

2. Cylindrical Roller Bearings

Features

Cylindrical roller bearings (CRB) feature higher radial rigidity and can take higher radial loads than ball bearings; this makes them especially suitable for applications that require high rigidity such as lathe spindles, and for use as rear end bearings subjected to large belt loads.

The optimized internal design and cage shape of NSK cylindrical roller bearings are the reason why they achieve low heat generation and stable operation in high-speed applications.

Double-row cylindrical roller bearings are also available in "E44" specification for oil lubrication with lubrication holes and oil groove in the center of the outer ring.

Different types and their features

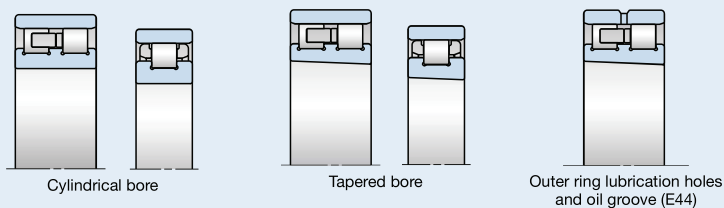
NN type cylindrical roller bearings are equipped with ribs on the inner ring, NNU type bearings with ribs on the outer ring. The NN type is widely used, as initial running-in with grease lubrication is short, and oil is prevented from accumulating inside the bearing with oil lubrication.

Bearing type	Cage	Specification	Available Sizes
NN	MB	Roller guided brass cage	NN3005-NN3048 (NN3008-NN3048)
			NN3920-NN3956 (NN3920-NN3952)
			NN4920-NN4948 (NN4920-NN4948)
	TB	Roller guided PPS cage	NN3006-NN3032 (NN3008-NN3032)
NNU	MB	Roller guided brass cage	NNU4920-NNU4948 (NNU4920-NNU4948)
N	MR	Roller guided brass cage	N1006-N1044 (N1007-N1044)
NSKROBUST Series	TP	Outer ring guided PEEK cage	N1009-N1017

The values in brackets indicate bearing sizes for which NSK-HPS and APTSURF are available. For further information, please refer to page 25.

Bore Specifications and Lubrication Holes

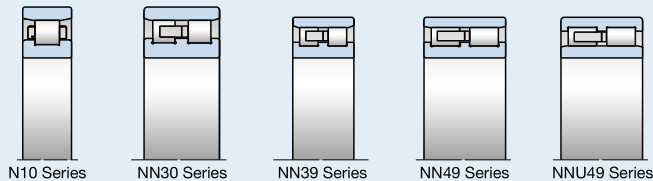
Fig. 2.1



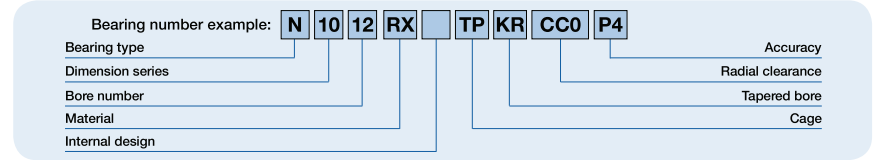
Both cylindrical bore and tapered bore are available. We recommend the latter, as the tapered bore makes it possible to adjust the radial internal clearance after mounting. Thus, dispersion in clearance after assembly may be avoided.

Bearing Types and Dimension Series

Fig. 2.2

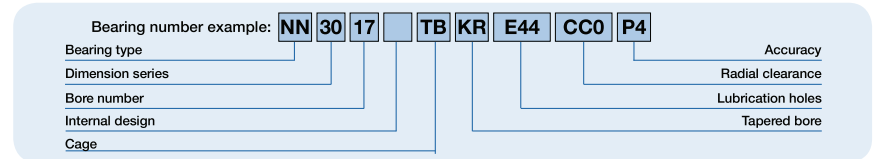


Numbering System of Single-Row Cylindrical Roller Bearings (Standard Series and NSKROBUST Series)



