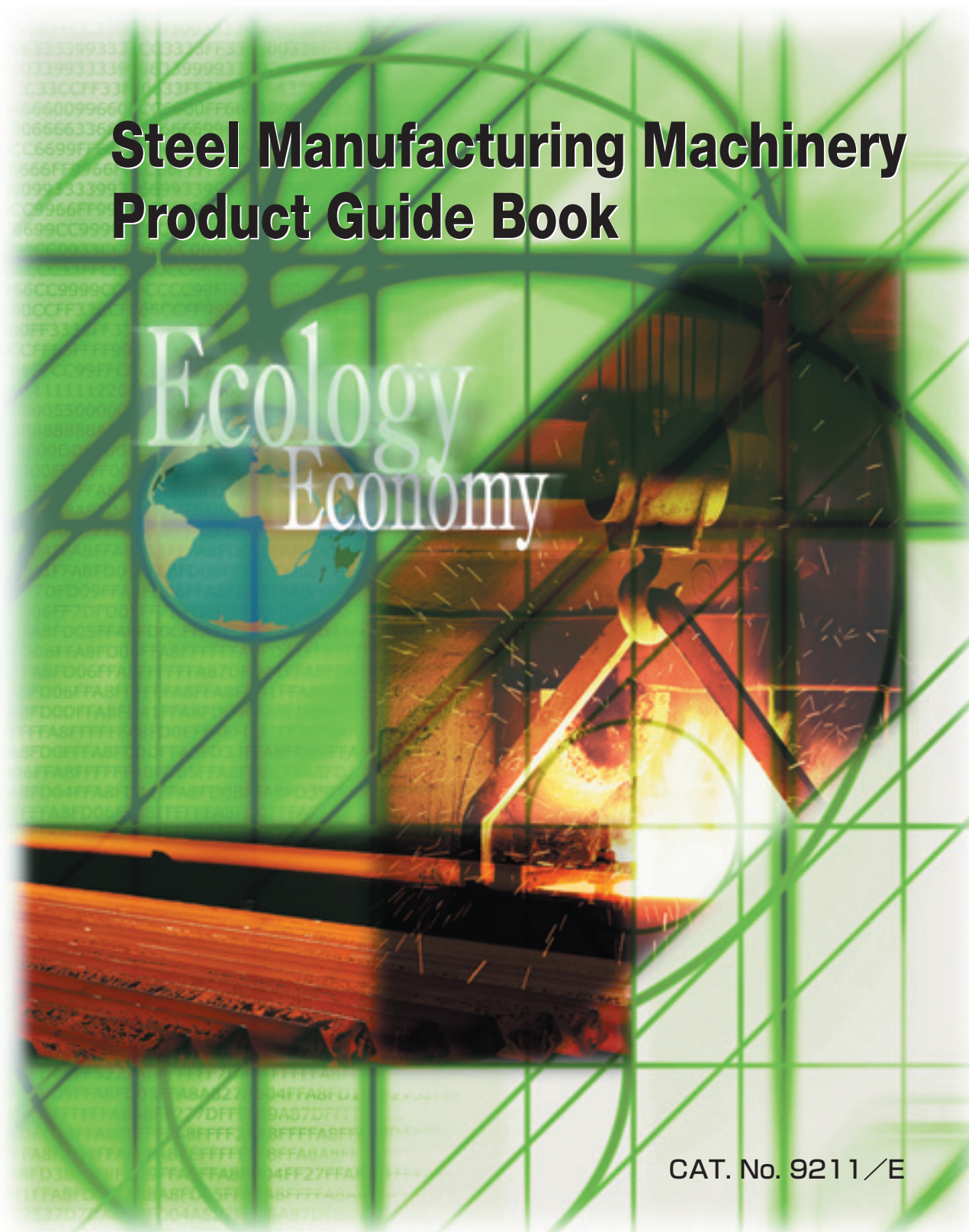


For New Technology Network



Steel Manufacturing Machinery Product Guide Book

Ecology
Economy



CAT. No. 9211 / E

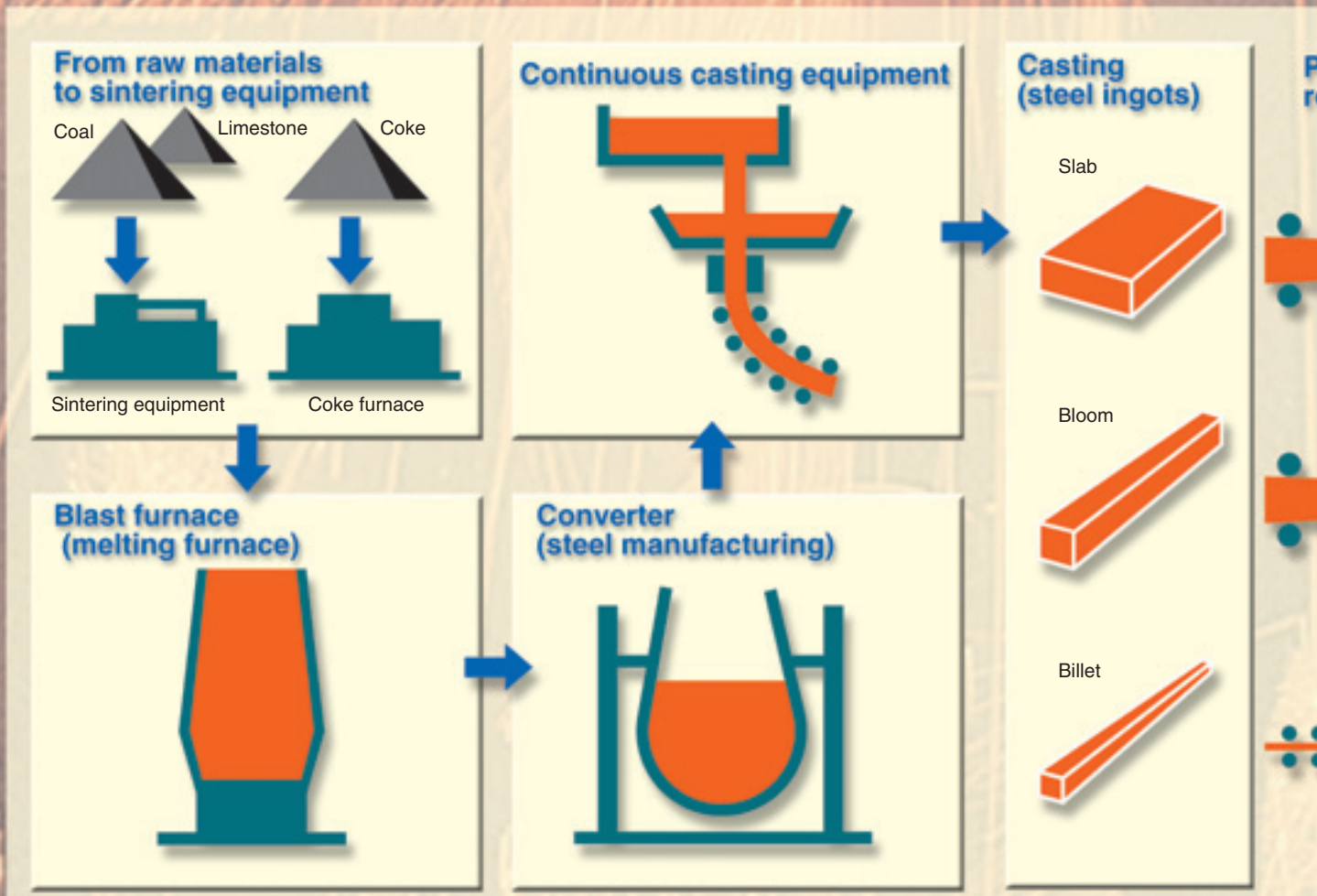
Ecological / Economical proposals from NTN

NTN products exhibit benefits at various locations.

Steel manufacturing equipment is typical of enormous line systems that operate continuously, 24 hours a day. The bearing is one of the machine parts that supports the high-reliability of the system.

NTN is working on the creation of part technologies that realize ecology and economy for various parts of the machine by providing products that offer longer life, longer time between maintenance periods, and are environment-friendly.

Basic steel manufacturing process



C O N T E N T S

— Location and bearing used —

Products made of rolled ingots

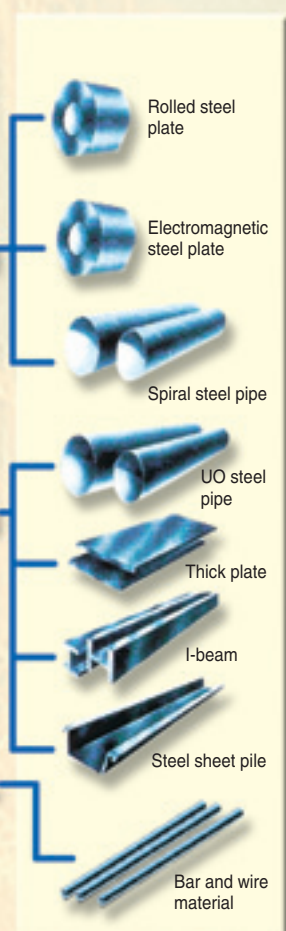
Continuous hot or cold rolling



Thick plate rolling and large rolling



Rolled bar/wire material



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- Constant velocity joint (BC coupling type)
- Tension leveler roll unit

Section 7 Surface treatment

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- Plummer block with solid grease
- Insulation type CVJ
- Constant velocity joint (Large-sized DOJ)



Longer life, longer time between maintenance

● Raw material and sintering conveyor



Effectively prevents penetration of foreign material.

Sealed spherical roller bearings WA type

CAT. NO. 3702/E

Wear cut to 1/20.



● Converter trunnion



Dividing in two shortens time required for changing.

Super large-sized split spherical roller bearings : Double-fractured

CAT. NO. 2250/E

Time required for changing cut to 1/10.

● General equipment



Eliminates need to supply grease.

Constant velocity joint

CAT. NO. 5603/E

periods, environment friendly proposals from NTN.



●Continuous casting equipment

Offers longer life in high temperature environments.

ECO series

Long life spherical roller bearings for high temperature use (LH-Series)

CAT. NO. 3027/E

Thirty times longer life in high temperature environment, 3.5 time longer life at room temperature.



●Surface treatment equipment

Leaks prevented by solid grease.

Bearings with solid grease

CAT. NO. 3022/E

Grease lasts four years.

●Rolling mill



Contributes to longer life of roll neck bearings.

Sealed four row tapered roller bearings
《Large size, long operating life EA bearings》

CAT. NO. 3024/E

Offers three times longer machine life.

