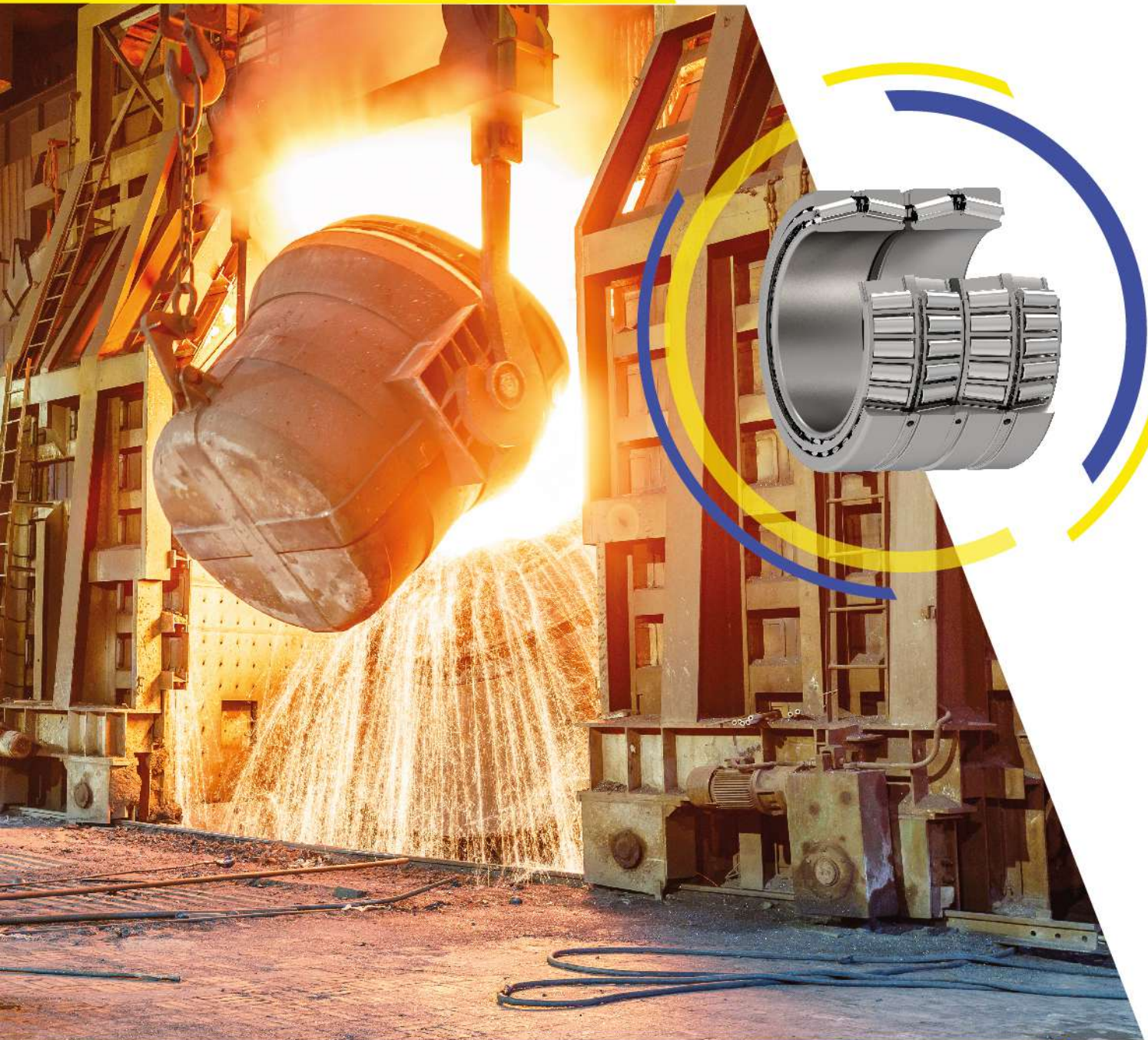


**Decrease in downtime.
Increase in output.
Year after year.**



Bearing solutions for the steel industry

WHO IS NBC



Founded in 1946, NBC is India's first bearings manufacturer and the last word in quality and durability. In 2020, the company acquired leading European manufacturer, Kinex Bearings to further boost its expertise.