Code	Property	Description	Reference pages									
N	Bearing type	N: Single-row CRB (inner ring rib type)	46-47, 110									
10	Dimension series	10: 10 Series	46-47, 110									
12	Bore number	Bearing bore = Bore number × 5 (mm)	112-115									
RX	Material	No symbol: Standard CRB (material of inner and outer ring and rollers: SUJ2 bearing steel) RS, RX: Ultra high-speed single-row CRB (NSKROBUST Series)	14-15 24-25									
		<table border="1"> <thead> <tr> <th>Type</th> <th colspan="2">Material</th> </tr> </thead> <tbody> <tr> <td>RS</td> <td>Inner/Outer ring Bearing steel (SUJ2)</td> <td>Rollers Bearing steel (SUJ2)</td> </tr> <tr> <td>RX</td> <td>Heat resistant steel for highspeed operation (SHX)</td> <td>Heat resistant steel for highspeed operation (SHX)</td> </tr> </tbody> </table>		Type	Material		RS	Inner/Outer ring Bearing steel (SUJ2)	Rollers Bearing steel (SUJ2)	RX	Heat resistant steel for highspeed operation (SHX)	Heat resistant steel for highspeed operation (SHX)
		Type		Material								
RS	Inner/Outer ring Bearing steel (SUJ2)	Rollers Bearing steel (SUJ2)										
RX	Heat resistant steel for highspeed operation (SHX)	Heat resistant steel for highspeed operation (SHX)										
Z	Internal design	No symbol: Standard type Z: Low heat generation type	112-115									
TP	Cage	TP: Outer ring guided PEEK cage No symbol: Rib guided brass cage MR: Roller guided brass cage	19, 24-25									
KR	Tapered bore	No symbol: Cylindrical bore KR (K): 1/12 Tapered bore	226-227									
CC0	Radial clearance	CC1: Standard clearance for cylindrical bore (Non-interchangeable)	46-47 112-115									
		CC0: Standard clearance for tapered bore (Non-interchangeable)										
		CCG: Special radial clearance										
P4	Accuracy	P2: ISO Class 2, P4: ISO Class 4, P5: ISO Class 5	222-225									
		P4Y: Special class (bore diameter and outside diameter are exclusive to NSK, all others are ISO Class 4)										

Numbering System of Double-Row Cylindrical Roller Bearings (High Rigidity Series)

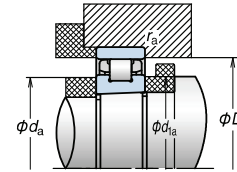
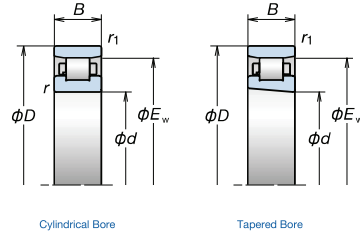


Code	Property	Description	Reference pages
NN	Bearing type	NN: Double-row CRB (inner ring rib type) NNU: Double-row CRB (outer ring rib type)	46-47, 110
30	Dimension series	30: 30 Series 39: 39 Series 49: 49 Series	46-47, 110
17	Bore number	Bearing bore = Bore number × 5 (mm)	116-127
Z	Internal design	No symbol: Standard type Z: Low heat generation type	116-127
TB	Cage	TB: Roller guided PPS cage No symbol: Rib guided brass cage	19, 24-25
		MB: Roller guided brass cage	
KR	Tapered bore	No symbol: Cylindrical bore KR (K): 1/12 Tapered bore	226-227
E44	Lubrication holes	No symbol: No lubrication holes E44: Outer ring with oil groove and lubrication holes	116-127
CC0	Radial clearance	CC1: Standard clearance for cylindrical bore (Non-interchangeable)	46-47 116-127
		CC0: Standard clearance for tapered bore (Non-interchangeable)	
		CCG: Special radial clearance	
P4	Accuracy	P2: ISO Class 2, P4: ISO Class 4, P5: ISO Class 5	222-225
		P4Y: Special class (bore diameter and outside diameter are exclusive to NSK, all others are ISO Class 4)	

