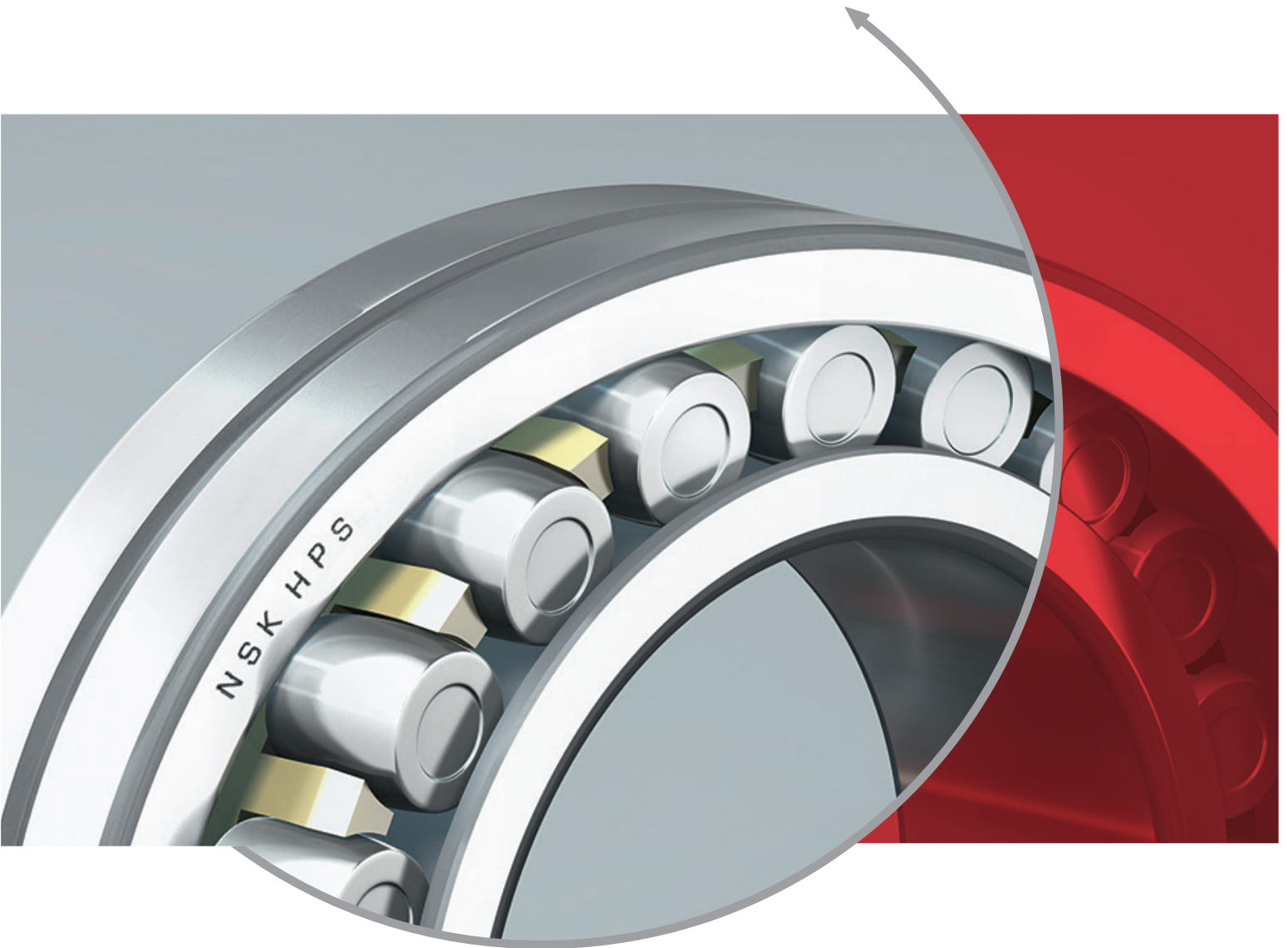




HPS™ SPHERICAL ROLLER BEARINGS



The High Performance Standard
in Operational Reliability.

HIGH LOADS. HIGH TEMPERATURES. **LONGER OPERATING LIFE.**

The complete scope of NSK design, material and manufacturing technologies have been applied to our HPS™ Spherical Roller Bearings, establishing a high performance standard for load capacities, limiting speeds and operating life across an expanded range of series and sizes. In addition to delivering dramatically improved reliability and reduced maintenance across a vast array of industrial applications, HPS™ Spherical Roller Bearings enable cost-efficiency in machinery and equipment downsizing as a result of their inherent operating capabilities.



