

# NSK

## NSKHPS CYLINDRICAL ROLLER BEARINGS

HIGH PERFORMANCE SERIES



STAY IN MOTION. STAY IN CONTROL.



## OPTIMIZED CAPACITY, STABILITY AND SPEED

### NSK CYLINDRICAL ROLLER BEARINGS

Smooth running at high speeds in electric motors and generators, pumps and compressors. High rigidity and accuracy in machine tool spindles, gearboxes and transmissions. Wear-resistant durability under heavy loads in steel making and mining machinery, cranes and hoists.

Cylindrical roller bearings are employed in a vast array of industries and applications, owing to their high-performance characteristics and a wide range of design variants - distinguished by roller rows, rib configurations, cages and materials.

Universally, NSK cylindrical roller bearings are optimized for capacity, stability and speed to extract higher performance and predictable reliability from machinery and equipment.

## HIGH PERFORMANCE STANDARD

NSKHPS cylindrical roller bearings are optimized by design to deliver utmost performance, accommodating high loads and high speeds with superior roller guidance, low running noise and reduced heat generation.

For conventional applications this translates into longer operating life as well as unrivaled machinery and equipment performance with:

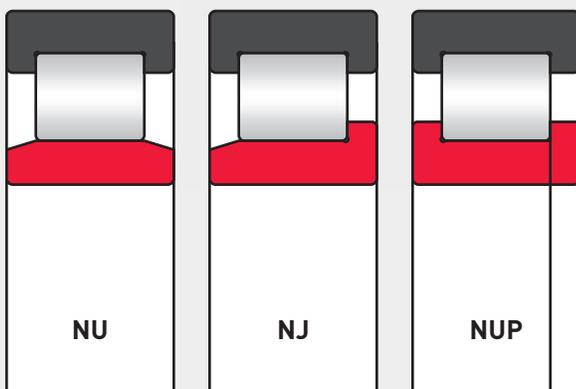
- **Dramatically increased bearing life** compared to conventional designs, as high as twice among larger sizes
- **As much as 23% higher basic load rating**
- **High strength and maximum rigidity** for supporting high loads and high speeds
- **Improved lubricant flow** promotes lower running temperature and low noise
- **Higher permissible misalignment**



# DESIGN FEATURES AND OPERATING CHARACTERISTICS

## DESIGN FEATURES

- › Manufactured with high-purity steel for superior fatigue strength
- › Optimized, high-capacity internal design packs in more rollers of larger size for a significant increase in load capacity and fatigue life
- › Special roller crowning distributes load more evenly across rollers and reduces edge loading
- › Available with machined brass, pressed steel and polyamide resin cage designs to suit a wide range of operating conditions
- › Special chemical resistant L-PPS resin cages for scroll and screw compressors also available
- › Available for NU, NJ and NUP design types
- › For dimension series 2, 22, 3, 23
- › Available for bore diameters from 20 to 220 mm
- › With C-Normal, C3 and C4 clearance



## TYPES AND OPERATING CHARACTERISTICS

- › **NU type:** with no inner ring ribs, allows axial displacement of the shaft in both directions where thermal expansion must be accommodated (free side)
- › **NJ type:** with a single inner ring rib, locates the shaft axially in one direction
- › **NUP type:** with a single inner ring rib + locating ring, locates the shaft axially in both directions (fixed side)

## HIGH PERFORMANCE CAGE OPTIONS

Cage selection can have a significant impact on rolling bearing performance. Operating stresses inherent to the application should be carefully considered. For NSKHPS cylindrical roller bearings, cage material options engineered to meet a wide array of application and operating challenges are available.

### Machined Brass Cage EM

- › Heavy duty, one-piece, roller guided cage suitable for high loads, high speeds and high temperatures
- › Pocket profile relieves stress concentration and achieves accurate roller guidance with low temperature rise
- › Promotes optimal oil film formation and lubricant flow

### Polyamide Resin Cage ET

- › Well-suited to normal duty applications with high speeds
- › For operating temperatures ranging from -40 to 120°C

### Pressed Steel Cage EW

- › High strength, one-piece, window-type cage suitable for high loads, high speeds and high temperatures
- › Supports maximum rigidity and low noise in operation

### L-PPS Resin Cage ET7

- › Exceptional resistance to oil, chemicals and abrasion
- › Dimensional stability at temperatures as high as 200°C



