

Steel Mill Application Spherical Bearings



Spherical roller bearings differ from other bearing types where the outer raceway is spherical, blanketing 2 rows of barrel shaped rollers and the inner ring is ground into two separate raceways with a guiding center rib. This type of bearing is forgiving of misalignment up to about 0.5 for ordinary loads and 2.0 for light loads. These bearings have a large capacity for radial loads and combination radial/thrust loads. Spherical roller bearings are ideal where shock and vibration loads are present.

There are several types of spherical roller bearing designs. The NTN standard type B design has asymmetrical rollers, which push the roller in to the center inner rib. This allows for quieter, smoother running bearings with low heat generation, which can be used in higher speed applications. Type C design is common in the industry, and is NTN's standard design for small sizes. The 213 series is a special design type, having a separate outer-raceway guided ring to separate the rows of rollers. The E design is considered state of the art: the number and size of the rollers is optimized to provide maximum load capacity for a given size bearing. Machined bronze cages are the most popular used in steel mill application bearings (only a high temperature plastic cage is standard with the E type design). For some applications, a standard pressed steel cage can be used. All spherical roller bearing types would be found in steel mill applications.

All size ranges are common in the steel mill industry. Casting machines for reinforcing bars or small sections use sizes as small as 22205. In some process lines, sizes of 23056 or larger are not uncommon. The 222 and 223 series in bore size ranges 15 to 24 will be most common. Most of the bearings for use in mounted units are supplied with the tapered (K) bore.

FEATURES & BENEFITS

high radial load capacity

high combination load capacity

vibration and shock resistance

state of the art design

machined bronze cage available

Typical Steel Mill Application Spherical Bearing Specifications



Type	Standard type (B type)	C type	213 type	E type
Construction				
Bearing series	Does not include C type	Series 222, 223, & 213 w/ bore dia. ≤ 50 mm; series 24024 - 24038.	Series 213 with bore dia. of 50 mm or more	Series 22211 to 22218
Rollers	Asymmetrical	Symmetrical	Asymmetrical	Symmetrical
Roller guide method	Unified inner ring center rib	Separable guide ring between rows on inner raceway	Separable guide ring between rows on outer raceway	High precision cage
Cage type	Pressed Cage; machined cage	Pressed Cage	Machined cage	Molded resin cage

Typical applications for spherical roller bearings that may be seen in steel mills:

- ✓ casting machine rolls
- ✓ continuous process line rolls
- ✓ work rolls for beam and bar mills
- ✓ roll-out tables
- ✓ gear boxes
- ✓ overhead cranes

Spherical Bearings		TS3	-	2	3	0	34	B	L1	K	D1	C3
Basic #	Prefix	←										
	Product Series	←										
	Width	←										
	Diameter	←										
	Bore Size	←										
	Internal Design	←										
	Cage	←										
	Bore Type	←										
	Lubrication	←										
	Radial Clearance	←										

Note: NTN also manufactures sealed spherical roller bearings. Contact NTN for more information.

Prefix

TS2—160C (320F)
 TS3—200C (392F)
 TS4—250C (482F)
 No code—Standard, 120C (250F)

Bore Size

34X5=170mm bore size

Internal Design

B—Asymmetrical rollers
 C—Symmetrical rollers
 E—Max. capacity symmetrical (plastic cage only)

Cage

L1—Machined bronze
 No code—Pressed steel

Bore Type

K—Tapered bore ratio 1:12
 K30—Tapered bore ratio 1:30
 No code—Cylindrical

Lubrication

If outside diameter is ≥ 320mm, oil hole and groove is standard

Radial Clearance

No code—Standard
 C3—Greater than Standard (most common)
 C4—Greater than C3
 C5—Greater than C4

Ask for NTN Spherical Roller Bearings for your replacement needs!

