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 measure of differentiation is achieved by better manufacturing processes, better material technology, better design fundamentals.

That differentiation 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

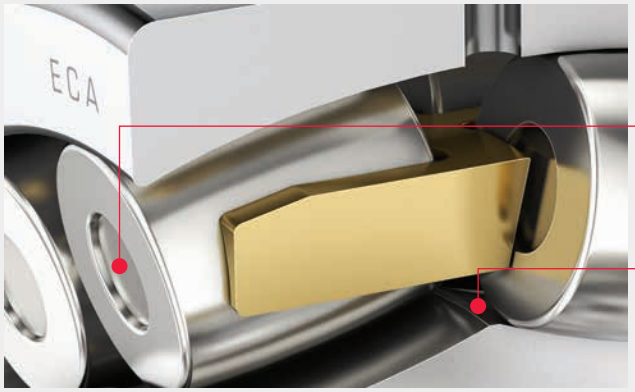
Boasting a newly optimized internal design and advanced NSK technologies, ECA Spherical Roller Bearings deliver a new level of performance, capacity, speed and reliability across all applications.

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	STATIC LOAD RATING	LIMITING SPEED
increased by as much as **47%**	increased by as much as **22%**	increased by as much as **44%***

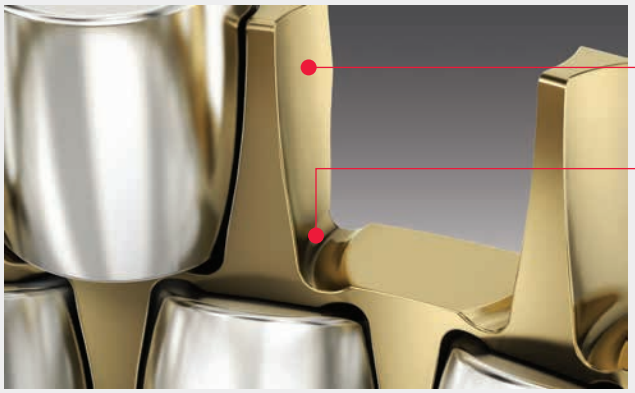
* using grease lubrication



OPTIMIZED INTERNAL DESIGN

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

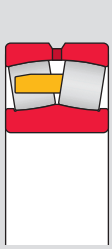
Optimized cage geometry
eliminates the need for a center guide ring and reduces sliding friction and wear



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



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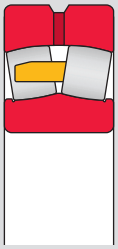

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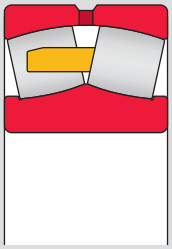

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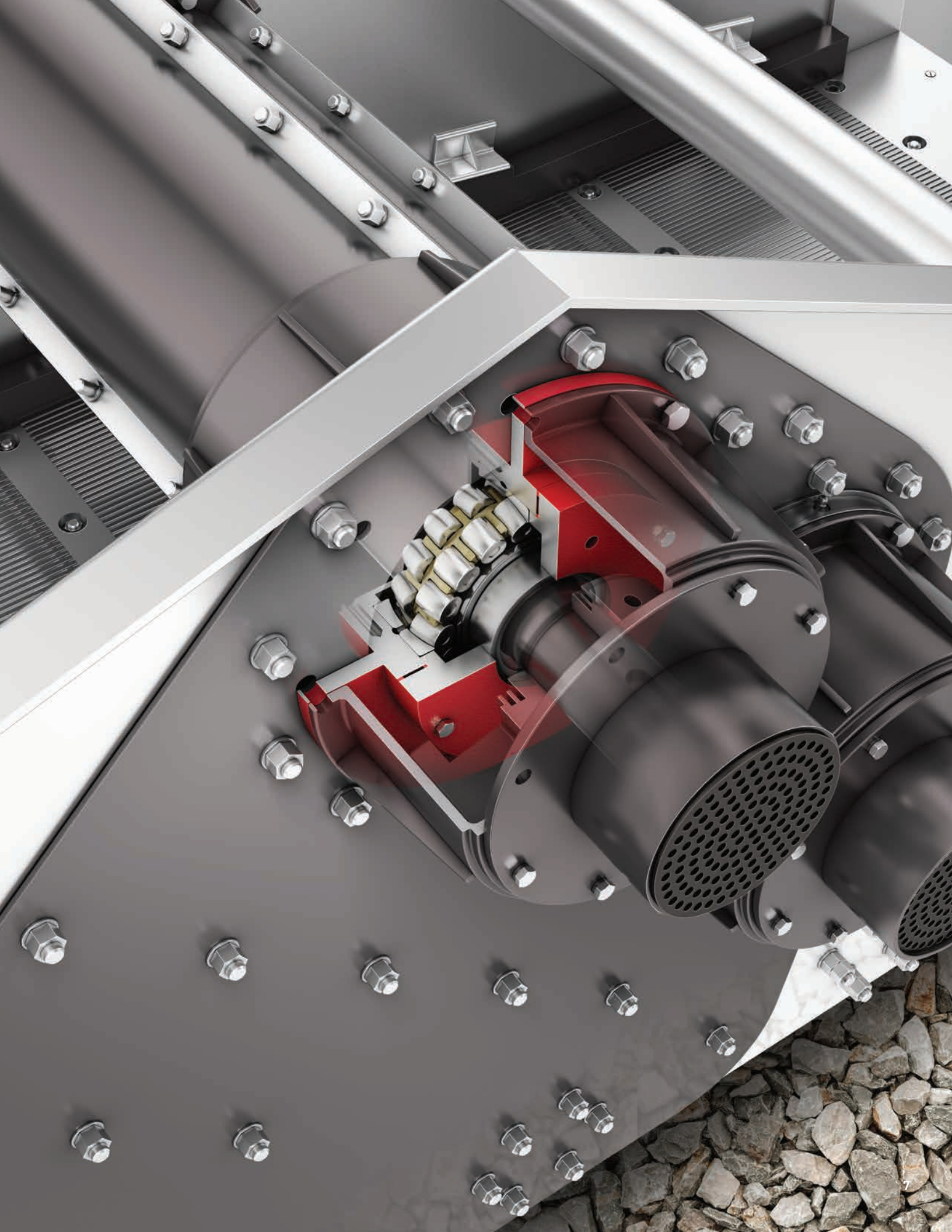
Bore diameter range	ranging from 40 to 130 mm; refer to pages 8/9
Bore types	cylindrical bore; 1:12 tapered bore
Clearances	all standard clearance types: C2, C-normal, C3, C4, C5
Vibrating equipment specification (series 223)	special internal clearance - set at upper 2/3 relative to standard; special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

