

NSK

EXTRA-CAPACITY ECA SPHERICAL ROLLER BEARINGS

A NEW STANDARD IN HIGH PERFORMANCE





FIELD-PROVEN TO OUTPERFORM AND OUTLAST

Extreme heavy and impact loads in steelmaking, mining and construction. Extreme speeds and high heat in papermaking. Extreme reliability where and when unexpected machine and equipment downtime is intolerable.

For the spherical roller bearings employed in industry's most challenging applications, the expectations are invariably demanding: to run harder, to run faster, to run longer. And to transcend being mere load bearing components to being performance enhancers - mitigating maintenance and operating costs, improving throughput and profitability.

Decisively.

That distinction is achieved by better manufacturing processes, better material technology, better design fundamentals.

That distinction is NSKHPS Spherical Roller Bearings.

A NEW STANDARD IN HIGH PERFORMANCE

NSKHPS Spherical Roller Bearings are the synthesis of NSK technologies, with material engineering, tribology, mechanical design and advanced manufacturing fully engaged to significantly outperform and outlast conventional designs.

With our new extra-capacity ECA spherical roller bearings, NSK has redefined our high-performance standards to deliver unrivaled machinery and equipment performance with:

- ➔ **Newly optimized internal design** and an advanced roller-guided cage that eliminates the need for a center guide ring
- ➔ **Higher load capacities** derived from a larger complement of larger-sized rollers
- ➔ **Higher limiting speeds** are achievable, even greater than comparable steel cage designs



DESIGN FEATURES AND PERFORMANCE CHARACTERISTICS

Boasting a newly optimized internal design and advanced NSK technologies, ECA Spherical Roller Bearings deliver a new level of performance, capacity, speed and reliability across all applications.

DESIGN FEATURES

- › Manufactured with high-purity steel for superior fatigue strength
- › Next-generation, roller-guided machined brass cage eliminates the need for a center guide ring and reduces sliding friction and wear
- › Optimized internal design packs in more rollers of larger size for a significant increase in load capacity and bearing fatigue life
- › Advanced raceway surface finish for improved lubrication characteristics and wear resistance
- › With outer ring lubricating groove and holes
- › High-temperature dimensional stability in working temperatures as great as 200°C



DYNAMIC LOAD RATING

increased by as much as

47%



STATIC LOAD RATING

increased by as much as

22%

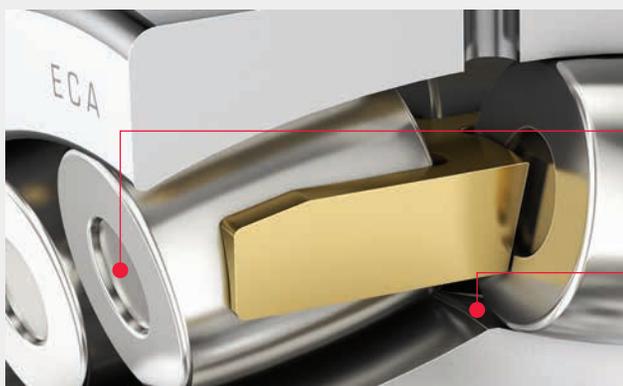


LIMITING SPEED

increased by as much as

44%*

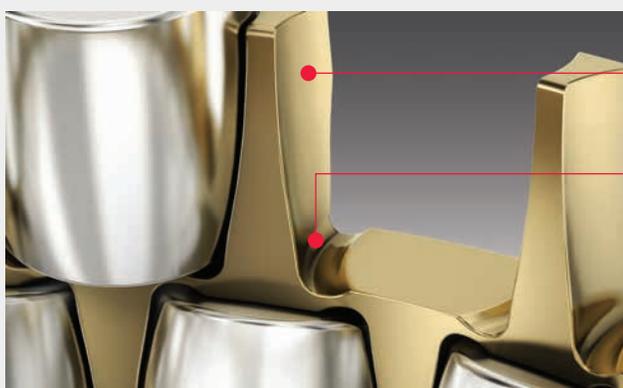
* using grease lubrication



OPTIMIZED INTERNAL DESIGN

➔ **Significantly higher load capacity**
with increased size and quantity of rollers packed into each roller row