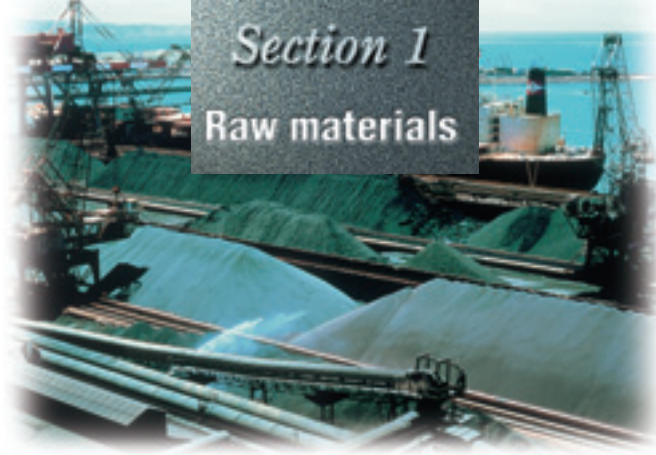
●Surface treatment equipment



Offers both low torque and tight sealing.

Tension leveler roll unit

CAT. NO. 2250/E



Section 1
Raw materials



■ For supporting tube dryer

Super large-sized plummer block CAT. NO. 2250/E

Colossal plummer block is the largest example of NTN manufacturing.
Outer dimensions: 2150 (H) x 2750 (L) x 1100 mm (W)
Weight: 15,200 kg (bearing) 240/1180K30



■ For raw materials conveyor pulley

Plummer block CAT. NO. 2250/E

- Design emphasizes strength; manufactured under the strictest quality control.
- Offers large selection including irregular shapes, flat bottom and labyrinth seal.



After sealed test



After open test

■ For raw materials conveyor pulley

Sealed spherical roller bearings WA type CAT. NO.3702/E

Compact sealed spherical roller bearings offer longer lasting grease lubrication and longer time between maintenance inspections in environments exposed to excessive dust.

- Effectively prevents penetration of foreign matter.
- Can be mounted on standard plummer blocks.
- Seal design enables grease to be added.

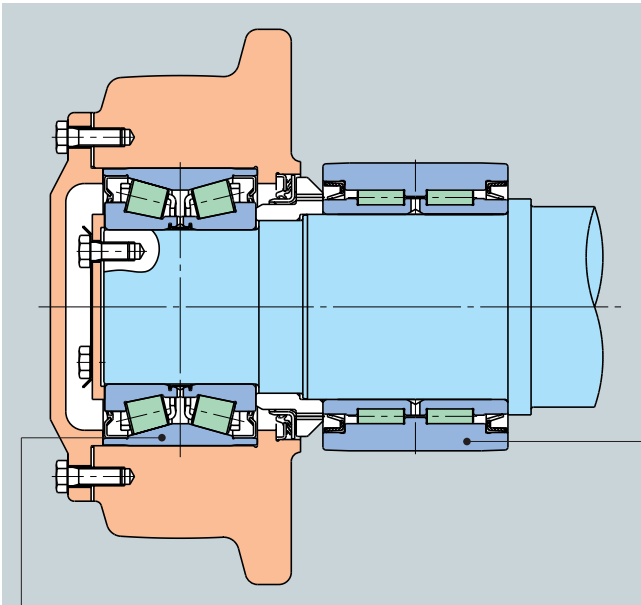
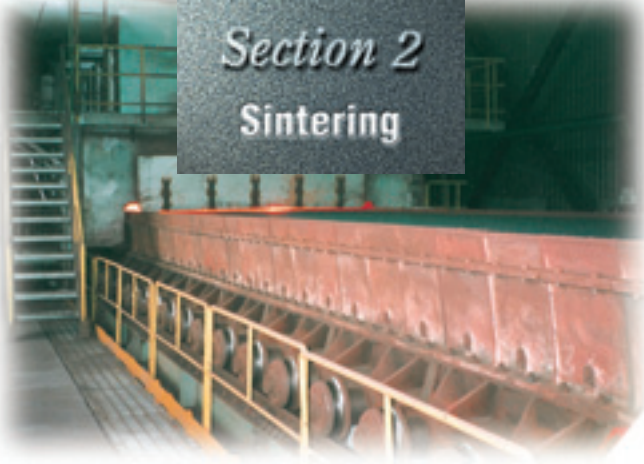


■ For raw materials conveyor

Bearing unit CAT. NO. 2400/E

- Superior sealed bearing unit uses rubber seal and slinger (NTN original design).
- Offer choice of type that requires lubrication or type that does not.

Section 2 Sintering

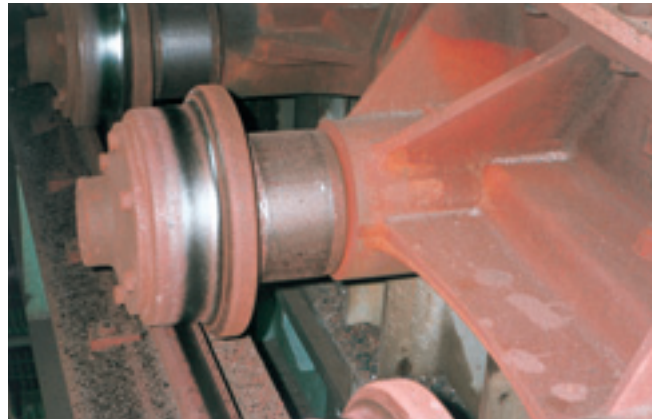


■ For pallet cart or wheel section

Sealed double row tapered roller bearings

CAT. NO. 2250/E

- Uses compact complex dust lip seal to realize both high resistance to dust and high load capacity.
- 2-piece inner ring is of non-separable construction due to fastening ring. Facilitates maintenance.

