

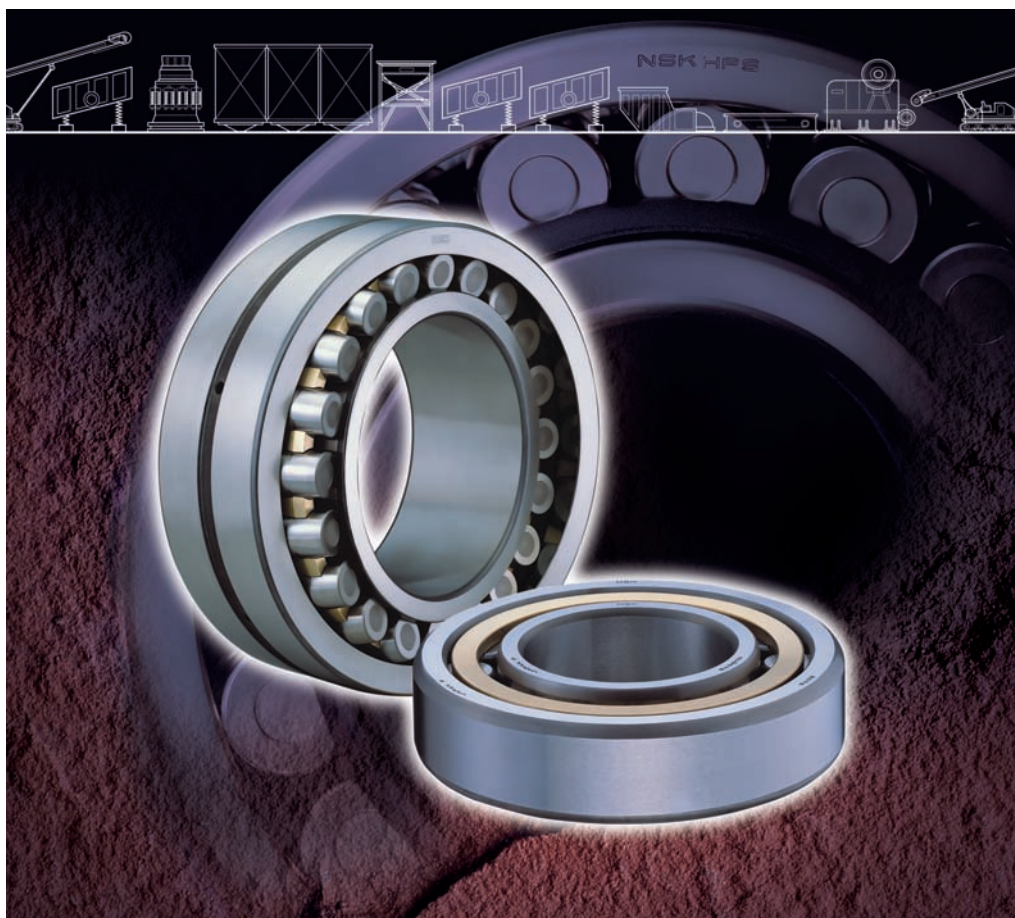
Bearings for Mining Machinery

Tough bearings that offer longer service life under demanding mining conditions thanks to NSK's wealth of outstanding technologies.

Bearing Tables

CA-VS3 and CA-VS4 Series Super Long-Life Spherical Roller Bearings for Vibrating Equipment D 046