2. Cylindrical Roller Bearings

Bore Diameter **30-70 mm**

Single-Row Cylindrical Roller Bearings



Bearing Numbers (*) (†)	Boundary Dimensions (mm)					Basic Load Ratings (kN)		E _w (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (‡) (min ⁻¹)	
	d	D	B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{0r} (Static)			Grease	Oil
*N1006MR1KR	30	55	13	1	0.6	19.7	19.6	48.5	0.135	19 000	31 000
*N1007MRKR	35	62	14	1	0.6	26.0	23.2	55	0.172	17 000	27 000
*N1008MRKR	40	68	15	1	0.6	31.5	29.0	61	0.213	15 000	25 000
*N1009MRKR	45	75	16	1	0.6	37.5	35.5	67.5	0.279	14 000	22 000
*N1009RSTPKR	45	75	16	1	0.6	26.9	29.4	67.5	0.243	16 000	23 000
*N1009RXTPKR	45	75	16	1	0.6	26.9	29.4	67.5	0.243	21 000	30 000
*N1009RSZTPKR	45	75	16	1	0.6	16.0	14.7	67.5	0.224	16 000	23 000
*N1009RXZTPKR	45	75	16	1	0.6	16.0	14.7	67.5	0.224	21 000	30 000
*N1010MRKR	50	80	16	1	0.6	37.0	36.0	72.5	0.286	13 000	20 000
*N1010RSTPKR	50	80	16	1	0.6	28.8	33.0	72.5	0.265	15 000	21 000
*N1010RXTPKR	50	80	16	1	0.6	28.8	33.0	72.5	0.265	20 000	27 000
*N1010RSZTPKR	50	80	16	1	0.6	17.1	16.5	72.5	0.244	15 000	21 000
*N1010RXZTPKR	50	80	16	1	0.6	17.1	16.5	72.5	0.244	20 000	27 000
*N1011BMR1KR	55	90	18	1.1	1	43.5	44.0	81	0.425	12 000	18 000
*N1011RSTPKR	55	90	18	1.1	1	35.0	39.5	81	0.383	13 000	19 000
*N1011RXTPKR	55	90	18	1.1	1	35.0	39.5	81	0.383	18 000	25 000
*N1011RSZTPKR	55	90	18	1.1	1	20.7	19.7	81	0.355	13 000	19 000
*N1011RXZTPKR	55	90	18	1.1	1	20.7	19.7	81	0.355	18 000	25 000
*N1012BMR1KR	60	95	18	1.1	1	46.0	48.5	86.1	0.454	11 000	17 000
*N1012RSTPKR	60	95	18	1.1	1	37.5	44.0	86.1	0.411	12 000	18 000
*N1012RXTPKR	60	95	18	1.1	1	37.5	44.0	86.1	0.411	17 000	23 000
*N1012RSZTPKR	60	95	18	1.1	1	22.2	22.1	86.1	0.380	12 000	18 000
*N1012RXZTPKR	60	95	18	1.1	1	22.2	22.1	86.1	0.380	17 000	23 000
*N1013BMR1KR	65	100	18	1.1	1	47.0	51.0	91	0.483	10 000	16 000
*N1013RSTPKR	65	100	18	1.1	1	39.5	49.0	91	0.440	11 000	17 000
*N1013RXTPKR	65	100	18	1.1	1	39.5	49.0	91	0.440	16 000	22 000
*N1013RSZTPKR	65	100	18	1.1	1	23.6	24.5	91	0.406	11 000	17 000
*N1013RXZTPKR	65	100	18	1.1	1	23.6	24.5	91	0.406	16 000	22 000
*N1014BMR1KR	70	110	20	1.1	1	57.5	63.0	100	0.668	9 000	15 000
*N1014RSTPKR	70	110	20	1.1	1	46.5	57.0	100	0.607	10 000	16 000
*N1014RXTPKR	70	110	20	1.1	1	46.5	57.0	100	0.607	15 000	20 000
*N1014RSZTPKR	70	110	20	1.1	1	27.8	28.5	100	0.563	10 000	16 000
*N1014RXZTPKR	70	110	20	1.1	1	27.8	28.5	100	0.563	15 000	20 000