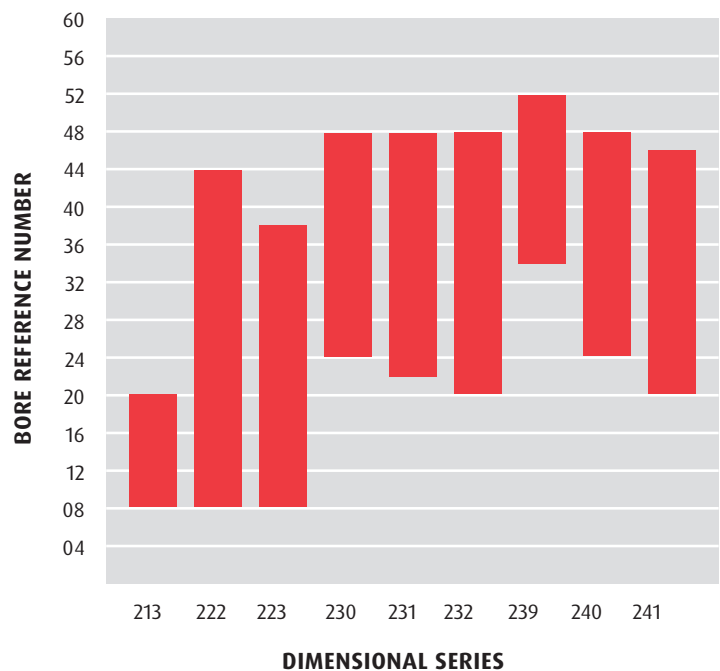
DESIGN FEATURES

- Manufactured from high strength, high-cleanliness Z-steel for greater fatigue strength
- Advanced raceway surface finishing for durability and wear resistance
- Optimized internal design to deliver the greatest performance from roller and cage geometry
- Available with high strength pressed steel (EA) or machined brass (CAM) cage
- High temperature dimensional stability up to 200° C
- Wide range of availability from 40 to 260 mm bore diameter

OPERATING BENEFITS

- As much as twice the operating life of conventional designs
- Up to 20% higher limiting speed
- Dynamic load rating as much as 43% higher
- Greater operational reliability with increased productivity and reduced maintenance costs
- High capacity performance enables cost-efficiency through bearing downsizing

RANGE OF AVAILABILITY



CAGE DESIGNS

NSK cage designs for HPS™ Spherical Roller Bearings promote stable and accurate roller guidance with reduced friction through high speeds and misalignments as well as high strength and wear resistance through high loads and punishing operating conditions.

EA - high strength steel cage with wear-resistant surface treatment (Fig. 1)

CAM - one piece machined brass cage (Fig. 2)

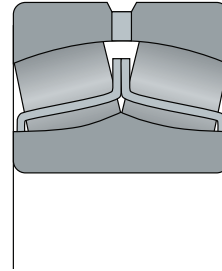


Fig. 1 - EA cage

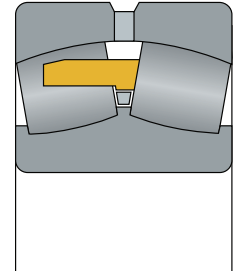


Fig. 2 - CAM cage

DESIGN SPECIFICATIONS

DIMENSIONAL SERIES	213, 222, 223, 230, 231, 232, 239, 240, 241
BORE DIAMETER	40 to 260 mm
CAGE	Pressed Steel (EA), Machined Brass (CAM)
BORE TYPE	Cylindrical, 1:12 Tapered (K)
LUBRICATION FEATURES	Outer Ring Groove and Holes (E4)
INTERNAL CLEARANCE	C2, CN, C3, C4
HEAT TREATMENT	S11, dimensional stability to 200° C
OPERATING CONDITIONS	High loads, high speeds, high temperature, misalignment



NOMENCLATURE STRUCTURE

223	24	EA	K	E4	C3
DIMENSIONAL SERIES	BORE REFERENCE NO.	CAGE OPTIONS	BORE TYPE	LUBRICATION FEATURES	INTERNAL CLEARANCE
	Multiply by five for bearing bore diameter in mm	EA: High Capacity Steel CAM: One Piece Machined Brass Cage	Blank: Cylindrical Bore K: 1:12 Tapered Bore	E4: Groove and Holes, Outer Ring	C2: Tight Blank: Normal C3: > Normal Clearance C4: > C3 Clearance