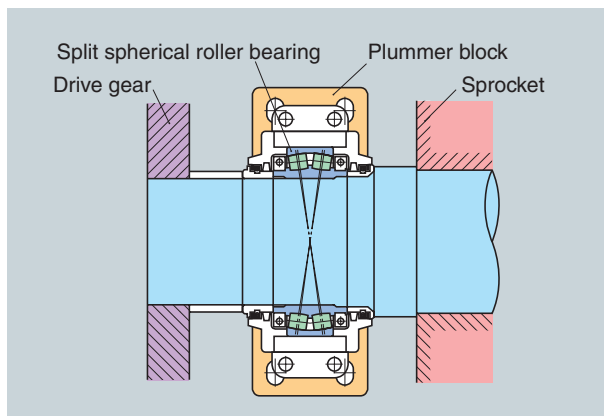


■ For pallet cart or pressure roll

Sealed double row cylindrical roller bearings

CAT. NO. 2250/E

- Uses special seal to realize longer life by preventing sintering powder to penetrate.
- Employs carburized materials of sufficient thickness to maintain outer ring strength.
- 2-piece inner ring is of non-separable construction due to fastening ring. Facilitates maintenance.

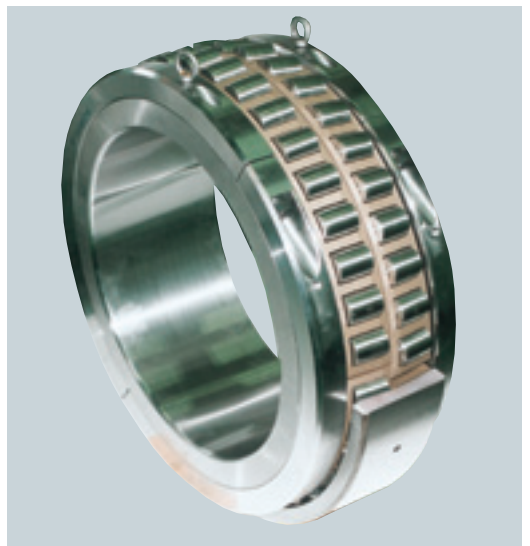


■ For sprocket shaft

Split spherical roller bearings : Double-fractured

CAT. NO. 2250/E

- Enables bearings to be changed without removing large diameter drive gears; dramatically reduces cost and time required for changing bearings.
- Can be easily modified from one-piece bearing to split bearing in existing space.



Section 3 Converter



■ For converter and trunnion support

Super large-sized split spherical roller bearings : Double-fractured

CAT. NO. 2250/E

- Using a split bearing between converter and pull gear dramatically reduces time required for changing the bearing. It takes only 1/10 the time it takes to change a one-piece bearing.
- Bearing can be designed to fit existing housing; bearing can be easily modified.

Photograph outer dimensions

ϕ 1120 (inner diameter) x ϕ 1540 (outer diameter) x 525/355 mm (width)

Max. actual dimensions

ϕ 1400 (inner diameter) x ϕ 1900 (outer diameter) x 880/530 mm (width)



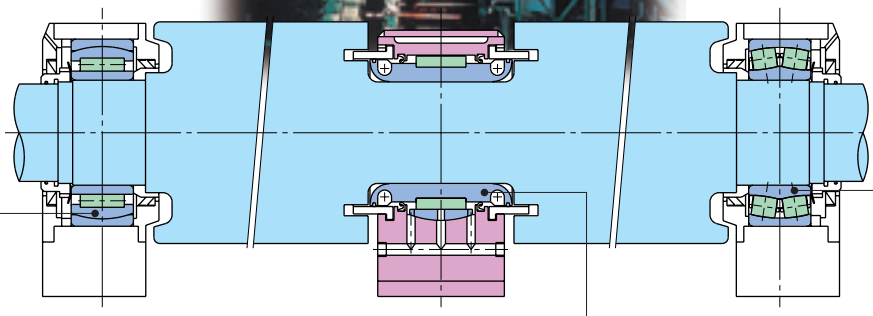
■ For converter and trunnion support

Super large-sized spherical roller bearings

CAT. NO. 2250/E

- One-piece bearing. The bearing offers easy replacement and is still used for non-drive bearing.

Section 4 Continuous casting



■ For free side bearing of guide roll

Cylindrical roller bearings with self-aligning rings

CAT. NO. 2250/E

- Spherical outer ring diameter and alignment inner diameter offers easy alignment.
- General bearing shape maximizes rated load.
- Allows axial shaft movement due to heat expansion. (Used as free side bearing.)



■ For neck of frame guide roll

Split cylindrical roller bearings and water cooling jacket type housing

CAT. NO. 2250/E

- Multiple layer seal construction prevents penetration of water and scale.
- General bearing shape maximizes rated load.
- Allows axial shaft movement due to heat expansion.
- Uses water-cooled jacket housing to suppress temperature rise of the bearing.