Abutment and Fillet Dimensions					Clearances in Bearings with Tapered Bores (µm)						Clearances in Bearings with Cylindrical Bores (µm)	
d _a (min.)	d _{1a} (min.)	D _a		r _a (max.)	CC9 (°)		CC0		CC1		CC1	
		(max.)	(min.)		min.	max.	min.	max.	min.	max.		
35	36	51	49	0.5	5	10	8	15	10	25	5	15
40	41	58	56	0.5	5	12	8	15	12	25	5	15
45	46	64	62	0.6	5	12	8	15	12	25	5	15
50	51	71	68	0.6	5	15	10	20	15	30	5	18
50	51	71	68	0.6	5	15	10	20	15	30	5	18
50	51	71	68	0.6	5	15	10	20	15	30	5	18
50	51	71	68	0.6	5	15	10	20	15	30	5	18
50	51	71	68	0.6	5	15	10	20	15	30	5	18
55	56	76	73	0.6	5	15	10	20	15	30	5	18
55	56	76	73	0.6	5	15	10	20	15	30	5	18
55	56	76	73	0.6	5	15	10	20	15	30	5	18
55	56	76	73	0.6	5	15	10	20	15	30	5	18
55	56	76	73	0.6	5	15	10	20	15	30	5	18
61.5	63	85	82	1	5	15	10	20	15	35	5	20
61.5	63	85	82	1	5	15	10	20	15	35	5	20
61.5	63	85	82	1	5	15	10	20	15	35	5	20
61.5	63	85	82	1	5	15	10	20	15	35	5	20
61.5	63	85	82	1	5	15	10	20	15	35	5	20
66.5	68	90	87	1	5	15	10	20	15	35	5	20
66.5	68	90	87	1	5	15	10	20	15	35	5	20
66.5	68	90	87	1	5	15	10	20	15	35	5	20
66.5	68	90	87	1	5	15	10	20	15	35	5	20
66.5	68	90	87	1	5	15	10	20	15	35	5	20
71.5	73	95	92	1	5	15	10	20	15	35	5	20
71.5	73	95	92	1	5	15	10	20	15	35	5	20
71.5	73	95	92	1	5	15	10	20	15	35	5	20
71.5	73	95	92	1	5	15	10	20	15	35	5	20
71.5	73	95	92	1	5	15	10	20	15	35	5	20
76.5	78	105	101	1	10	20	15	30	20	40	10	25
76.5	78	105	101	1	10	20	15	30	20	40	10	25
76.5	78	105	101	1	10	20	15	30	20	40	10	25
76.5	78	105	101	1	10	20	15	30	20	40	10	25
76.5	78	105	101	1	10	20	15	30	20	40	10	25

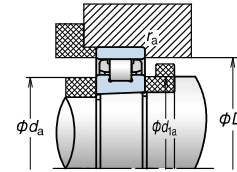
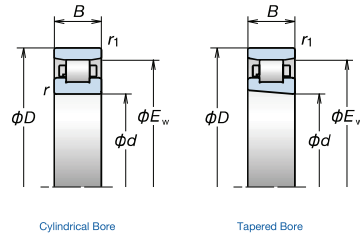
(*) The suffix "K" or "KR" represents bearings with tapered bores (1 : 12). For the cylindrical bore type, eliminate the symbol and leave this symbol blank.
 (†) GN gauge is available for the bearings denoted by an asterisk (*). For GN gauge, please refer to Page 180.
 (‡) For application of limiting speeds, please refer to Page 216.
 (§) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
 ● Dynamic equivalent load P191
 ● Static equivalent load P198
 ● Nozzle Position P240
 ● Recommended Grease Quantities P257