HPS™ SPHERICAL ROLLER BEARINGS

Bearing Dimension and Operating Data: Bore Diameter 40 – 140mm



Basic Bearing No.	Cage Design		Basic Bearing Dimensions			Basic Load Ratings				Limiting Speeds	
	Steel	Brass	mm			(lbf)		(N)		(RPM)	
			d	D	B	Dynamic	Static	Dynamic	Static	Grease	Oil
21308	•		40	90	23	26 500	25 000	118 000	111 000	6 000	7 500
22208	•		40	80	23	27 800	22 300	113 000	99 500	6 700	8 500
22308	•		40	90	33	38 000	34 500	170 000	153 000	5 300	6 700
21309	•		45	100	25	33 500	32 500	149 000	144 000	5 000	6 300
22209	•		45	85	23	26 500	25 000	118 000	111 000	6 000	7 500
22309	•		45	100	36	46 500	44 000	207 000	195 000	4 500	5 600
21310	•		50	110	27	40 000	39 000	178 000	174 000	4 500	5 600
22210	•		50	90	23	27 800	26 700	124 000	119 000	5 600	7 100
22310	•		50	110	40	55 500	52 500	246 000	234 000	4 300	5 300
21311	•		55	120	29	40 000	39 000	178 000	174 000	4 500	5 600
22211	•		55	100	25	33 500	32 500	149 000	144 000	5 300	6 700
22311	•		55	120	43	65 500	65 500	292 000	292 000	3 800	4 800
21312	•		60	130	31	53 500	55 000	238 000	244 000	3 800	4 800
22212	•		60	110	28	40 000	39 000	178 000	174 000	4 800	6 000
22312	•		60	130	46	76 000	77 000	340 000	340 000	3 600	4 500
21313	•		65	140	33	59 500	61 500	264 000	275 000	3 600	4 500
22213	•		65	120	31	49 500	52 000	221 000	230 000	4 300	5 300
22313	•		65	140	48	84 000	85 500	375 000	380 000	3 200	4 000
21314	•		70	150	35	70 000	73 500	310 000	325 000	3 200	4 000
22214	•		70	125	31	50 500	52 000	225 000	232 000	4 000	5 300
22314	•		70	150	51	95 500	97 500	425 000	435 000	3 000	3 800
21315	•		75	160	37	70 000	73 500	310 000	325 000	3 200	4 000
22215	•		75	130	31	53 500	55 000	238 000	244 000	4 000	5 000
22315	•		75	160	55	109 000	113 000	485 000	505 000	2 800	3 600

Available with cylindrical or tapered bore (suffix K), with standard and alternative internal clearance (C2, C3, C4).

