

2. Cylindrical Roller Bearings

Features

Cylindrical roller bearings (CRBs) 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 achieve low heat generation and stable operation in high-speed applications.

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

Type Differences

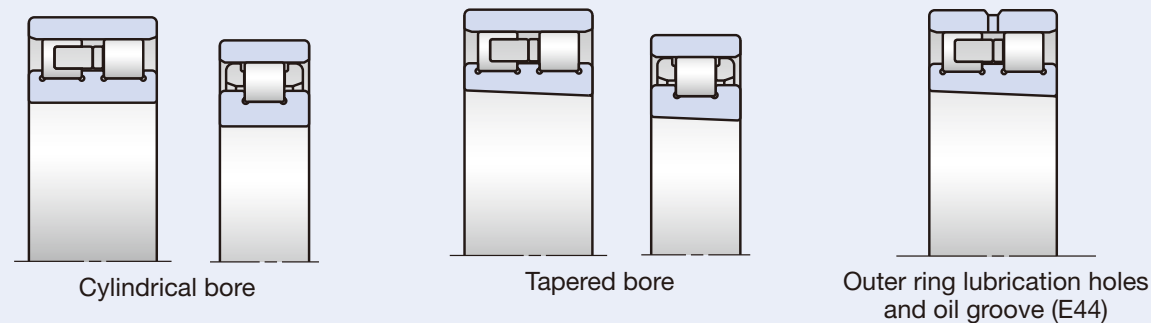
NN-type cylindrical roller bearings feature ribs on the inner rings, while the ribs of NNU-type bearings are on the outer ring. NN-type bearings are used widely for their versatility; under grease lubrication, they provide a short run-in period, while under oil lubrication, their design prevents oil from overaccumulating within.

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For details on NSK HPS and APTSURF bearings, see p. 29

Bore Specifications and Lubrication Holes

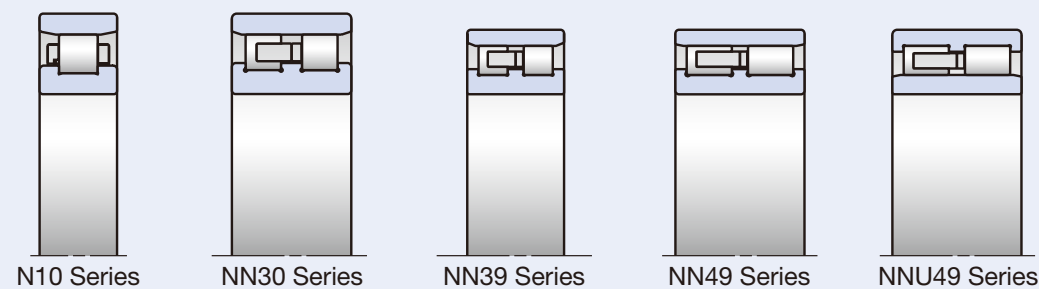
Fig. 2.1



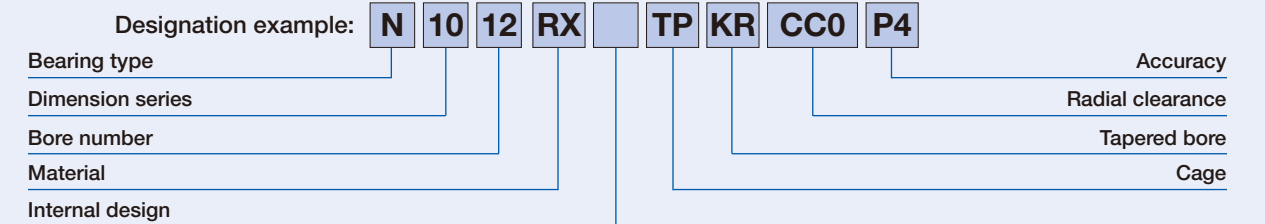
Both cylindrical bore and tapered bores are available. NSK recommends tapered bores as they help to prevent clearance variation by allowing for adjustments of radial internal clearance after mounting.

Bearing Types and Dimension Series

Fig. 2.2

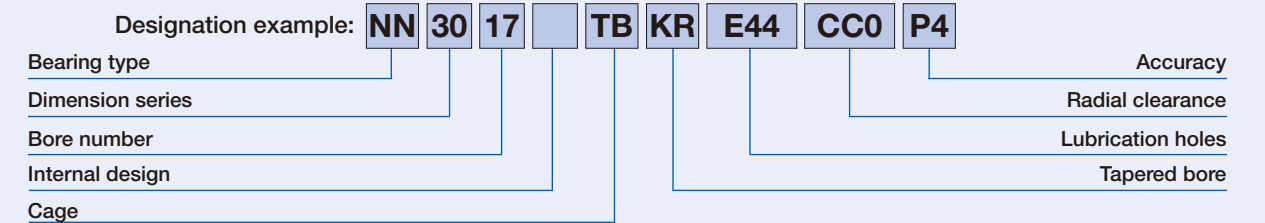


Numbering System for Single-Row Cylindrical Roller Bearings (Standard Series and NSKROBUST Series)