2. Cylindrical Roller Bearings

Bore Diameter 75-400mm

Single-Row Cylindrical Roller Bearings



Bearing Numbers (*) (†)	Boundary Dimensions (mm)					Basic Load Ratings (kN)		E _w (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (‡) (min ⁻¹)	
	d	D	B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{0r} (Static)			Grease	Oil
*N1015MRKR	75	115	20	1.1	1	69.0	74.5	105	0.700	8 500	13 700
*N1015RSTPKR	75	115	20	1.1	1	49.5	63.0	105	0.645	9 900	15 000
*N1015RXTPKR	75	115	20	1.1	1	49.5	63.0	105	0.645	14 000	19 000
*N1015RSZTPKR	75	115	20	1.1	1	29.6	31.5	105	0.596	9 900	15 000
*N1015RXZTPKR	75	115	20	1.1	1	29.6	31.5	105	0.596	14 000	19 000
*N1016BMR1KR	80	125	22	1.1	1	73.0	82.0	113	0.957	7 900	12 700
*N1016RSTPKR	80	125	22	1.1	1	61.5	78.5	113	0.872	9 200	14 000
*N1016RXTPKR	80	125	22	1.1	1	61.5	78.5	113	0.872	13 000	17 000
*N1016RSZTPKR	80	125	22	1.1	1	36.5	39.5	113	0.805	9 200	14 000
*N1016RXZTPKR	80	125	22	1.1	1	36.5	39.5	113	0.805	13 000	17 000
*N1017BMR1KR	85	130	22	1.1	1	75.0	86.0	118	1.067	7 500	10 300
*N1017RSTPKR	85	130	22	1.1	1	65.0	86.0	118	0.933	8 800	13 000
*N1017RXTPKR	85	130	22	1.1	1	65.0	86.0	118	0.933	12 000	17 000
*N1017RSZTPKR	85	130	22	1.1	1	38.5	43.0	118	0.859	8 800	13 000
*N1017RXZTPKR	85	130	22	1.1	1	38.5	43.0	118	0.859	12 000	17 000
*N1018MRKR	90	140	24	1.5	1.1	101	114	127	1.27	7 000	9 600
*N1019BMR1KR	95	145	24	1.5	1.1	95.0	114	132	1.37	6 700	9 200
*N1020MRKR	100	150	24	1.5	1.1	107	126	137	1.46	6 400	8 800
*N1021BMR1KR	105	160	26	2	1.1	129	155	146	1.79	6 100	8 300
*N1022BMR1KR	110	170	28	2	1.1	144	173	155	2.22	5 800	7 900
*N1024MRKR	120	180	28	2	1.1	159	191	165	2.34	5 400	7 300
*N1026MRKR	130	200	33	2	1.1	198	238	182	3.55	4 900	6 700
*N1028BMR1KR	140	210	33	2	1.1	189	240	192	3.78	4 600	6 300
*N1030BMRKR	150	225	35	2.1	1.5	233	294	206	4.56	4 300	5 100
*N1032BMRKR	160	240	38	2.1	1.5	330	340	219	5.59	4 000	4 800
N1034MRKR	170	260	42	2.1	2.1	330	415	237	7.85	3 600	4 400
N1036MRKR	180	280	46	2.1	2.1	405	510	255	9.76	3 400	4 100
N1038KR	190	290	46	2.1	2.1	415	535	265	10.4	3 200	4 000
N1040MRKR	200	310	51	2.1	2.1	450	580	281	13.5	3 000	3 700
N1044MRKR	220	340	56	3	3	575	750	310	17.4	2 500	3 000
N1048KR	240	360	56	3	3	605	820	330	18.6	2 300	2 800
N1052KR	260	400	65	4	4	645	1 000	364	27.6	2 100	2 600
N1060KR	300	460	74	4	4	885	1 400	420	42.2	1 800	2 200
N1064KR	320	480	74	4	4	905	1 470	440	43.8	1 800	2 100
N1068KR	340	520	82	5	5	1 080	1 740	475	59.8	1 600	2 000
N1072KR	360	540	82	5	5	1 110	1 830	495	61.6	1 600	1 900
N1080KR	400	600	90	5	5	1 360	2 280	550	84.1	1 400	1 700