■ For guide roll

Long life spherical roller bearings for high temperature use (LH-Series) [Symmetrical roller]

CAT. NO. 3027/E

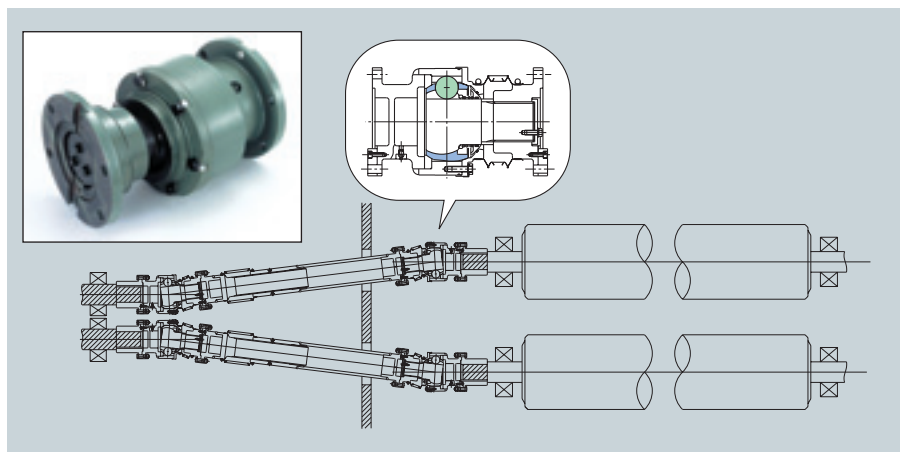
- Uses newly developed long-life high temperature bearing material STJ2 to realize longer life at high temperatures (200C°) as well as room temperature.
- Uses symmetric rollers to maximize rated load.

■ For pinch guide roll drive

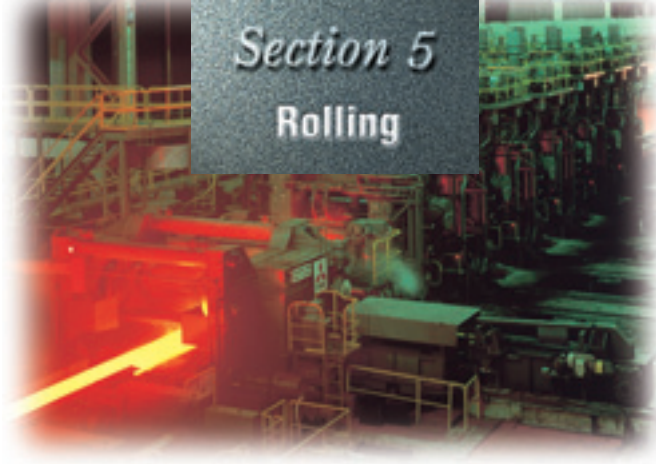
Constant velocity joint (HTJ)

CAT. NO. 5603/E

- One-piece shaft / inner ring unit offers higher load capacity.
- Double seal construction seals out heat and water.
- Assembly is facilitated by CVJ main body separate separation.



Section 5 Rolling

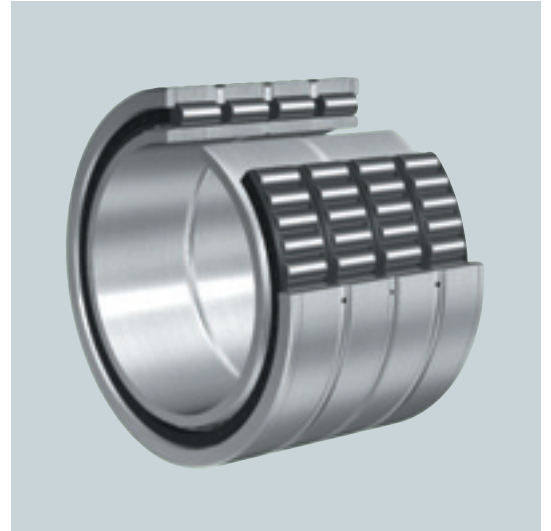


■ Primarily for work roll

Sealed four row tapered roller bearings 《Large size, long operating life EA bearings》

CAT. NO. 3024/E

- Realizes three times longer machine life than standard carburized steel bearings when used on actual machine (continuous hot rolling mill).
- Sealed type bearing doesn't require greasing and effectively improves the environment (no grease leaking).



■ Primarily for radial load bearing of backup roll

Four row cylindrical roller bearings

CAT. NO. 2250/E

- Change to EA enables longer life.
- Uses pin type cage to maximize rated load and further extend life.

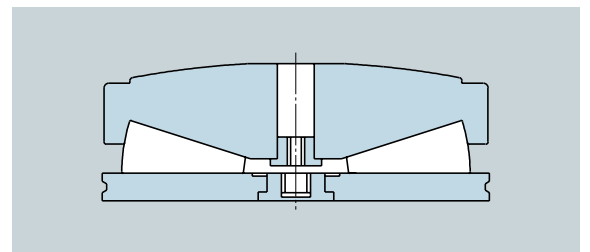
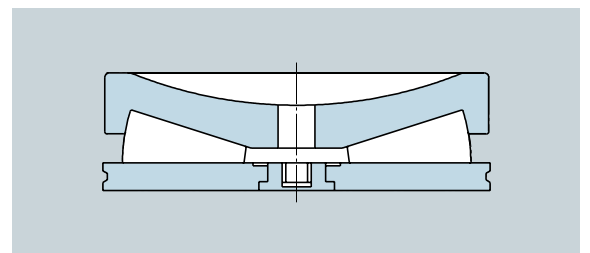


■ Primarily for axial load bearing of backup roll

Double row tapered roller bearings

CAT. NO. 2250/E

- Uses pin type cage to maximize rated load and further extend life.
- Contact angle made into steep gradient to maximize performance for axial loads.