EMM-VS Series Cylindrical Roller Bearings for Vibrating Equipment D 047



Air Turbine
Dental
Handpieces

Pumps &
Compressors

Agricultural
Machinery

Construction
Machinery

**Mining
Machinery**

Railway
Rolling Stock

Papermaking
Machines

Wind Power
Industry

Steel Industry

**INDUSTRY
SOLUTIONS**

Air Turbine
Dental
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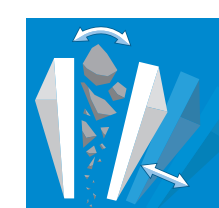
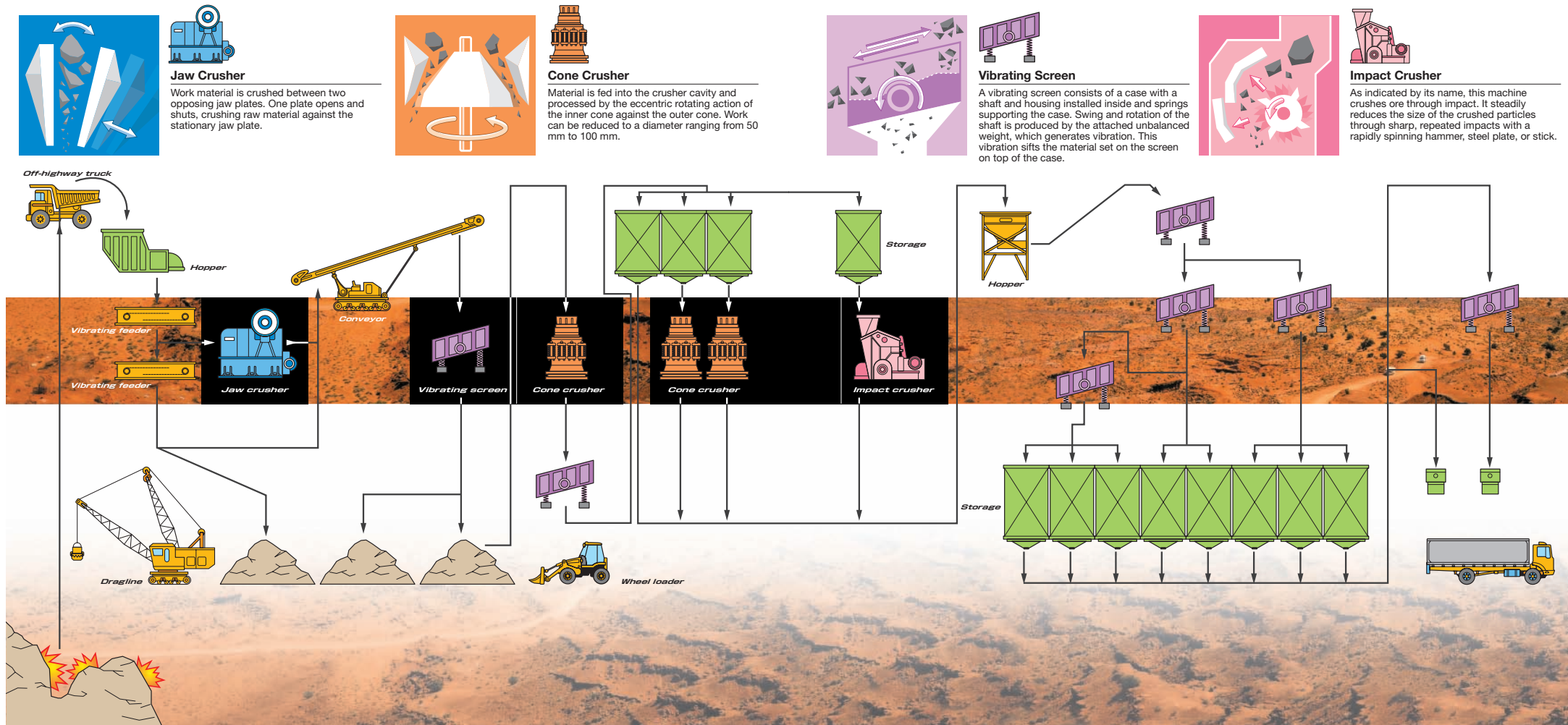
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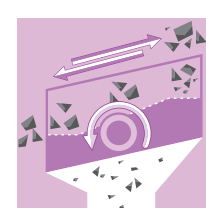
Bearings for Mining Machinery



Jaw Crusher
Work material is crushed between two opposing jaw plates. One plate opens and shuts, crushing raw material against the stationary jaw plate.