75 years since its beginning, NBC remains India's leading bearings manufacturer and exporter. NBC is also the world's only bearings manufacturer to receive the prestigious Deming Grand Prize for Total Quality Management.



1946 India's first bearing manufacturer



200+ million bearings manufactured/ annum



2300+ variants of bearings offered



5 manufacturing locations



Leading exporter



Happy customers in 30+ countries



R&D and Innovation Centre



2800+ People



Automotive



Industrial



Railway



Aerospace

Why NBC Bearings is important for the Steel industry

The steel-making process is a fast-paced sequence that entails melting, purifying, and rolling at the specified temperature. The process can be simplified into three stages: Iron making, where raw material like iron ore, coal, and lime is melted to form molten iron, followed by Steel making, where removal and addition of alloying agents and dissolved gases take place. The last and the focused stage is Rolling and Finishing, which determines the characteristics of the Steel, such as correct profile, mechanical properties, and surface quality for desired steel grade.

Like any other industry, the present-day steel manufacturing units are equipped with state-of-the-art heavy machinery that operates in synergy to produce cutting-edge value-added Steel. Bearings are integral to these machines and are found in equipment used at raw material storage sites, steelmaking, rolling, and finishing processes.

The condition inside the steel industry is very demanding and tough. From melting furnaces to rolling mills, the rolling bearing must withstand:

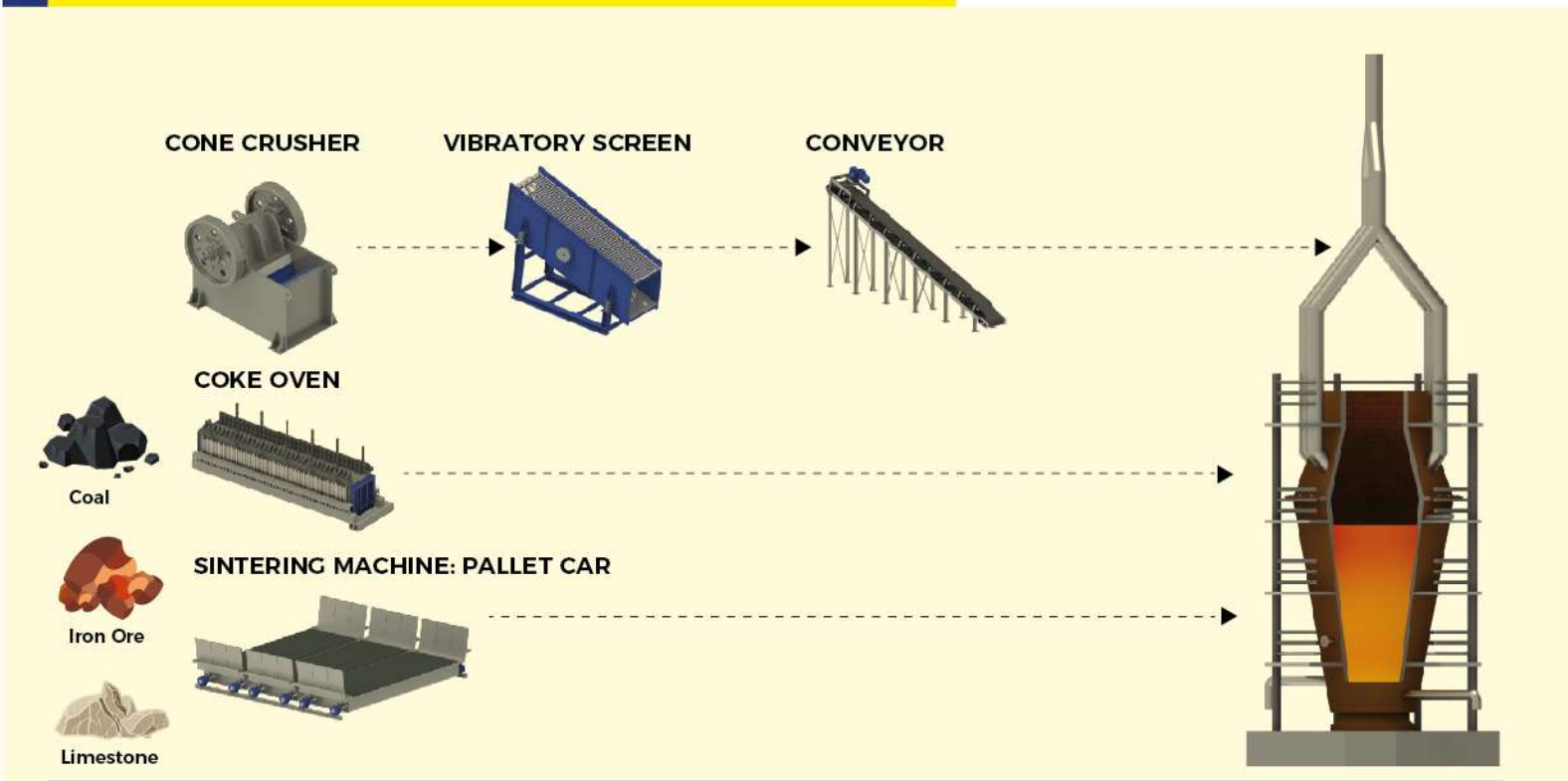
- High-Temperature fluctuation
- Speed extremes
- High and constant shock loads
- Hard particle contamination
- Moisture and chemicals