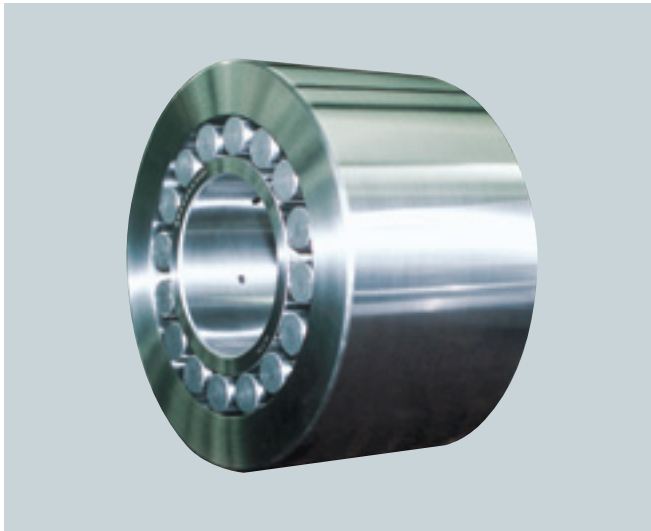
■ For pressure screw down

Tapered roller thrust bearings

CAT. NO. 2250/E

- General bearing shape maximizes rated load.
- Inner ring surface is spherical to fit pressure screw shape.

Section 5 Rolling



■ For backup roll bearings of special multi-stage rolling mills

Open type backing roll bearings for sendzimir cold strip mill

CAT. NO. 2250/E

- Because it is directly used for backup roll, the bearing is stronger and has a thicker outer ring.
- Mutual difference of assembly thickness for bearings mounted on same shaft is controlled to be extremely small.
- Because high precision is demanded under heavy loads, the bearing is manufactured for high load capacity and high precision.

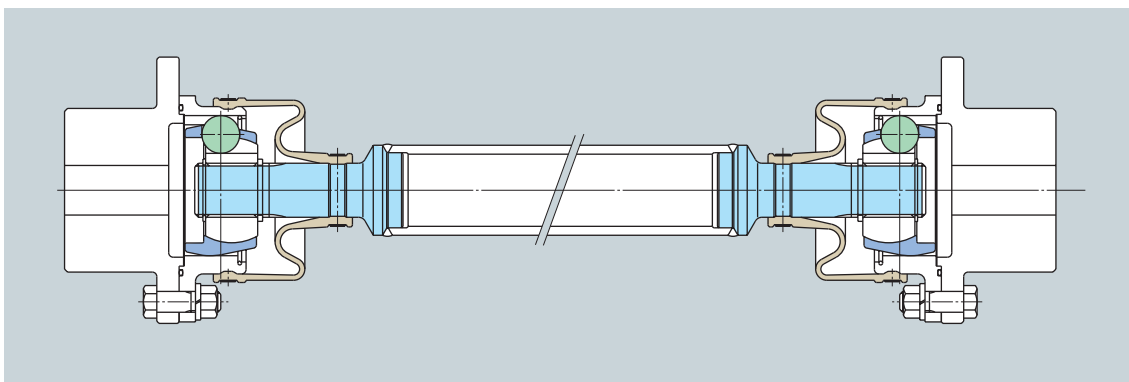


■ For backup roll bearings of special multi-stage rolling mills

Sealed type backing roll bearings for sendzimir cold strip mill

CAT. NO. 2250/E

- Uses seal to enable use of special bearing lubricating oil; realizes longer bearing life.
- Enable recovery of waste oil; does not affect rolled materials.
- Enables use of low viscosity rolling oil.



■ For hot run table

Constant velocity joint (BC coupling type, long shaft series)

CAT. NO. 5603/E

- Type sealed with rubber boots with superior sealing performance does not require grease to be added.
- Uses SUS304 with superior corrosion resistance for pipe of intermediate shaft.

Section 5 Rolling

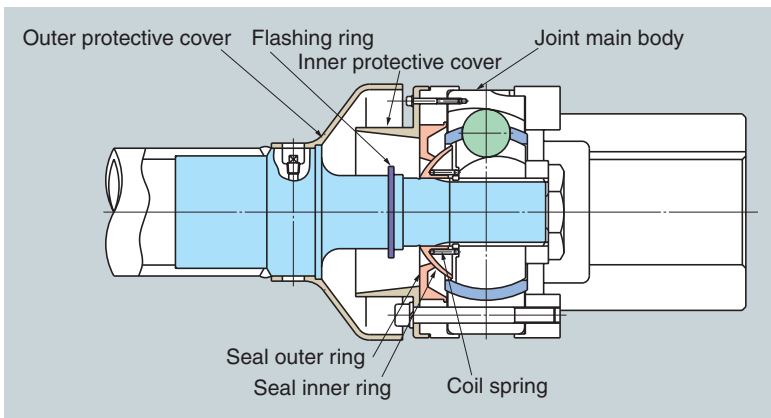


■ For backup roll or formed steel rolling mills

Large-sized four row tapered roller bearings 《Pin type cages》

CAT. NO. 2250/E

- Uses pin type cage to increase rated load and realize longer life.
- Change to EA enables longer life.

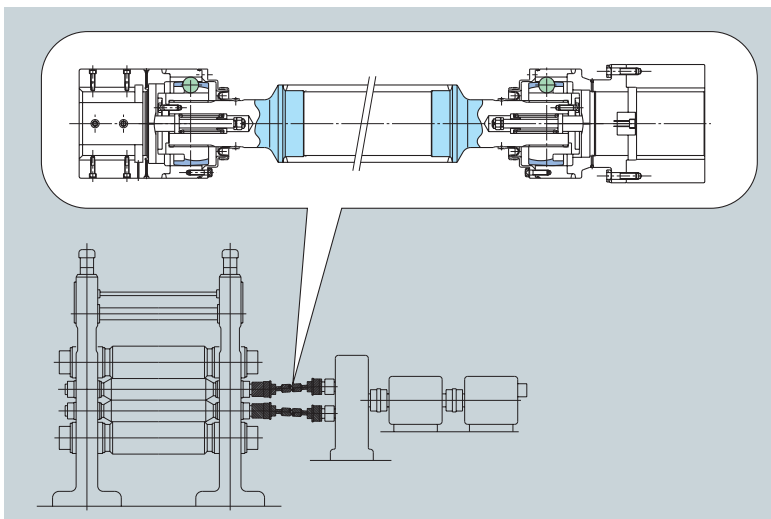


■ For down coiler wrapper roll

Mechanical metal seal type CVJ (Constant velocity joint)

CAT. NO. 5603/E

- CVJ with mechanical metal seal for severe environments such as high temperature, water and scale.