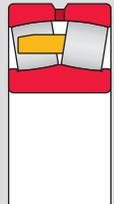
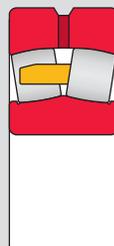
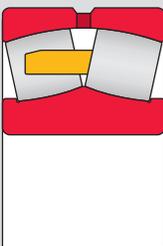
➔ **Optimized cage geometry**
eliminates the need for a center guide ring and reduces sliding friction and wear



➔ **Controlled roller motion**
with precision "roller hugging" cage pocket contour

➔ **Reduced cage stress**
with a design that balances form fitting shape with uncompromised cage bar strength in maximum stress zones

Range of availability: dimension series, diameters and design features

			Bore diameter range	ranging from 40 to 130 mm; refer to pages 8/9
			Bore types	cylindrical bore; 1:12 tapered bore
			Clearances	all standard clearance types: C2, C-normal, C3, C4, C5
			Vibrating equipment specification (series 223)	special internal clearance - set at upper 2/3 relative to standard; special dimensional tolerances - set at 1/2 relative to normal
222	213	223		



UNSHAKABLE PERFORMANCE IN VIBRATING SCREENS

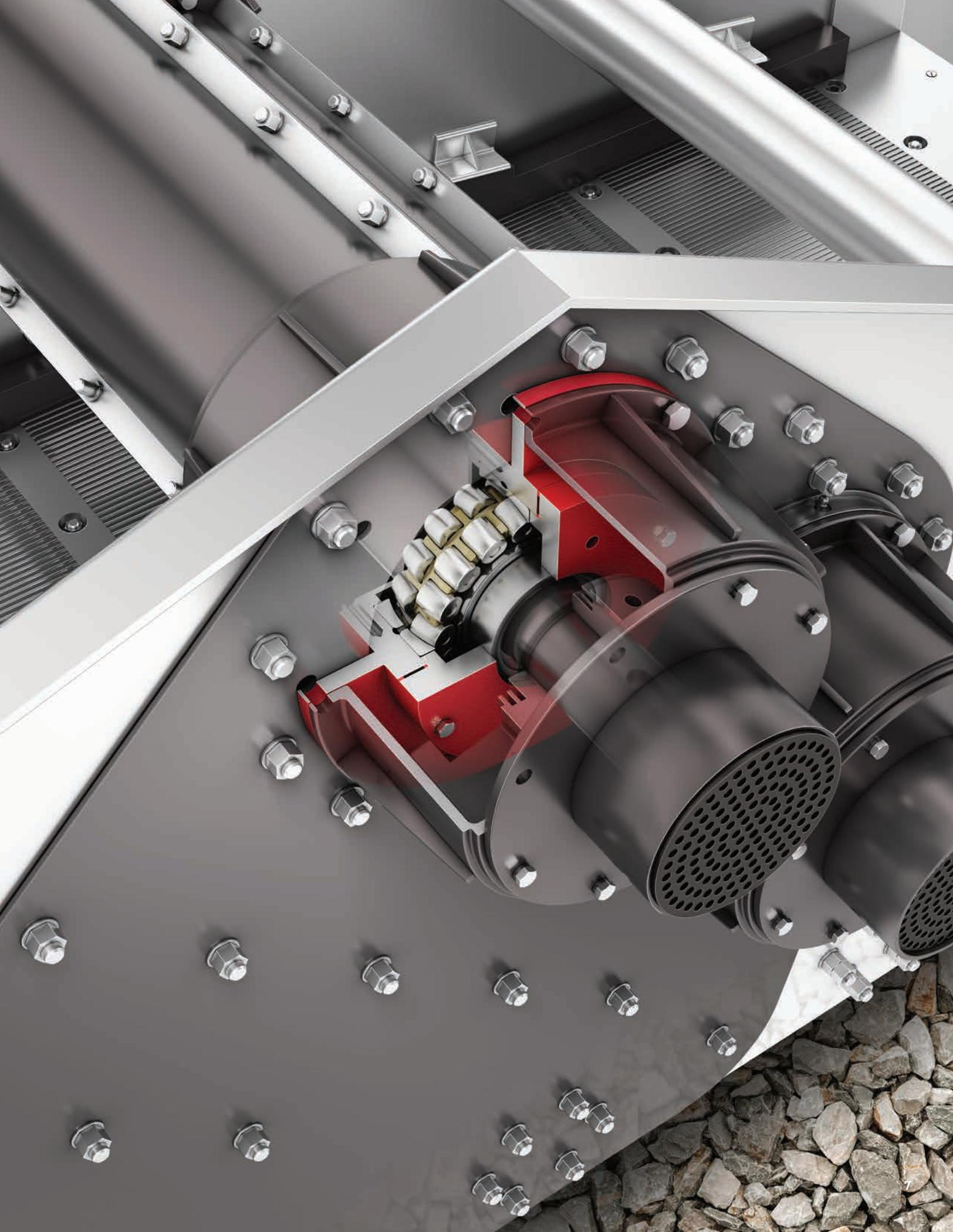
Punishing loads. Radial acceleration. Relentless vibration and mechanical shock. NSK's ECA-VS spherical roller bearings are engineered specifically — and ideally — to contend with the severity of vibrating machinery and equipment applications with stabilized load distribution and robust performance to deliver long-life operating benefits including:

- ➔ **Superior resistance to heavy loads and shock loads**
- ➔ **Smooth running** with superior roller guidance and controlled roller skew
- ➔ **High-speed performance** with low operating temperature rise
- ➔ **Reduced bearing damage** from slippage, surface fatigue and flaking
- ➔ **Higher operational reliability** with reduced incidents and maintenance costs

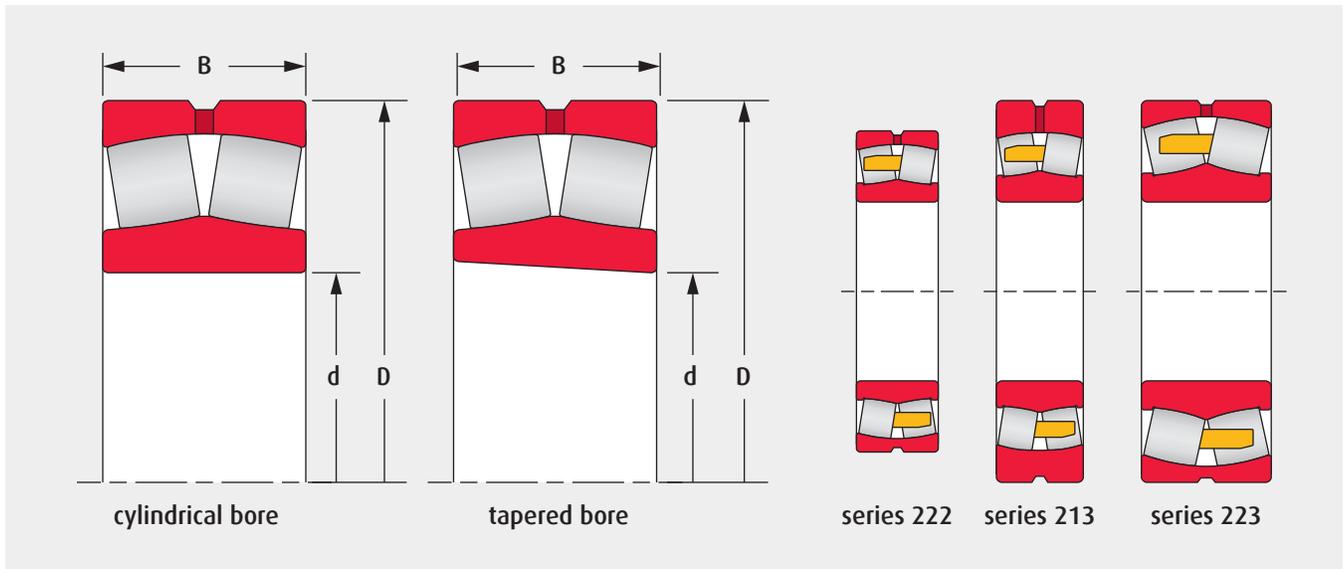


Higher dynamic and static load ratings:

From left - the spherical roller of NSK's new extra-capacity 22320ECA spherical roller bearing versus NSK's previous design



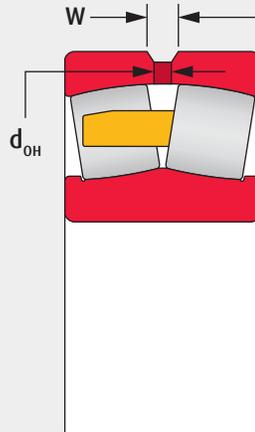
BEARING DIMENSIONS AND OPERATING VALUES



BOUNDARY DIMENSIONS			BASIC BEARING NO.		BASIC LOAD RATINGS		SPEEDS r/min					
mm					kN		Thermal Reference	Limiting Speed				
d	D	B	Cylindrical Bore	Tapered Bore	Dynamic	Static		Mechanical	Grease			
40	80	23	22208ECAME4	22208ECAMKE4	108	93	7 100	13 000	6 700			
	90	33	22308ECAME4	22308ECAMKE4	161	142				5 600	9 600	5 300
45	85	23	22209ECAME4	22209ECAMKE4	113	105	6 300	12 000	6 000			
	100	36	22309ECAME4	22309ECAMKE4	197	182				5 000	8 400	4 500
50	90	23	22210ECAME4	22210ECAMKE4	119	113	6 000	11 000	5 600			
	110	40	22310ECAME4	22310ECAMKE4	233	219				4 800	8 000	4 300
55	100	25	22211ECAME4	22211ECAMKE4	143	136	5 300	11 000	5 300			
	120	43	22311ECAME4	22311ECAMKE4	278	274				4 300	7 100	3 800
60	110	28	22212ECAME4	22212ECAMKE4	171	165	5 300	9 500	4 800			
	130	46	22312ECAME4	22312ECAMKE4	320	320				4 000	6 200	3 600
65	120	31	22213ECAME4	22213ECAMKE4	212	219	4 800	8 500	4 300			
	140	48	22313ECAME4	22313ECAMKE4	375	380				3 800	6 100	3 200
70	125	31	22214ECAME4	22214ECAMKE4	216	220	4 500	8 000	4 000			
	150	51	22314ECAME4	22314ECAMKE4	425	435				3 600	5 500	3 000
75	130	31	22215ECAME4	22215ECAMKE4	229	232	4 300	8 000	4 000			
	160	55	22315ECAME4	22315ECAMKE4	485	505				3 400	5 200	2 800
80	140	33	22216ECAME4	22216ECAMKE4	264	275	4 000	7 100	3 600			
	170	39	21316ECAME4	21316ECAMKE4	355	375				3 800	6 000	3 000
	170	58	22316ECAME4	22316ECAMKE4	540	565				3 200	4 600	2 600

Dimensions of Oil Grooves and Holes (mm)

NOMINAL BEARING WIDTH		OIL GROOVE WIDTH	OIL HOLE DIAMETER
B			
Over	Incl.	W	d_{OH}
18	30	5	2.5
30	40	6	3
40	50	7	4
50	65	8	5
65	80	10	6
80	100	12	8