These challenges can put enormous pressure on these bearings, which can downgrade the machine, causing an unplanned stoppage. Therefore, a high-performance bearing is one of the most important parameters to maximize uptime and reduce maintenance costs.

NBC Roller Bearings are manufactured to sustain the harsh operating conditions of the Steel Industry. We provide a wide range of high-quality, cost-effective bearings that enhance productivity, extend life, reduce maintenance costs, and are highly precise and reliable for challenging industrial operations.

IRON MAKING



BEARING SOLUTIONS FOR CONE CRUSHER



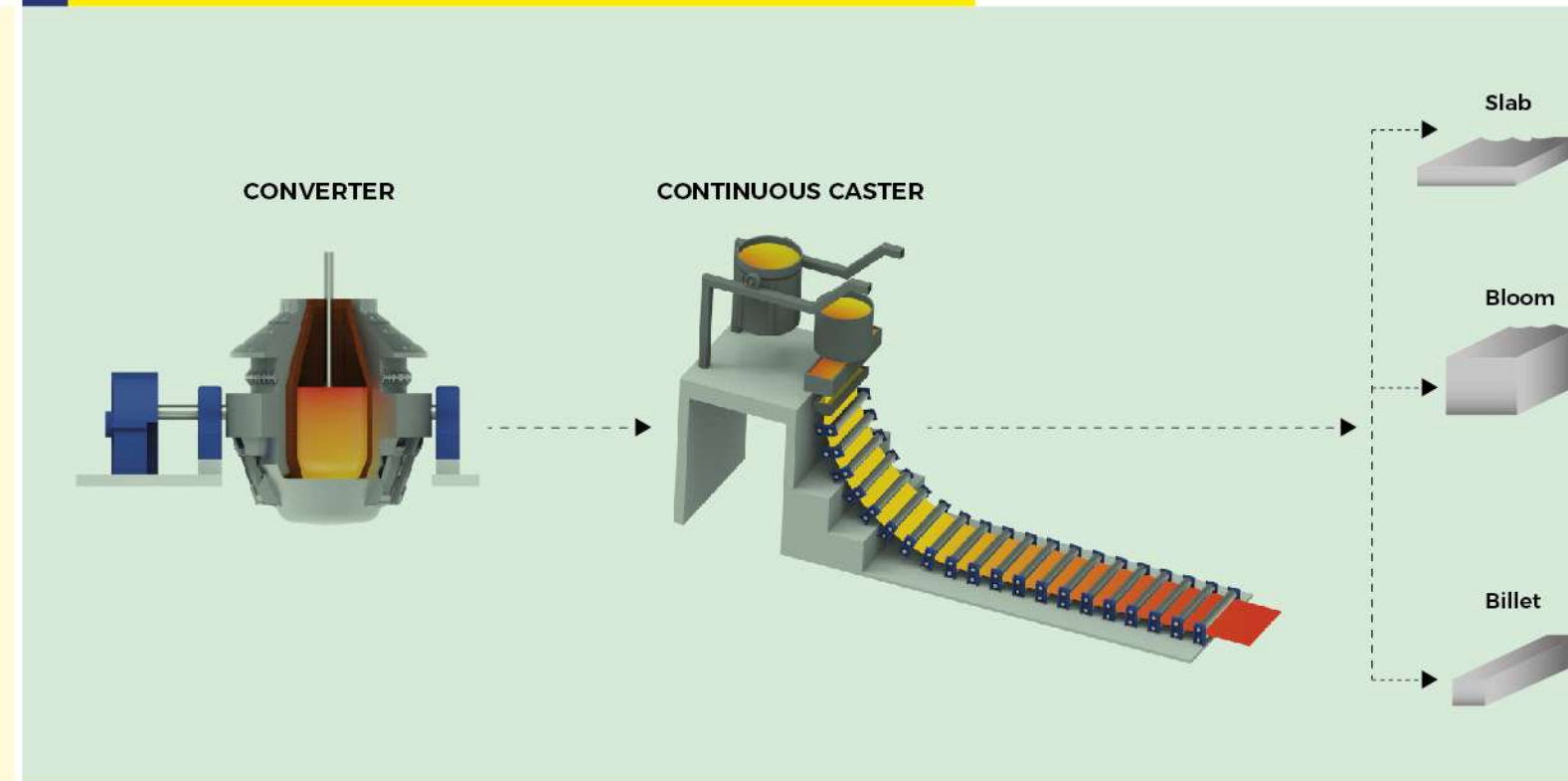
BEARING SOLUTIONS FOR VIBRATORY SCREEN & CONVEYOR