			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 code: 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 28-29												
		<table><tr><th>Type</th><th colspan="2">Material</th></tr><tr><td></td><th>Inner/Outer ring</th><th>Rollers</th></tr><tr><td>RS</td><td>Bearing steel (SUJ2)</td><td>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></table>		Type	Material			Inner/Outer ring	Rollers	RS	Bearing steel (SUJ2)	Bearing steel (SUJ2)	RX	Heat resistant steel for highspeed operation (SHX)	Heat resistant steel for highspeed operation (SHX)
		Type		Material											
				Inner/Outer ring	Rollers										
		RS		Bearing steel (SUJ2)	Bearing steel (SUJ2)										
RX	Heat resistant steel for highspeed operation (SHX)	Heat resistant steel for highspeed operation (SHX)													
Z	Internal design	No code: Standard type Z: Low heat generation type	112-115												
TP	Cage	TP: Outer ring guided PEEK cage No code: Rib guided brass cage MR: Roller guided brass cage	19, 28-29												
KR	Tapered bore	No code: Cylindrical bore KR (K): 1/12 Tapered bore	226-227												
CC0	Radial clearance	CC1: Standard clearance for cylindrical bore (Non-interchangeable) CC0: Standard clearance for tapered bore (Non-interchangeable) CCG: Special radial clearance	46-47 112-115												
P4	Accuracy	P2: ISO Class 2, P4: ISO Class 4, P5: ISO Class 5 P4Y: Special class (bore diameter and outside diameter are exclusive to NSK, all others are ISO Class 4)	222-225												

Numbering System for Double-Row Cylindrical Roller Bearings

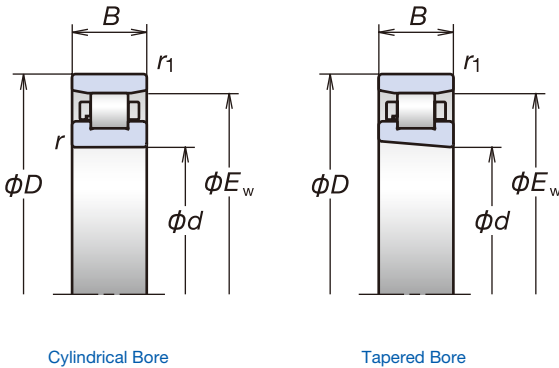
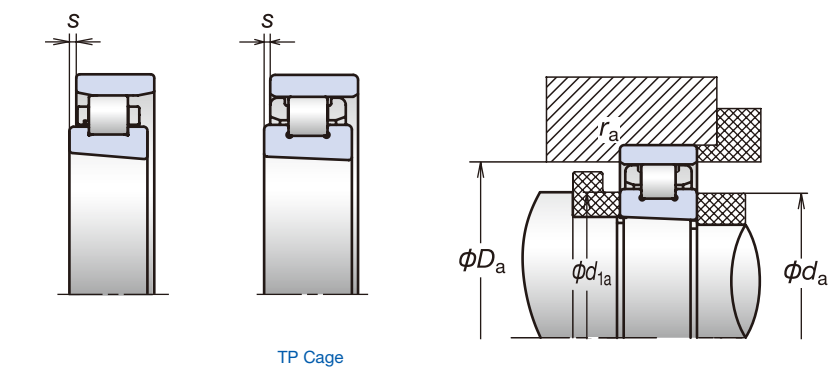


				Reference pages
NN	Bearing type	NN: Double-row CRB (inner ring rib type) NNU: Double-row CRB (outer ring rib type)		46-47, 110
30	Dimension series	30: 30 Series 39: 39 Series 49: 49 Series		46-47, 110
17	Bore number	Bearing bore = Bore number × 5 (mm)		116-127
Z	Internal design	No code: Standard type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

2. Cylindrical Roller Bearings

Bore Diameter **30-70 mm**

Single-Row Cylindrical Roller Bearings



Designation ⁽¹⁾ (²)	Boundary Dimensions (mm)					Basic Load Ratings (kN)		E_w (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds ⁽³⁾ (min ⁻¹)	
	d	D	B	r (min.)	r_1 (min.)	C_r (Dynamic)	C_{or} (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

⁽⁴⁾ Axial Displacement (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μ m)						Clearances in Bearings with Cylindrical Bores (μ m)	
	d_a (min.)	d_{1a} (min.)	D_a		r_a (max.)	CC9 ⁽⁵⁾		CC0		CC1		CC1	
			(max.)	(min.)		min.	max.	min.	max.	min.	max.	min.	max.
s													
1.1	35	36	51	49	0.5	5	10	8	15	10	25	5	15
1.5	40	41	58	56	0.5	5	12	8	15	12	25	5	15
1.7	45	46	64	62	0.6	5	12	8	15	12	25	5	15
2.0	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
2.0	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
2.7	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
2.7	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
2.7	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
3.2	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25

(¹) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). For cylindrical bores, omit this code.
(²) GN gauges are available for bearing designations with asterisk (*). For details, refer to Page 180.
(³) For details on limiting speeds, refer to Page 216.
(⁴) Axial displacement refers the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(⁵) 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