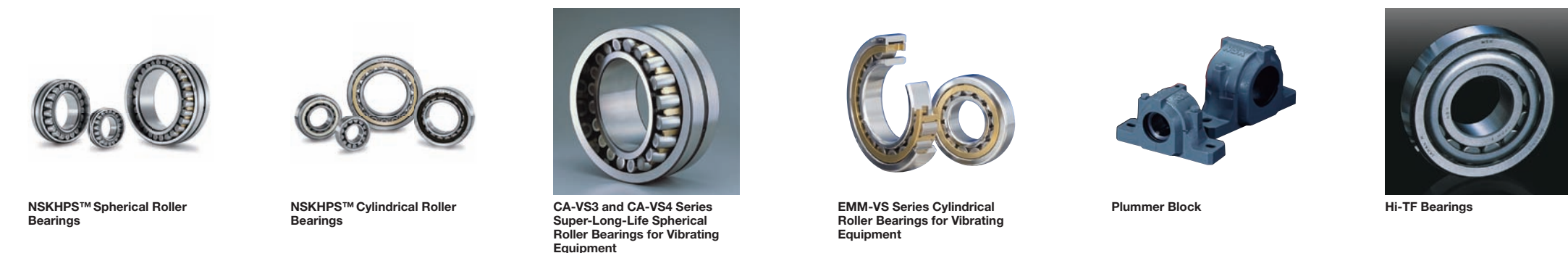
Cone Crusher
Material is fed into the crusher cavity and processed by the eccentric rotating action of the inner cone against the outer cone. Work can be reduced to a diameter ranging from 50 mm to 100 mm.



Vibrating Screen
A vibrating screen consists of a case with a shaft and housing installed inside and springs supporting the case. Swing and rotation of the shaft is produced by the attached unbalanced weight, which generates vibration. This vibration sifts the material set on the screen on top of the case.



Impact Crusher
As indicated by its name, this machine crushes ore through impact. It steadily reduces the size of the crushed particles through sharp, repeated impacts with a rapidly spinning hammer, steel plate, or stick.



NSKHPS™ Spherical Roller Bearings

NSKHPS™ Cylindrical Roller Bearings

CA-VS3 and CA-VS4 Series Super-Long-Life Spherical Roller Bearings for Vibrating Equipment

EMM-VS Series Cylindrical Roller Bearings for Vibrating Equipment

Plummer Block

Hi-TF Bearings

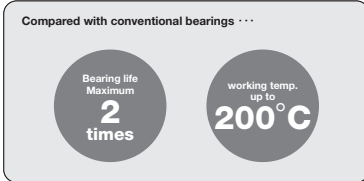
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■ Bearings for Mining Machinery

NSKHPS™ Spherical Roller Bearings

Features Compared to conventional bearings:

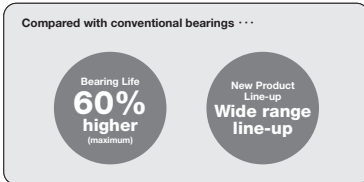


1. Improved reliability
Bearing life has increased by a maximum of 2 times compared with that of conventional bearings by the optimization of the bearing's internal design and improvement of processing technology.

2. High-temperature dimensional stabilizing treatment as standard
NSK's proprietary heat treatment technology enables high-temperature dimensional stabilization up to 200 °C.

NSKHPS™ Cylindrical Roller Bearings

Features Compared to conventional bearings:



1. Improved reliability
Bearing life is up to 60% longer compared to conventional bearings thanks to optimization of the bearing's internal design and improvement of processing technology.