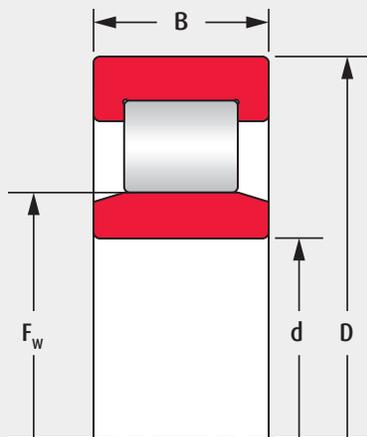
**Pictured above, clockwise from top left:**  
machined brass cage EM, polyamide resin cage ET, L-PPS resin cage ET7 and pressed steel cage EW

## RANGE OF AVAILABILITY - CAGE TYPE

Dimension series	Machined brass	Polyamide resin	Pressed steel	L-PPS resin
2	205 to 244	204 to 226	205 to 213	204 to 226
22	2205 to 2240	2205 to 2220	--	2205 to 2220
3	305 to 340	304 to 320	305 to 311	304 to 320
23	2305 to 2340	2305 to 2320	--	2304 to 2320

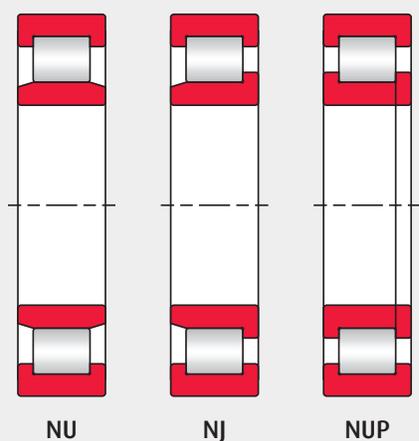
# BEARING DIMENSIONS AND OPERATING VALUES

BORE DIAMETER: 20 - 55 MM



BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
20	47	14	26.5	204 E	31 500	22 600	16 000	19 000	13 000	16 000
	52	15	27.5	304 E	39 000	26 900	13 000	18 000	12 000	15 000
	52	21	27.5	2304 E	40 500	30 000	13 000		11 000	14 000
25	52	15	31.5	205 E	36 000	27 700	14 000	17 000	12 000	14 000
	52	18	31.5	2205 E	43 000	34 500	14 000	20 000	12 000	14 000
	62	17	34	305 E	51 000	37 500	11 000	15 000	10 000	12 000
	62	24	34	2305 E	70 000	56 000	11 000	18 000	9 000	11 000
30	62	16	37.5	206 E	48 000	37 500	12 000	14 000	9 500	12 000
	62	20	37.5	2206 E	60 000	50 000	12 000	17 000	9 500	12 000
	72	19	40.5	306 E	65 500	50 000	9 500	13 000	8 500	10 000
	72	27	40.5	2306 E	92 000	77 500	9 500	16 000	8 000	9 500
35	72	17	44	207 E	62 000	50 000	10 000	12 000	8 500	10 000
	72	23	44	2207 E	76 000	65 500	11 000	15 000	8 500	10 000
	80	21	46.2	307 E	82 000	65 500	8 500	11 000	7 500	9 500
	80	31	46.2	2307 E	115 000	101 000	9 000	14 000	6 700	8 500

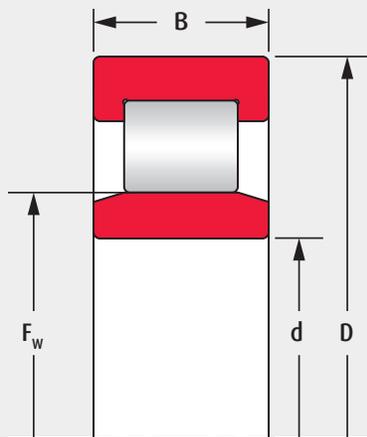
Refer to the table on **Page 5** for the availability of NSKHPS cylindrical roller bearings by cage type and size



BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
40	80	18	49.5	208 E	68 500	55 500	9 000	11 000	7 500	9 000
	80	23	49.5	2208 E	89 000	77 500	9 000	13 000	7 500	9 000
	90	23	52	308 E	102 000	81 500	7 500	10 000	6 700	8 000
	90	33	52	2308 E	140 000	122 000	8 000	12 000	6 000	7 500
45	85	19	54.5	209 E	77 500	66 500	8 500	10 000	6 700	8 000
	85	23	54.5	2209 E	93 500	84 500	8 500	12 000	6 700	8 500
	100	25	58.5	309 E	120 000	98 500	7 100	9 000	6 000	7 500
	100	36	58.5	2309 E	169 000	153 000	7 100	11 000	5 300	6 700
50	90	20	59.5	210 E	85 000	76 500	8 000	9 000	6 300	7 500
	90	23	59.5	2210 E	102 000	97 000	7 500	11 000	6 300	8 000
	110	27	65	310 E	135 000	113 000	6 700	8 000	5 000	6 000
	110	40	65	2310 E	200 000	187 000	6 700	10 000	5 000	6 300
55	100	21	66	211 E	106 000	98 500	6 700	8 500	5 600	7 100
	100	25	66	2211 E	125 000	122 000	6 700	10 000	5 600	7 100
	120	29	70.5	311 E	169 000	143 000	6 000	7 500	4 500	5 600
	120	43	70.5	2311 E	247 000	233 000	6 000	9 000	4 500	5 600