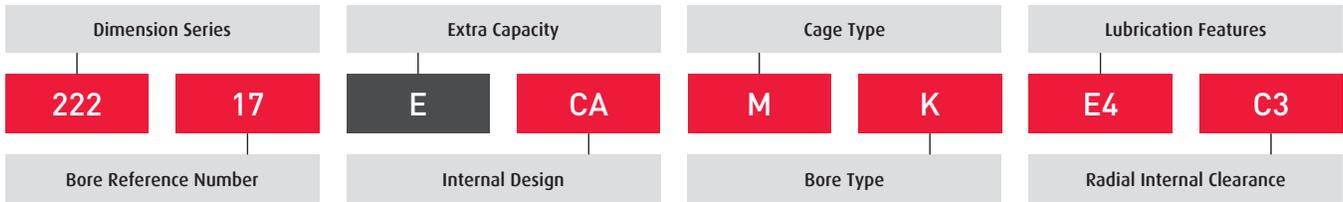
Number of Oil Holes

NOMINAL BEARING O.D.		NUMBER OF HOLES
D		
Over	Incl.	
—	180	4
180	250	6
250	315	6

BOUNDARY DIMENSIONS			BASIC BEARING NO.		BASIC LOAD RATINGS		SPEEDS r/min		
mm							Dynamic	Static	Thermal Reference
d	D	B	Cylindrical Bore	Tapered Bore					
85	150	36	22217ECAME4	22217ECAMKE4	310	325	4 000	6 700	3 400
	180	60	22317ECAME4	22317ECAMKE4	600	630	3 000	4 500	2 400
90	160	40	22218ECAME4	22218ECAMKE4	360	395	3 800	6 000	3 200
	190	43	21318ECAME4	21318ECAMKE4	415	450	3 600	5 300	2 800
	190	64	22318ECAME4	22318ECAMKE4	665	705	2 800	4 300	2 400
95	170	43	22219ECAME4	22219ECAMKE4	415	450	3 800	5 600	3 000
	200	67	22319ECAME4	22319ECAMKE4	735	780	2 600	4 000	2 200
100	180	46	22220ECAME4	22220ECAMKE4	455	490	3 600	5 300	2 800
	215	73	22320ECAME4	22320ECAMKE4	860	930	2 400	4 000	2 000
110	200	53	22222ECAME4	22222ECAMKE4	605	645	3 400	4 800	2 600
	240	80	22322ECAME4	22322ECAMKE4	1 030	1 120	2 200	3 600	1 900
120	215	58	22224ECAME4	22224ECAMKE4	685	765	3 200	4 500	2 400
	260	86	22324ECAME4	22324ECAMKE4	1 190	1 320	1 900	3 400	1 700
130	230	64	22226ECAME4	22226ECAMKE4	820	940	2 800	4 000	2 200

DESIGNATION SYSTEM

EXTRA-CAPACITY ECA SPHERICAL ROLLER BEARINGS



DESIGNATION	ATTRIBUTE	
Dimension series	213	extra-heavy duty type
	222	medium duty type
	223	heavy duty type
Bore reference number		multiply x 5 for bore diameter in millimeters
Extra capacity	E	optimized cage and rollers
Internal design	CA	high capacity design
Cage type	M	machined brass cage
Bore type	blank	cylindrical bore
	K	1:12 tapered bore
Lubrication features	E4	lubrication groove and holes in the outer ring

DESIGNATION	ATTRIBUTE	
Radial internal clearance	C2	tight clearance
	blank	normal clearance (CN)
	C3	greater than normal clearance
	C4	greater than C3 clearance
	C5	greater than C4 clearance
	-VS3	special C3 clearance range and special accuracy for vibrating equipment
	-VS4	special C4 clearance range and special accuracy for vibrating equipment

NSK



NSK AMERICAS

UNITED STATES

NSK Corporation
Ann Arbor MI
1.888.446.5675

CANADA

NSK Canada Inc.
Brampton ON
1.905.890.9740

MEXICO

NSK Rodamientos Mexicana,
S.A. de C.V.
Silao Guanajuato MX
52.472.500.9500

BRAZIL

NSK Brasil Ltda.
Suzano SP
55.11.4744.2500

ARGENTINA

NSK Argentina SRL
Buenos Aires
54.11.4704.5100

LATIN AMERICA

NSK Latin America Inc.
Miramar FL
1.305.477.0605

Website: www.nsk.com/am-en
NSK Global: www.nsk.com

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