2. Wide product lineup
NSK offers NSKHPS bearings with four types of cages featuring a range of sizes for a high degree of versatility across general-purpose applications:

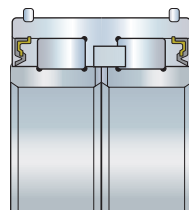
- Pressed-steel cage with high cost-performance
- Highly reliable machined-brass cage
- Polyamide-resin cage with excellent heat and chemical resistance

Full Complement Cylindrical Roller Bearings for Crane Sheaves

These cylindrical roller bearings incorporate seals to prevent the entry of foreign matter.

Features

- Improved seals: Contact seals increase resistance to entry of foreign matter or water.
- High load capacity: Larger radial load and axial load capacity compared to conventional sheave bearings.
- Corrosion resistance: Phosphate surface treatment improves resistance to rust.
- Easier grease replenishment: Sealed bearing includes inner ring holes to facilitate grease replenishment.
- Fewer mounted components: With snap rings for the outer ring, fewer components are required around the bearing, making for a more cost-effective sheave.



CA-VS Series Spherical Roller Bearings

Standard-sized CA Series bearings feature a machined brass cage and tough, wear-resistant capabilities ideal for heavy or shock load applications. NSK offers U15 and VS units specifically for vibrating screens, feeders, and other vibrating applications.

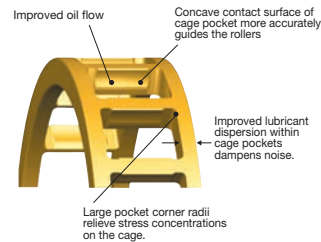
Features

- Highly resistant to heavy or shock loads.
- Long service life for vibrating applications.
- Excellent self-aligning ability.
- Preventive measures against shaft deflection.
- Easy installation



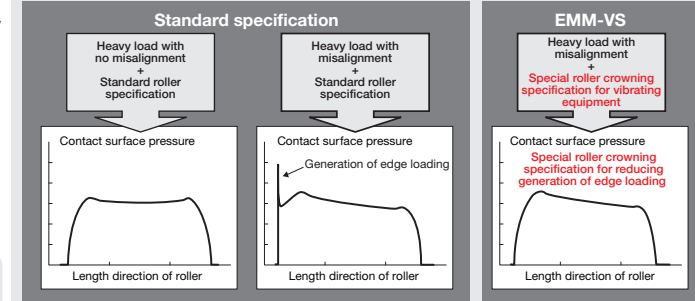
EMM-VS Series Cylindrical Roller Bearings for Vibrating Equipment

EMM Series: Outer Ring Guided Machined-Brass Cage



- Machined-brass cage (High strength, wear-resistant cage)
- Outer ring guided one-piece cage

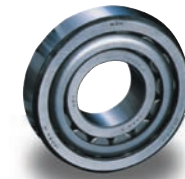
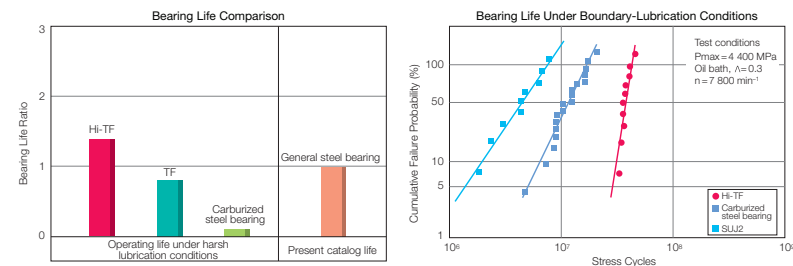
■ Analysis of roller surface pressure



Hi-TF Bearings

Bearings manufactured from NSK's Hi-TF material have been specifically designed for outstanding toughness under harsh operating conditions, surpassing even NSK's earlier TF bearings. Hi-TF bearings incorporate this new material and a new heat-treatment technology to provide long service life under contaminated lubrication conditions with superior resistance to wear, seizure, and heat. Hi-TF bearings meet the rigorous requirements of bearings now and into the future.