Basic Bearing	Cage Design		Basic Bearing Dimensions			Basic Load Ratings				Limiting Speeds	
	No.	Steel	Brass	mm			(lbf)		(N)		(RPM)
				d	D	B	Dynamic	Static	Dynamic	Static	Grease
21316	•		80	170	39	80 000	84 000	355 000	375 000	3 000	3 800
22216	•		80	140	33	59 500	61 500	264 000	275 000	3 600	4 500
22316	•		80	170	58	122 000	128 000	540 000	565 000	2 600	3 400
21317	•		85	180	41	81 000	88 500	360 000	395 000	3 000	4 000
22217	•		85	150	36	70 000	73 500	310 000	325 000	3 400	4 300
22317	•		85	180	60	134 000	141 000	600 000	630 000	2 400	3 200
21318	•		90	190	43	93 000	101 000	415 000	450 000	2 800	3 600
22218	•		90	160	40	81 000	88 500	360 000	395 000	3 200	4 000
22318	•		90	190	64	150 000	158 000	665 000	705 000	2 400	3 000
21319		•	95	200	45	96 700	98 000	430 000	435 000	1 500	2 000
22219	•		95	170	43	93 000	101 000	415 000	450 000	3 000	3 800
22319	•		95	200	67	165 000	175 000	735 000	780 000	2 200	2 800
21320		•	100	215	47	111 300	109 000	495 000	485 000	1 400	1 900
22220	•		100	180	46	102 000	110 000	455 000	490 000	2 800	3 600
22320	•		100	215	73	194 000	209 000	860 000	930 000	2 000	2 600
23220	•	•	100	180	60.3	118 000	135 000	525 000	605 000	1 600	2 200
21322		•	110	240	50	127 000	123 000	565 000	545 000	1 300	1 700
22222	•		110	200	53	136 000	145 000	605 000	645 000	2 600	3 200
22322	•		110	240	80	231 000	253 000	1 030 000	1 120 000	1 900	2 400
23122		•	110	180	56	107 900	141 000	480 000	630 000	1 600	2 000
23222		•	110	200	69.8	145 000	171 000	645 000	760 000	1 500	1 900
24122		•	110	180	69	129 300	168 000	575 000	750 000	1 600	2 000
22224	•		120	215	58	154 000	172 000	685 000	765 000	2 400	3 000
22324	•		120	260	86	268 000	296 000	1 190 000	1 320 000	1 700	2 200
23024		•	120	180	46	88 800	118 000	395 000	525 000	1 800	2 200
23124		•	120	200	62	130 400	162 000	580 000	720 000	1 400	1 800
23224		•	120	215	76	177 600	218 000	790 000	970 000	1 300	1 700
24024		•	120	180	60	107 900	158 000	480 000	705 000	1 500	2 000
24124		•	120	200	80	156 200	213 000	695 000	950 000	1 400	1 800
22226	•		130	230	64	184 000	211 000	820 000	940 000	2 200	2 600
22326		•	130	280	93	278 800	305 000	1 240 000	1 350 000	1 300	1 600
23026		•	130	200	52	112 400	148 000	500 000	655 000	1 700	2 000
23126		•	130	210	64	141 600	186 000	630 000	825 000	1 300	1 700
23226		•	130	230	80	196 700	243 000	875 000	1 080 000	1 200	1 600
24026		•	130	200	69	139 400	194 000	620 000	865 000	1 400	1 800
24126		•	130	210	80	165 200	228 000	735 000	1 010 000	1 300	1 700
22228		•	140	250	68	187 700	213 000	835 000	930 000	1 400	1 700
22328		•	140	300	102	326 000	360 000	1 450 000	1 590 000	1 200	1 500
23028		•	140	210	53	118 000	161 000	525 000	715 000	1 600	1 900
23128		•	140	225	68	163 000	212 000	725 000	945 000	1 200	1 600
23228		•	140	250	88	233 800	292 000	1 040 000	1 300 000	1 100	1 500
24028		•	140	210	69	142 800	213 000	635 000	945 000	1 300	1 700
24128		•	140	225	85	187 700	261 000	835 000	1 160 000	1 200	1 600

HPS™ SPHERICAL ROLLER BEARINGS

Bearing Dimension and Operating Data: Bore Diameter 150 – 260mm



Basic Bearing No.	Cage Design		Basic Bearing Dimensions			Basic Load Ratings				Limiting Speeds	
	Steel	Brass	mm			(lbf)		(N)		(RPM)	
			d	D	B	Dynamic	Static	Dynamic	Static	Grease	Oil
22230		•	150	270	73	214 700	252 000	955 000	1 120 000	1 300	1 600
22330		•	150	320	108	344 000	380 000	1 530 000	1 690 000	1 100	1 400
23030		•	150	225	56	132 600	183 000	590 000	815 000	1 400	1 800
23130		•	150	250	80	203 500	266 000	905 000	1 180 000	1 100	1 400
23230		•	150	270	96	274 300	350 000	1 220 000	1 560 000	1 100	1 400
24030		•	150	225	75	166 400	245 000	740 000	1 090 000	1 200	1 500
24130		•	150	250	100	240 500	345 000	1 070 000	1 530 000	1 100	1 400
22232		•	160	290	80	256 300	297 000	1 140 000	1 320 000	1 200	1 500
22332		•	160	340	114	382 200	425 000	1 700 000	1 900 000	1 100	1 300
23032		•	160	240	60	151 700	215 000	675 000	955 000	1 300	1 700
23132		•	160	270	86	240 500	315 000	1 070 000	1 400 000	1 000	1 300
23232		•	160	290	104	308 000	395 000	1 370 000	1 770 000	1 000	1 300
23932		•	160	220	45	101 200	152 000	450 000	675 000	1 400	1 800
24032		•	160	240	80	190 000	283 000	845 000	1 260 000	1 100	1 400
24132		•	160	270	109	278 800	395 000	1 240 000	1 760 000	1 000	1 300
22234		•	170	310	86	278 800	335 000	1 240 000	1 500 000	1 100	1 400
22334		•	170	360	120	442 900	475 000	1 970 000	2 110 000	1 000	1 200
23034		•	170	260	67	178 700	246 000	795 000	1 090 000	1 200	1 600
23134		•	170	280	88	265 300	355 000	1 180 000	1 570 000	1 000	1 300
23234		•	170	310	110	337 200	430 000	1 500 000	1 910 000	900	1 200
23934		•	170	230	45	98 900	148 000	440 000	660 000	1 300	1 700
24034		•	170	260	90	231 600	340 000	1 030 000	1 520 000	1 000	1 300
24134		•	170	280	109	287 800	420 000	1 280 000	1 860 000	1 000	1 300

Available with cylindrical or tapered bore (suffix K), with standard and alternative internal clearance (C2, C3, C4).

