-

NTN corporation

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