Features Achieves longer bearing life even under harsh conditions with excellent resistance to wear, seizure, and heat



Plummer Blocks

Plummer block housings can be used with high-capacity spherical roller bearings or self-aligning ball bearings. They are manufactured from high-strength cast iron as standard but are also available in cast steel or spheroidal graphite cast iron.



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■ Bearings for Mining Machinery

CA-VS3 and CA-VS4 Series Super Long-Life Spherical Roller Bearings for Vibrating Equipment

Example: **223 20 CAM E4 -VS3**

Bearing Series (Bearing type+width series+diameter series)
 Bearing bore (Bore number)
 Cage type
 CAM: High load capacity machined-brass cage

•Bearings for vibrating equipment
 •Special accuracy for vibrating equipment
 •Special internal clearance for vibrating equipment

Outer ring with oil groove and oil hole (external features designation)

Dimensional Tolerance and Radial Internal Clearance

NSK's VS3 and VS4 specifications stabilize load distribution by controlling the internal clearance and dimensional tolerance of the bearing.

- The VS3 and VS4 Series meet U15 specifications (special tolerance for vibrating equipment) for CAVS Series self-aligning spherical roller bearings; however, to simplify the suffix and clarify the difference between the new and conventional Series, suffix U15 is omitted.
- The numbers in VS3 and VS4 (3 and 4) refer to bearing internal clearance "C3U15" and "C4U15."
- The dimensional tolerance of a bearing is set at 1/2 relative to the outer diameter tolerance and internal diameter tolerance.
- The radial internal clearance is set at 2/3 relative to the standard.

Bearing Designation	Basic Load Ratings (kN)		Boundary Dimensions (mm)				Radial Clearance (Cylindrical Bore)		
	C_r	C_{0r}	d (mm)	Diameter Tolerance (μm)	D (mm)	Diameter Tolerance (μm)	B (mm)	VS3(μm)	VS4(μm)
22308CAME4-VS ()	152 000	129 000	40	0	90	-7	33	50 to 60	65 to 80
22309CAME4-VS ()	185 000	167 000	45	0	100	-7	36	60 to 75	85 to 100
22310CAME4-VS ()	232 000	211 000	50	0	110	-7	40		
22311CAME4-VS ()	261 000	241 000	55	0	120	-13	43	75 to 90	100 to 120
22312CAME4-VS ()	305 000	288 000	60	0	130	-13	46		
22313CAME4-VS ()	330 000	315 000	65	0	140	-13	48		
22314CAME4-VS ()	380 000	370 000	70	-9	150	-13	51	90 to 110	120 to 145
22315CAME4-VS ()	425 000	415 000	75	0	160	-18	55		
22316CAME4-VS ()	485 000	480 000	80	0	170	-18	58		
22317CAME4-VS ()	520 000	510 000	85	0	180	-18	60	110 to 135	150 to 180
22318CAME4-VS ()	605 000	595 000	90	0	190	-23	64		
22319CAME4-VS ()	655 000	675 000	95	0	200	-23	67		
22320CAME4-VS ()	750 000	785 000	100	-12	215	-23	73		
22322CAME4-VS ()	925 000	980 000	110	0	240	-23	80	135 to 160	180 to 210
22324CAME4-VS ()	1 060 000	1 120 000	120	0	260	-23	86		
22326CAME4-VS ()	1 240 000	1 350 000	130	0	280	-23	93	160 to 190	205 to 240
22328CAME4-VS ()	1 450 000	1 590 000	140	0	300	-23	102		
22330CAME4-VS ()	1 530 000	1 690 000	150	0	320	-23	108	190 to 220	240 to 280
22332CAME4-VS ()	1 700 000	1 900 000	160	-15	340	-23	114		
22334CAME4-VS ()	1 970 000	2 110 000	170	0	360	-13	120	200 to 240	260 to 310
22336CAME4-VS ()	2 170 000	2 340 000	180	0	380	-28	126		
22338CAME4-VS ()	2 370 000	2 590 000	190	0	400	-18	132	220 to 260	285 to 340