BEARING SOLUTIONS FOR SINTERING MACHINE: PALLET CAR



STEEL MAKING



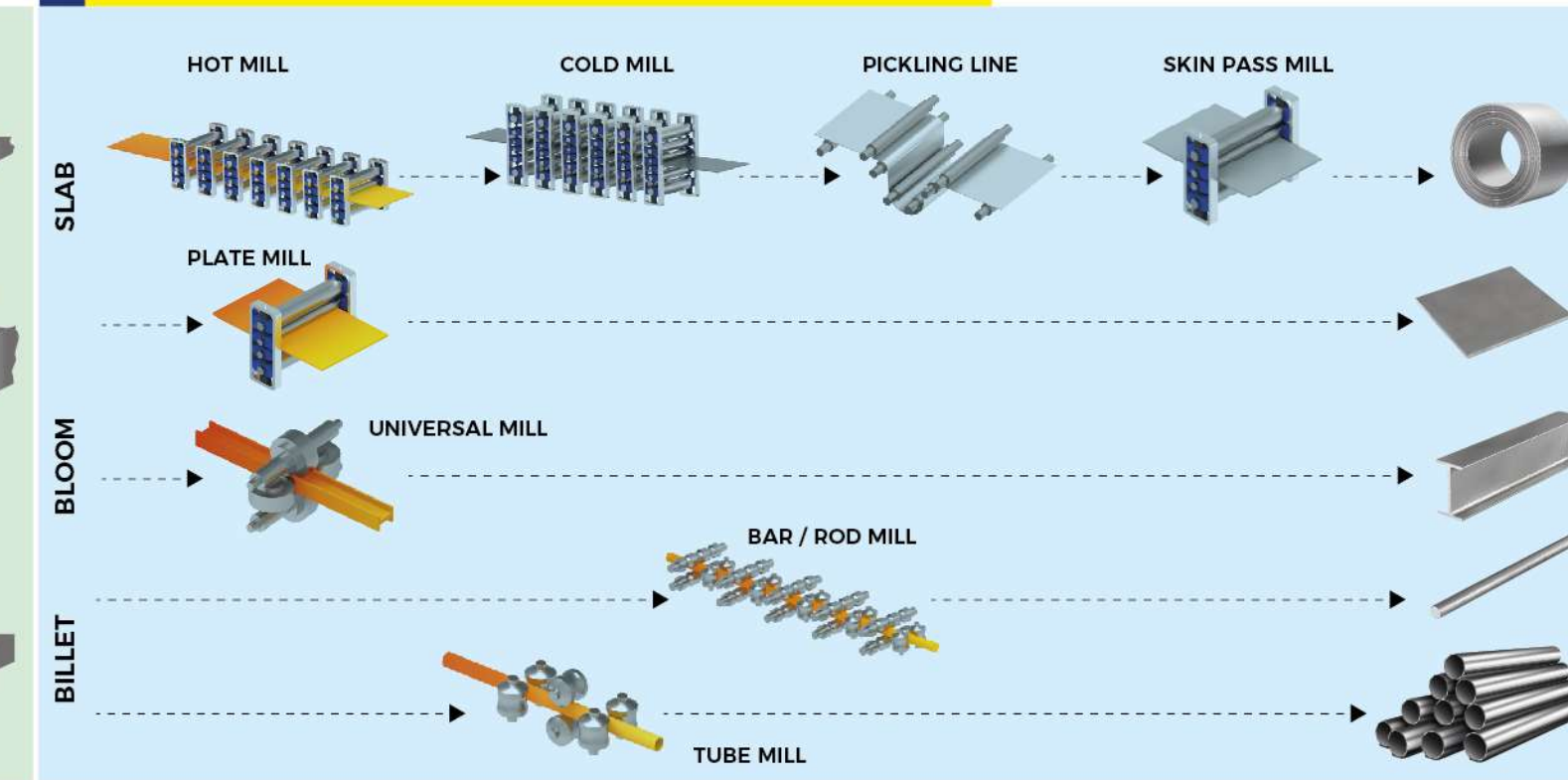
BEARING SOLUTIONS FOR CONVERTER



BEARING SOLUTIONS FOR CONTINUOUS CASTER



ROLLING AND FINISHING



BEARING SOLUTIONS FOR HOT MILL, COLD MILL & PLATE MILL



BEARING SOLUTIONS FOR PICKLING LINE



BEARING SOLUTIONS FOR SKIN PASS MILL



BEARING SOLUTIONS FOR UNIVERSAL MILL, BAR/ROD MILL & TUBE MILL

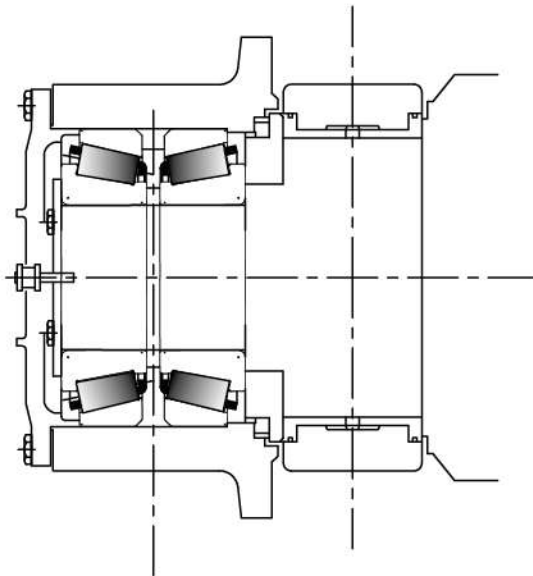


IRON MAKING



Sintering Equipment: Pallet Car

The first step in iron making, sintering, is a thermal process where iron ore fines, cokes, and fluxes are mixed and converted into a sinter, suitable to be fed to a blast furnace. The pallet car is an essential component