(*) The suffix "K" or "KR" represents bearings with tapered bores (1 : 12). For the cylindrical bore type, eliminate the symbol and leave this symbol blank.
 (†) GN gauge is available for the bearings denoted by an asterisk (*). For GN gauge, please refer to Page 180.
 (‡) For application of limiting speeds, please refer to Page 216.
 (§) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

Abutment and Fillet Dimensions					Clearances in Bearings with Tapered Bores (µm)						Clearances in Bearings with Cylindrical Bores (µm)	
d _a (min.)	d _{a1a} (min.)	D _a		r _a (max.)	CC9 (°)		CC0		CC1		CC1	
		(max.)	(min.)		min.	max.	min.	max.	min.	max.		
81.5	83	110	106	1	10	20	15	30	20	40	10	25
81.5	83	110	106	1	10	20	15	30	20	40	10	25
81.5	83	110	106	1	10	20	15	30	20	40	10	25
81.5	83	110	106	1	10	20	15	30	20	40	10	25
81.5	83	110	106	1	10	20	15	30	20	40	10	25
86.5	88	120	115	1	10	20	15	30	20	40	10	25
86.5	88	120	115	1	10	20	15	30	20	40	10	25
86.5	88	120	115	1	10	20	15	30	20	40	10	25
86.5	88	120	115	1	10	20	15	30	20	40	10	25
86.5	88	120	115	1	10	20	15	30	20	40	10	25
91.5	93	125	120	1	10	25	20	35	25	45	10	30
91.5	93	125	120	1	10	25	20	35	25	45	10	30
91.5	93	125	120	1	10	25	20	35	25	45	10	30
91.5	93	125	120	1	10	25	20	35	25	45	10	30
91.5	93	125	120	1	10	25	20	35	25	45	10	30
98	100	133.5	129	1	10	25	20	35	25	45	10	30
103	105	138.5	134	1	10	25	20	35	25	45	10	30
108	110	143.5	139	1	10	25	20	35	25	45	10	30
114	116	153.5	148	1	10	25	20	35	25	50	10	30
119	121	163.5	157	1	10	25	20	35	25	50	10	30
129	131	173.5	167	1	10	25	20	35	25	50	10	30
139	142	193.5	184	1	15	30	25	40	30	60	10	35
149	152	203.5	194	1	15	30	25	40	30	60	10	35
161	164	217	208	1.5	15	35	30	50	35	65	10	35
171	174	232	221	1.5	15	35	30	50	35	65	10	35
181	185	249	239	2	15	35	30	50	35	75	10	40
191	195	269	258	2	15	35	30	50	35	75	10	40
201	205	279	268	2	20	40	30	50	40	80	15	45
211	215	299	284	2	20	40	30	50	40	80	15	45
233	238	327	313	2.5	20	45	35	60	45	90	15	50
253	258	347	333	2.5	25	50	40	65	50	100	15	50
276	281	384	367	3	25	55	40	70	55	110	20	55
316	322	444	424	3	30	60	45	75	60	120	20	60
336	342	464	444	3	30	65	45	80	65	135	20	65
360	367	500	479	4	30	65	45	80	65	135	20	65
380	387	520	499	4	35	75	50	90	75	150	25	75
420	428	580	554.5	4	35	75	50	90	75	150	25	75

For additional information:
 ● Dynamic equivalent load P191
 ● Static equivalent load P198
 ● Nozzle Position P240
 ● Recommended Grease Quantities P257