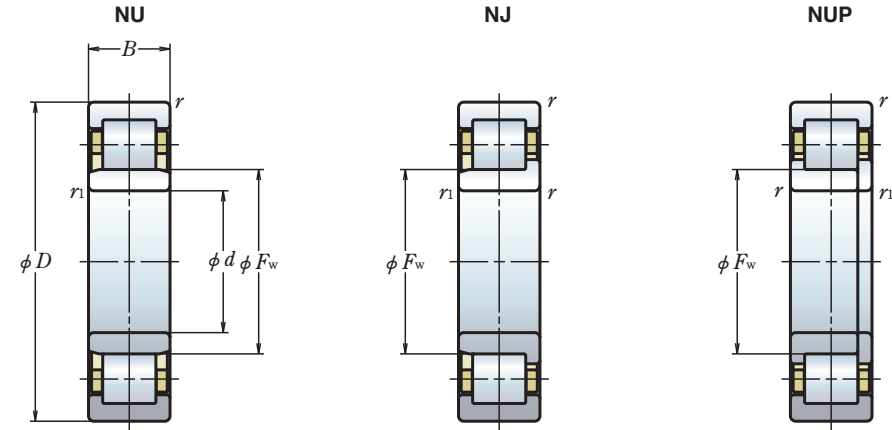
Remark VS (): Replace the parentheses with the appropriate number (3 or 4) when ordering.

EMM-VS Series Cylindrical Roller Bearings for Vibrating Equipment

Example: **NU 23 08 EMM C3(4) -VS**

Bearing Type (NU,NJ,NUP)
 Bearing Series
 Bore Number

EMM-VS : Bearings for Vibrating Equipment
 Internal Radial Clearance



Bearing Designations		Boundary Dimensions (mm)						Basic Load Ratings (N)	
		d	D	B	$r_{min.}$	$r_{1 min.}$	F_w	C_r	C_{0r}
NU2308EMMC3-VS	NU2308EMMC4-VS	40	90	33	1.5	1.5	52	114 000	122 000
NU2309EMMC3-VS	NU2309EMMC4-VS	45	100	36	1.5	1.5	58.5	137 000	153 000
NU2310EMMC3-VS	NU2310EMMC4-VS	50	110	40	2	2	65	163 000	187 000
NU2311EMMC3-VS	NU2311EMMC4-VS	55	120	43	2	2	70.5	201 000	233 000
NU2312EMMC3-VS	NU2312EMMC4-VS	60	130	46	2	2	77	222 000	262 000
NU2313EMMC3-VS	NU2313EMMC4-VS	65	140	48	2.1	2.1	82.5	233 000	265 000
NU2314EMMC3-VS	NU2314EMMC4-VS	70	150	51	2.1	2.1	89	274 000	325 000
NU2315EMMC3-VS	NU2315EMMC4-VS	75	160	55	2.1	2.1	95	330 000	395 000
NU2316EMMC3-VS	NU2316EMMC4-VS	80	170	58	2.1	2.1	101	355 000	430 000
NU2317EMMC3-VS	NU2317EMMC4-VS	85	180	60	3	3	108	395 000	485 000
NU2318EMMC3-VS	NU2318EMMC4-VS	90	190	64	3	3	113.5	435 000	535 000
NU2319EMMC3-VS	NU2319EMMC4-VS	95	200	67	3	3	121.5	460 000	585 000
NU2320EMMC3-VS	NU2320EMMC4-VS	100	215	73	3	3	127.5	570 000	715 000
NU2322EMMC3-VS	NU2322EMMC4-VS	110	240	80	3	3	143	675 000	880 000
NU2324EMMC3-VS	NU2324EMMC4-VS	120	260	86	3	3	154	795 000	1 030 000