■ For skin pass mill

Constant velocity joint (Large-sized DOJ)

CAT. NO. 5603/E

- Type sealed with rubber boots with superior sealing performance does not require grease to be added.
- CVJ eliminates chattering mark on rolling surface.
(Applicable CVJ: #250 – 725)

Section 5 Rolling



■ For crankshaft of Pilger Mill

Split cylindrical roller bearings

CAT. NO. 2250/E

- Because it is for crankshafts, construction allows only split bearing to be mounted.
- Has cage strength and load capacity that can resist impact of cranking.

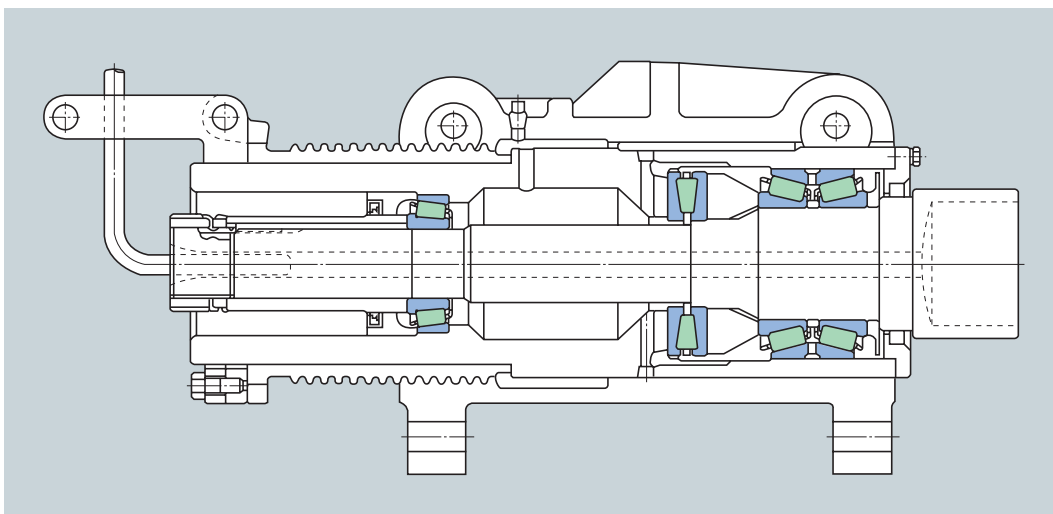


■ For wire material rolling guide roller

Bearings with solid grease (deep groove ball bearings + solid grease)

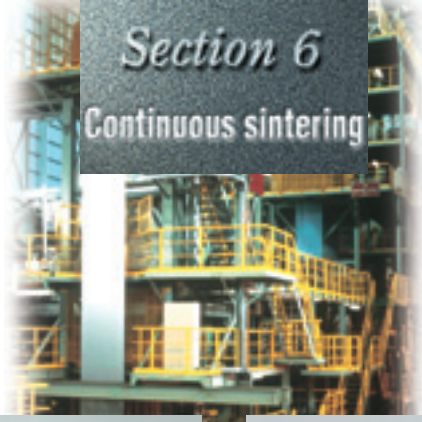
CAT. NO. 3022/E

- Because it is sealed with solid grease (thermosetting grease), grease does not leak out even if the bearing is penetrated by rolling water; enables longer life.
- Has proven results for extending life of guide rollers for wire rolling, etc.

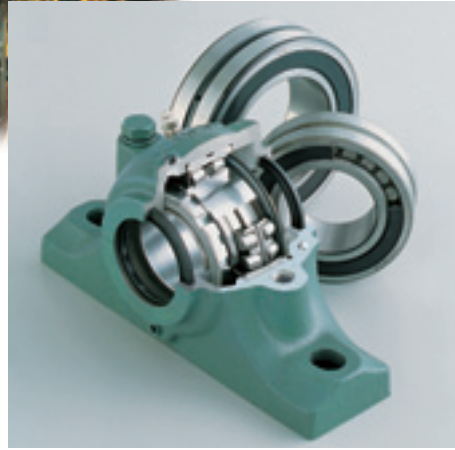


Thrust block for piercer/elongator

Section 6 Continuous sintering



ECO series



■ For support bearings for various types of rolls

Long life spherical roller bearings for high temperature use (LH-Series)

CAT. NO. 3027/E

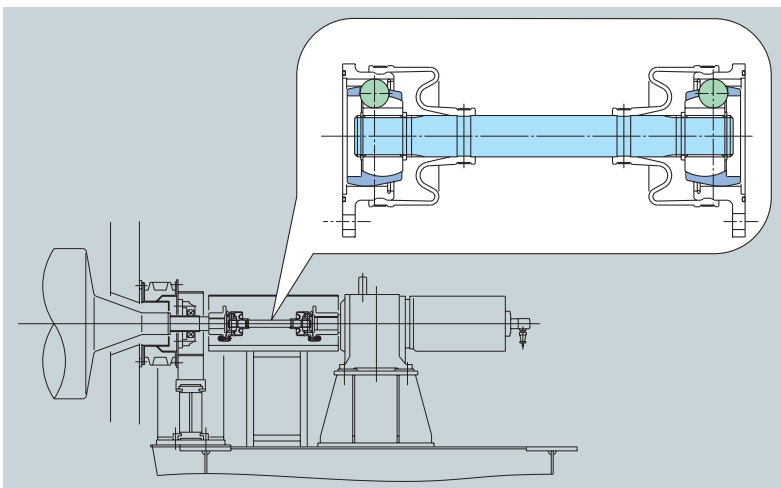
- Offers 3.5 times longer life than standard bearing steel even when used at room temperature.
- Enhanced strength for resisting surface damage (peeling, smearing).