of the sintering machine and is equipped with a high load carrying bearing that can accommodate heavy axial and radial loads.



Operating Conditions

- Extremely low speed
- Debris
- High temperature
- Heavy loads



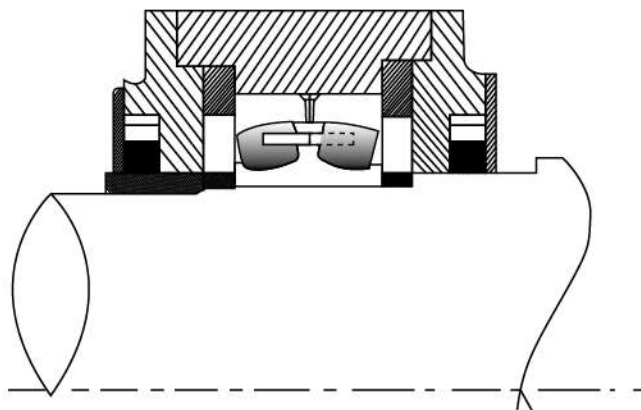
- Two Row Tapered Roller Bearings
- Two Row Cylindrical Roller Bearings

STEEL MAKING



Converter (BOF)

A primary steelmaking process where molten pig iron converts into a low-carbon liquid due to oxidizing action of oxygen. The process takes place in steel making furnace, a large, heavy converter vessel weighing several hundred tons and, therefore, is supported by bearings with high load-carrying capacity that can also accommodate axial displacement..