UNSHAKABLE PERFORMANCE IN VIBRATING SCREENS

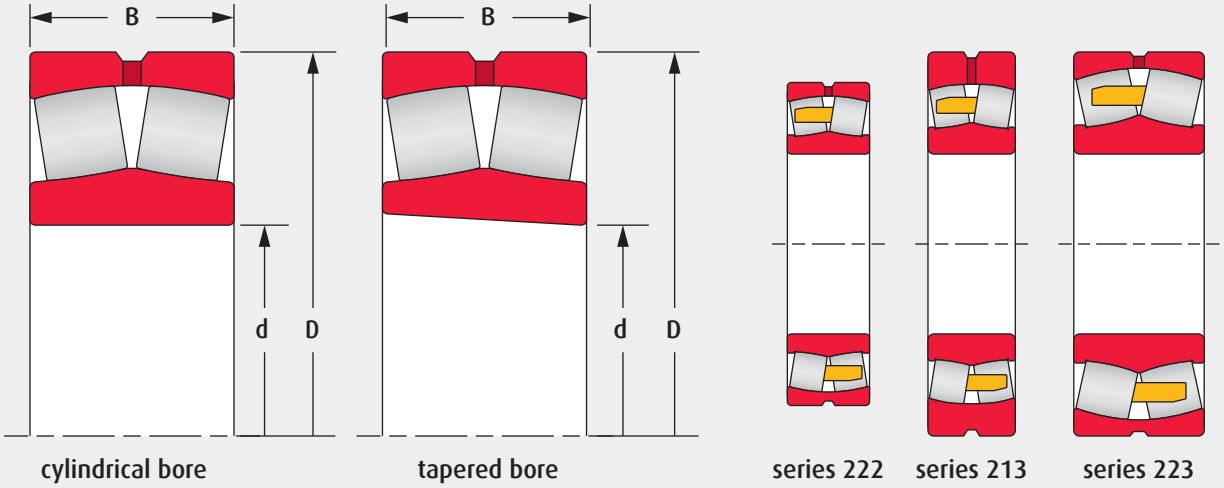
Punishing loads. Radial acceleration. Relentless vibration and mechanical shock. NSK's ECA-VS spherical roller bearings are engineered specifically - and ideally - to contend with the severity of vibrating machinery and equipment applications with stabilized load distribution and robust performance to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

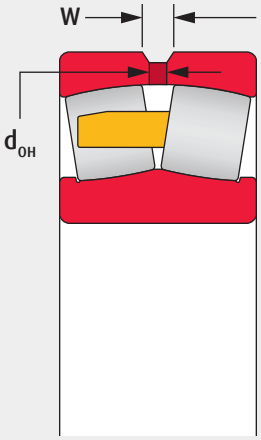


cylindrical bore tapered bore series 222 series 213 series 223

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 B		OIL GROOVE WIDTH	OIL HOLE DIAMETER
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



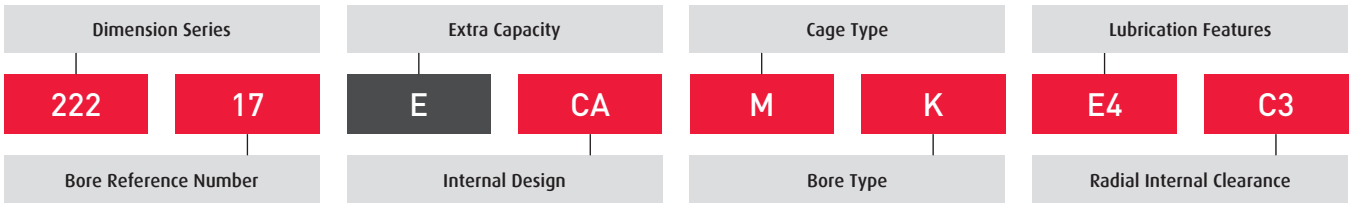
Number of Oil Holes

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

BOUNDARY DIMENSIONS mm			BASIC BEARING NO.		BASIC LOAD RATINGS kN		SPEEDS r/min Thermal Reference	Limiting Speed	
d	D	B	Cylindrical Bore	Tapered Bore	Dynamic	Static		Mechanical	Grease
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

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