■ For support bearings for various types of rolls

Sealed spherical roller bearings WA type

CAT. NO. 3702/E

- Grease is sealed in by us; there is no need to add grease when using.
- Because the bearing has a rubber contact seal, large quantities of grease do not accumulate in the plummer block when grease is added, so grease does not leak out.



■ For roll drive in furnace

Constant velocity joint (BC coupling type)

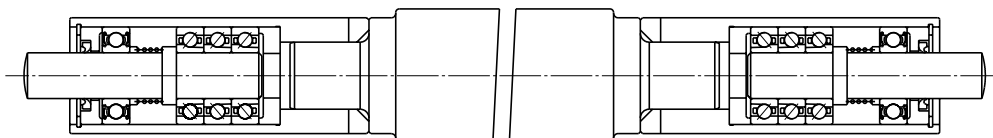
CAT. NO. 5603/E

- Thermal expansion of furnace role absorbed by CVJ plunging. (Applicable CVJ: #75 – 200)
- Contributes to cleanliness and maintenance of environment.
- Sealed with boots with superior sealing performance; does not require grease to be added.

Tension leveler roll unit

CAT. NO. 2250/E

■ Cartridge unit



- Uses high precision, small-diameter, long roll; roll surface roughness has also been reduced.
- Cartridge is fitted with several rows of angular ball bearings to enhance load capacity and speed in the axial direction.
- Labyrinth construction and low contact seal realize both low torque and tight sealing.



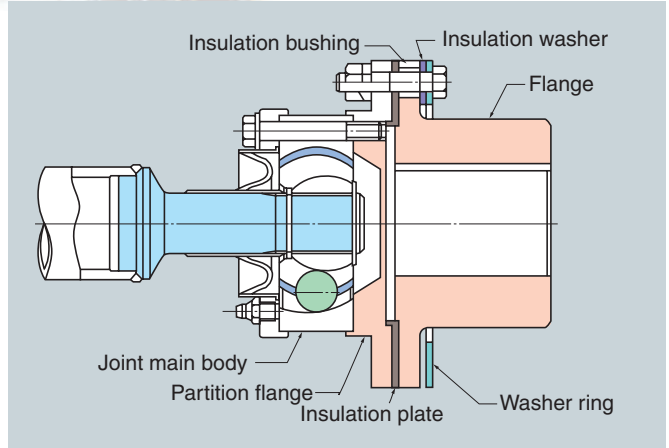
Section 7 Surface treatment



■ For support bearings for various types of rolls

Plummer block with solid grease CAT. NO. 3022/E

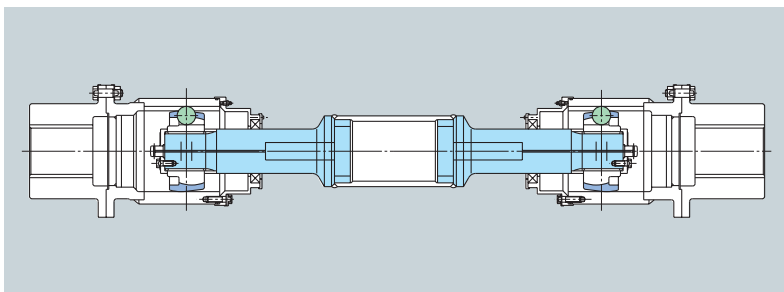
- Because it is sealed with thermosetting grease, grease does not leak out or get on other parts.
- Grease does not have to be added, so greasing labor can be eliminated.



■ For various roll drive

Insulation type CVJ CAT. NO. 5603/E

- Insulated CVJ for preventing electric corrosion due to fault current, with insulation in joint main body and flange joint.
- Facilitates replacement of insulation parts.

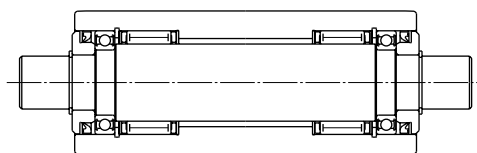


■ For tension reel

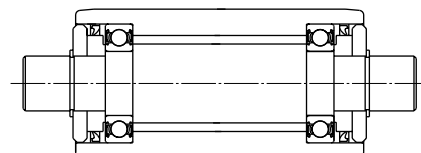
Constant velocity joint (Large-sized DOJ) CAT. NO. 5603/E

- This CVJ can accept a CVJ maximum 300 mm stroke in the axial direction.
(Applicable CVJ: DOJ350 – 625)

■ Backup unit



NKZ type



BUB type

- Labyrinth construction and low contact seal realize both low torque and tight sealing.
- If even lower torque is necessary, a roll unit (BUB type) that uses deep groove ball bearings only is available.
- Because it is used as a backup roll, roll precision and surface roughness are reduced.