Basic Bearing	Cage Design		Basic Bearing Dimensions			Basic Load Ratings				Limiting Speeds	
			mm			(lbf)		(N)		(RPM)	
No.	Steel	Brass	d	D	B	Dynamic	Static	Dynamic	Static	Grease	Oil
22236		•	180	320	86	287 800	345 000	1 280 000	1 540 000	1 100	1 300
22336		•	180	380	126	487 800	525 000	2 170 000	2 340 000	950	1 200
23036		•	180	280	74	210 200	285 000	935 000	1 270 000	1 200	1 400
23136		•	180	300	96	296 700	395 000	1 320 000	1 760 000	900	1 200
23236		•	180	320	112	364 200	475 000	1 620 000	2 110 000	850	1 100
23936		•	180	250	52	132 600	200 000	590 000	890 000	1 200	1 600
24036		•	180	280	100	272 000	395 000	1 210 000	1 750 000	950	1 200
24136		•	180	300	118	335 000	460 000	1 490 000	2 040 000	900	1 200
22238		•	190	340	92	319 200	390 000	1 420 000	1 730 000	1 000	1 200
22338		•	190	400	132	532 800	580 000	2 370 000	2 590 000	900	1 100
23038		•	190	290	75	218 100	305 000	970 000	1 350 000	1 100	1 400
23138		•	190	320	104	332 700	455 000	1 480 000	2 020 000	850	1 100
23238		•	190	340	120	404 700	530 000	1 800 000	2 350 000	800	1 100
23938		•	190	260	52	119 400	197 000	530 000	875 000	1 200	1 500
24038		•	190	290	100	274 300	415 000	1 220 000	1 840 000	900	1 200
24138		•	190	320	128	366 400	525 000	1 630 000	2 330 000	850	1 100
22240		•	200	360	98	364 200	450 000	1 620 000	2 010 000	950	1 200
23040		•	200	310	82	265 300	385 000	1 180 000	1 700 000	1 000	1 300
23140		•	200	340	112	382 200	525 000	1 700 000	2 330 000	800	1 000
23240		•	200	360	128	465 400	620 000	2 070 000	2 750 000	750	1 000
23940		•	200	280	60	159 600	239 000	710 000	1 060 000	1 100	1 400
24040		•	200	310	109	296 000	475 000	1 315 000	2 120 000	850	1 100
24140		•	200	340	140	440 600	600 000	1 960 000	2 670 000	800	1 000
22244		•	220	400	108	440 600	545 000	1 960 000	2 430 000	850	1 000
23044		•	220	340	90	305 700	445 000	1 360 000	1 980 000	950	1 200
23144		•	220	370	120	440 600	610 000	1 960 000	2 710 000	710	950
23244		•	220	400	144	566 500	765 000	2 520 000	3 400 000	670	900
23944		•	220	300	60	176 500	278 000	785 000	1 240 000	1 000	1 300
24044		•	220	340	118	368 700	585 000	1 640 000	2 600 000	750	1 000
24144		•	220	370	150	505 800	720 000	2 250 000	3 200 000	710	950
23048		•	240	360	92	326 000	480 000	1 450 000	2 140 000	850	1 100
23148		•	240	400	128	501 300	700 000	2 230 000	3 100 000	670	850
23948		•	240	320	60	178 700	292 000	795 000	1 300 000	950	1 200
24048		•	240	360	118	388 900	615 000	1 730 000	2 730 000	710	950
24148		•	240	400	160	598 000	850 000	2 660 000	3 800 000	670	850
23952		•	260	360	75	263 000	420 000	1 170 000	1 870 000	850	1 000

APPLICATIONS

- Blowers and fans
- Construction machinery
- Conveyors
- Cranes and hoists
- Extruders and granulators
- Gears and drives
- Industrial generators
- Metal mill machinery
- Mining equipment
- Oil field equipment
- Paper making machinery
- Pump and compressors
- Wind turbine



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