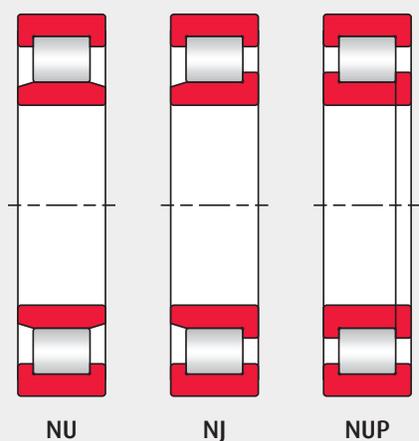
# BEARING DIMENSIONS AND OPERATING VALUES

BORE DIAMETER: 60 - 95 MM



BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
60	110	22	72	212 E	120 000	107 000	6 300	7 500	5 300	6 300
	110	28	72	2212 E	161 000	157 000	6 300	9 500	5 300	6 300
	130	31	77	312 E	184 000	157 000	5 600	9 500	4 800	5 600
	130	46	77	2312 E	274 000	262 000	5 600	8 500	4 300	5 300
65	120	23	78.5	213 E	132 000	119 000	6 000	7 100	4 800	5 600
	120	31	78.5	2213 E	183 000	181 000	6 000	8 500	4 800	6 000
	140	33	82.5	313 E	222 000	191 000	5 300	8 500	4 300	5 300
	140	48	82.5	2313 E	287 000	265 000	5 600	7 500	3 800	4 800
70	125	24	83.5	214 E	146 000	137 000	5 600	9 000	5 000	6 300
	125	31	83.5	2214 E	191 000	194 000	5 600	8 000	4 500	5 600
	150	35	89	314 E	252 000	222 000	4 800	8 000	4 000	5 000
	150	51	89	2314 E	335 000	325 000	5 000	7 100	3 600	4 500
75	130	25	88.5	215 E	160 000	156 000	5 300	8 500	4 800	6 000
	130	31	88.5	2215 E	199 000	207 000	5 300	7 500	4 300	5 300
	160	37	95	315 E	295 000	263 000	4 500	7 500	3 800	4 800
	160	55	95	2315 E	405 000	395 000	4 800	6 700	3 400	4 300

Refer to the table on Page 5 for the availability of NSKHPS cylindrical roller bearings by cage type and size



NU

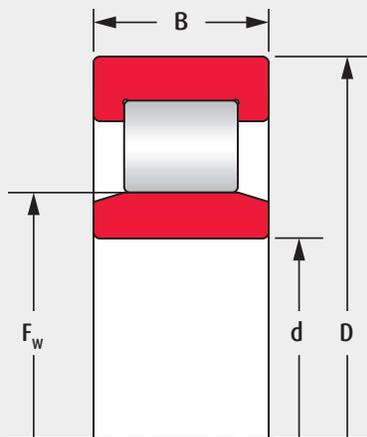
NJ

NUP

BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
80	140	26	95	216 E	171 000	167 000	5 000	8 000	4 500	5 300
	140	33	95	2216 E	229 000	243 000	5 000	7 100	4 000	5 000
	170	39	101	316 E	315 000	282 000	4 300	7 100	3 600	4 300
	170	58	101	2316 E	440 000	430 000	4 500	6 300	3 200	4 000
85	150	28	100.5	217 E	206 000	199 000	4 800	7 500	4 300	5 000
	150	36	100.5	2217 E	268 000	279 000	4 800	6 700	3 800	4 500
	180	41	108	317 E	360 000	330 000	4 000	6 700	3 400	4 000
	180	60	108	2317 E	485 000	485 000	4 300	6 000	3 000	3 800
90	160	30	107	218 E	224 000	217 000	4 800	7 100	4 000	4 800
	160	40	107	2218 E	298 000	315 000	4 800	6 300	3 600	4 300
	190	43	113.5	318 E	390 000	355 000	4 000	6 300	3 200	3 800
	190	64	113.5	2318 E	535 000	535 000	4 000	5 600	2 800	3 400
95	170	32	112.5	219 E	271 000	265 000	4 300	6 700	3 800	4 500
	170	43	112.5	2219 E	350 000	370 000	4 500	6 000	3 400	4 000
	200	45	121.5	319 E	410 000	385 000	3 800	6 000	3 000	3 600
	200	67	121.5	2319 E	565 000	585 000	3 800	5 300	2 600	3 400