Operating Conditions

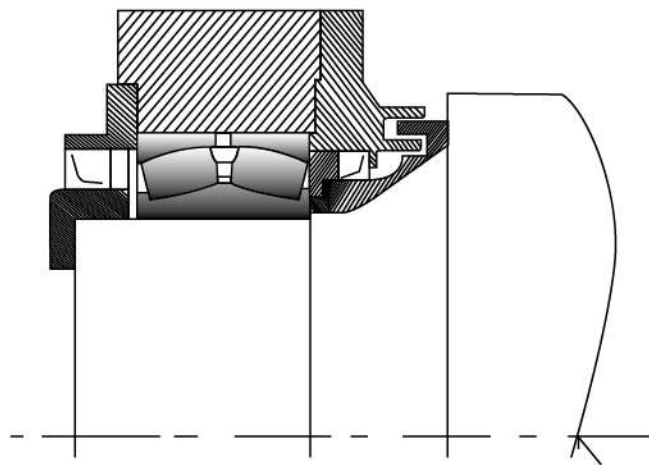
- High-temperature exposure
- Very slow speed
- Significant shaft deflections
- Very heavy loads
- Vibration from the agitation of the steel

STEEL MAKING



Continuous Casting Machine

An important linking process between steel making and rolling, continuous casting, also known as strand casting, converts liquid steel into continuous solid strands. As it involves passing molten steel in a ladle to mold via a tundish guided by multiple support rollers, the overall reliability of the casting process is mainly dependent on the performance of driven roller bearings.



Operating Conditions

- Water vapour
- Scale ingress
- Very low speed
- Deflection of rolls
- High temperature
- High radial load



Bearings
used

- Spherical Roller Bearings
- Full Complement

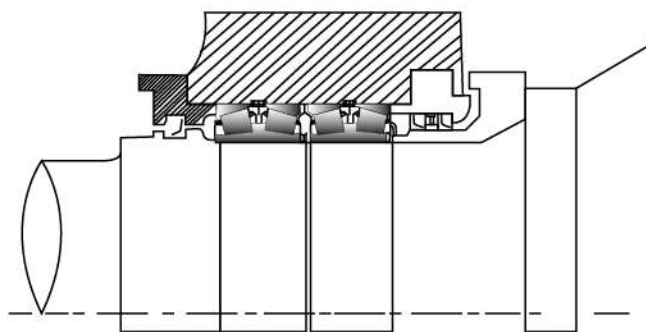
- Cylindrical Roller Bearings
- Needle Roller Bearings

ROLLING AND FINISHING



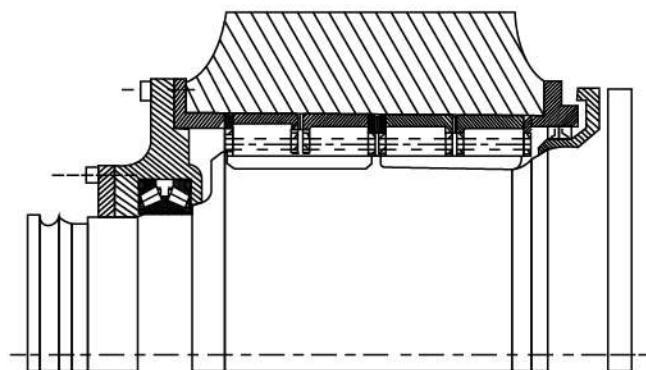
Flat Product Rolling (Plate Mill, Hot Strip Mill, Cold Strip Mill, Skin Pass Mill)

Heavy slabs from the continuous casting machine go into a plate, hot strip, cold strip, and skin pass mill. Flat rolling is a demanding application for bearings as the speed, temperature, and load varies in hot and cold strip mill. Therefore, the relationship between rollers and supporting bearings plays an essential role throughout the operation.