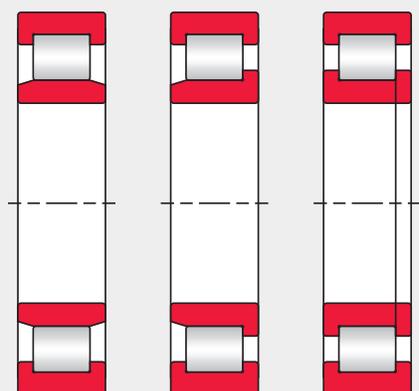
# BEARING DIMENSIONS AND OPERATING VALUES

BORE DIAMETER: 100 - 160 MM



BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
100	180	34	119	220 E	305 000	305 000	4 300	6 300	3 600	4 300
	180	46	119	2220 E	410 000	445 000	4 300	5 600	3 200	3 800
	215	47	127.5	320 E	465 000	425 000	3 600	5 600	2 800	3 400
	215	73	127.5	2320 E	700 000	715 000	3 400	5 000	2 400	3 000
105	190	36	125	221 E	320 000	310 000	4 300	6 000	3 400	4 000
	225	49	133	321 E	525 000	480 000	3 400	5 300	2 600	3 200
110	200	38	132.5	222 E	360 000	365 000	4 000	5 600	3 200	3 800
	200	53	132.5	2222 E	470 000	515 000	4 000	5 000	2 800	3 400
	240	50	143	322 E	555 000	525 000	3 200	5 000	2 600	3 000
	240	80	143	2322 E	830 000	880 000	3 000	4 500	2 200	2 800
120	215	40	143.5	224 E	410 000	420 000	3 600	5 300	3 000	3 400
	215	58	143.5	2224 E	555 000	620 000	3 600	4 800	2 600	3 200
	260	55	154	324 E	650 000	610 000	2 800	4 800	2 200	2 800
	260	86	154	2324 E	975 000	1 030 000	2 600	4 300	2 000	2 600

Refer to the table on Page 5 for the availability of NSKHPS cylindrical roller bearings by cage type and size



NU

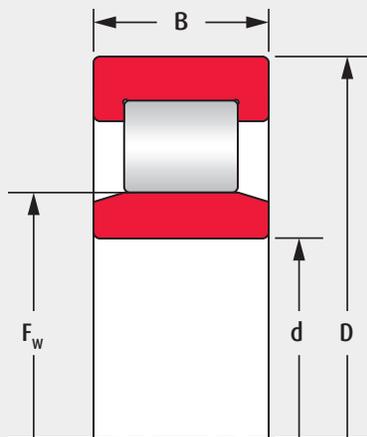
NJ

NUP

BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
130	230	40	153.5	226 E	445 000	455 000	3 400	5 000	2 600	3 200
	230	64	153.5	2226 E	650 000	735 000	3 400	4 500	2 400	3 000
	280	58	167	326 E	760 000	735 000	2 600	4 300	2 200	2 600
	280	93	167	2326 E	1 130 000	1 230 000	2 400	3 800	1 900	2 400
140	250	42	169	228 E	485 000	515 000	3 200	4 500	2 400	3 000
	250	68	169	2228 E	675 000	790 000	3 200	4 000	2 200	2 800
	300	62	180	328 E	815 000	795 000	2 400	4 000	2 000	2 400
	300	102	180	2328 E	1 250 000	1 380 000	2 200	2 600	1 700	2 200
150	270	45	182	230 E	550 000	595 000	2 800	4 300	2 200	2 800
	270	73	182	2230 E	780 000	930 000	2 800	3 800	2 000	2 600
	320	65	193	330 E	930 000	920 000	2 200	3 800	1 800	2 200
	320	108	193	2330 E	1 430 000	1 600 000	2 000	2 400	1 600	2 000
160	290	48	195	232 E	615 000	665 000	2 600	4 000	2 200	2 600
	290	80	193	2232 E	995 000	1 190 000	2 400	3 600	1 900	2 400
	340	68	204	332 E	1 060 000	1 050 000	1 900	3 600	1 700	2 000
	340	114	204	2332 E	1 610 000	1 820 000	1 800	2 400	1 500	1 900

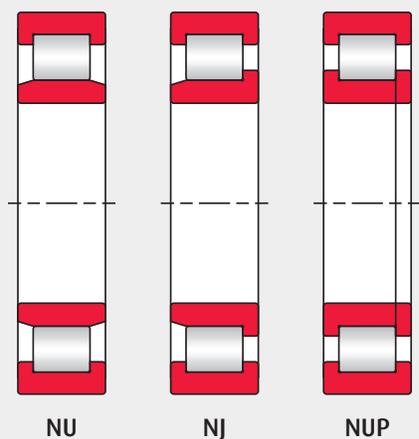
# BEARING DIMENSIONS AND OPERATING VALUES

BORE DIAMETER: 170 - 220 MM



BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
<b>170</b>	310	52	207	<b>234 E</b>	740 000	800 000	2 400	3 800	2 000	2 400
	310	86	205	<b>2234 E</b>	1 140 000	1 330 000	2 200	3 200	1 800	2 200
	360	72	218	<b>334 E</b>	1 140 000	1 150 000	1 800	3 400	1 600	2 000
	360	120	216	<b>2334 E</b>	1 830 000	2 070 000	1 600	2 200	1 400	1 800
<b>180</b>	320	52	217	<b>236 E</b>	770 000	850 000	2 200	3 600	1 900	2 200
	320	86	215	<b>2236 E</b>	1 240 000	1 510 000	2 000	3 200	1 700	2 000
	380	75	231	<b>336 E</b>	1 210 000	1 230 000	1 700	2 800	1 500	1 800
	380	126	227	<b>2336 E</b>	1 920 000	2 220 000	1 500	2 000	1 300	1 700
<b>190</b>	340	55	230	<b>238 E</b>	855 000	955 000	2 000	3 400	1 800	2 200
	340	92	228	<b>2238 E</b>	1 360 000	1 670 000	1 900	3 000	1 600	2 000
	400	78	245	<b>338 E</b>	1 300 000	1 340 000	1 600	2 600	1 400	1 700
	400	132	240	<b>2338 E</b>	2 170 000	2 520 000	1 400	2 000	1 300	1 600

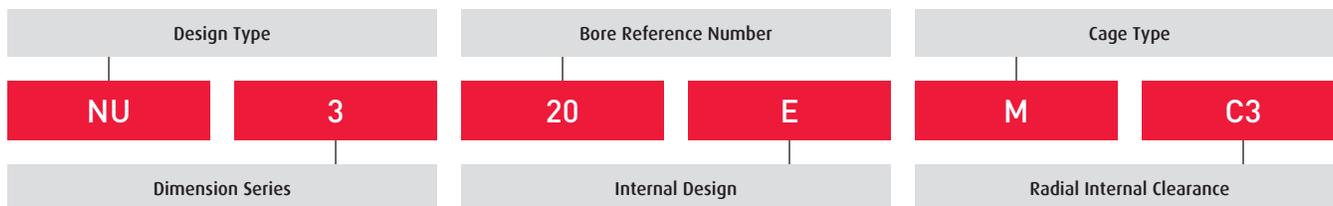
Refer to the table on **Page 5** for the availability of NSKHPS cylindrical roller bearings by cage type and size



BOUNDARY DIMENSIONS				BASIC BEARING No.	BASIC LOAD RATINGS		SPEED RATINGS, min <sup>-1</sup>			
mm					N		Thermal Reference	Limiting Speed		
d	D	B	F <sub>w</sub>		Dynamic	Static		Mechanical	Grease	Oil
200	360	58	243	240 E	945 000	1 060 000	1 900	3 200	1 700	2 000
	360	98	241	2240 E	1 500 000	1 870 000	1 800	2 200	1 500	1 800
	420	80	258	340 E	1 400 000	1 450 000	1 500	2 600	1 300	1 600
	420	138	253	2340 E	2 350 000	2 760 000	1 300	1 900	1 200	1 500
220	400	65	268	244 E	1 110 000	1 250 000	1 700		1 500	1 800

# DESIGNATION SYSTEM AFTERMARKET

## NSKHPS CYLINDRICAL ROLLER BEARINGS



DESIGNATION	ATTRIBUTE	
Design type	NU	no inner ring rib
	NJ	single inner ring rib
	NUP	single inner ring rib + locating ring
Dimension series	2	light duty type
	22	light duty type, wide
	3	medium duty type
	23	medium duty type, wide
Bore reference number		multiply x 5 for bearing bore diameter in millimeters
Internal design	E	high capacity design

DESIGNATION	ATTRIBUTE	
Cage type	M	machined brass
	T	polyamide resin
	W	pressed steel
	T7	L-PPS resin
Radial internal clearance	blank	normal clearance (CN)
	C3	greater than normal clearance
	C4	greater than C3 clearance

**NSK**



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