Operating Conditions

- Water/Coolant infiltration
- Scale infiltration
- Impact load
- High speed
- Heavy loads



Bearings used

- Four Row Cylindrical Roller Bearings
- Four Row Tapered Roller Bearings
- Thrust Tapered Roller Bearings

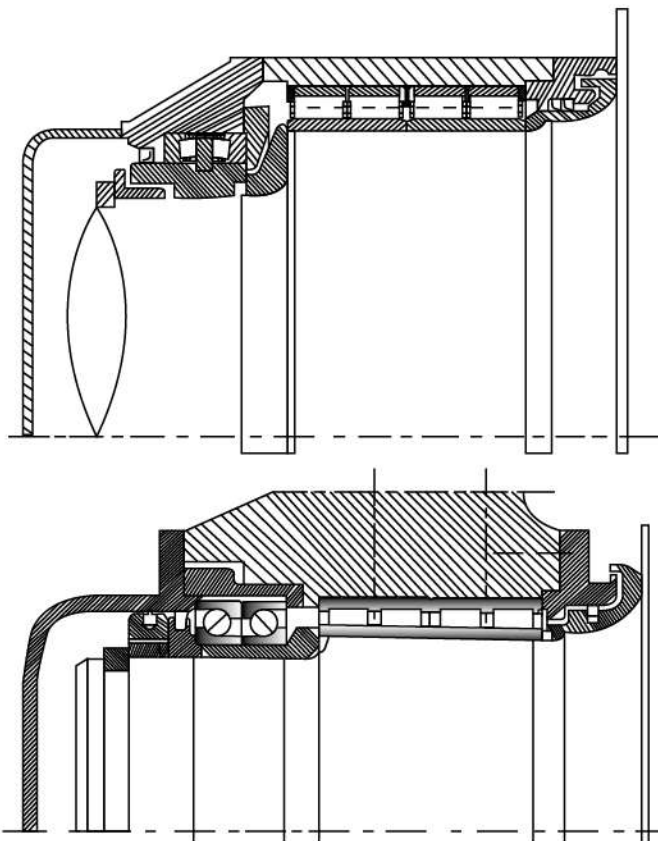
- Sealed Four Row Tapered Roller Bearings
- Two Row Tapered Roller Bearings with steep angle

ROLLING AND FINISHING



Long Product Rolling (Bar Mill, Tube Mill, and Universal Mill)

For a long product rolling process, the material goes into the roughing and finishing mill in the form of billet and bloom. Unlike a flat rolling mill, there is unsymmetrical rolling and, therefore, different styles of rolling mills. Due to this, the bearing arrangement may vary from flat product rolling as the bearings need to accommodate higher axial loads.



Operating Conditions

- Impact loads
- Scaling (contamination) ingress
- Water/Coolant infiltration
- High speed
- Heavy loads



Bearings used

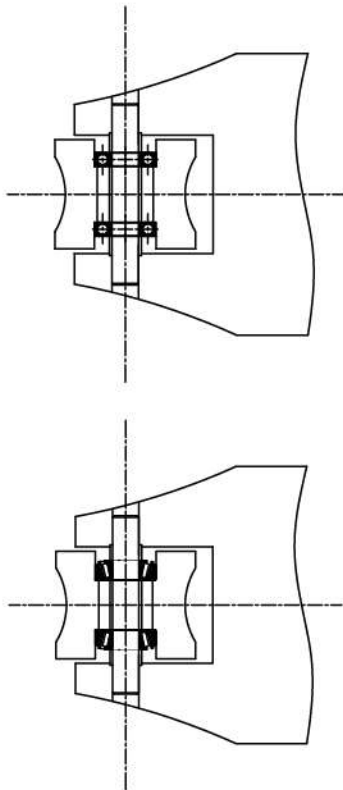
- 4-Row Cylindrical Roller Bearings
- 4-Row Tapered Roller Bearings
- Thrust Tapered Roller Bearings
- 2-Row Tapered Roller Bearings
- Double Row Angular Contact Ball Bearings

ROLLING AND FINISHING



Guide Rollers

Used in long products, rolling mill guide rolls are a series of rollers that determine the direction and angle of the steel bars between stands across mill length. Bearings used in guide rolls are subjected to demanding operating challenges; hence these bearings require stronger/special cage design, optimized contact geometry, and proper sealing arrangement.



Operating Conditions

- Very high acceleration/deceleration
- High speed
- Impact loads
- Water/Scale contamination



Bearings
used

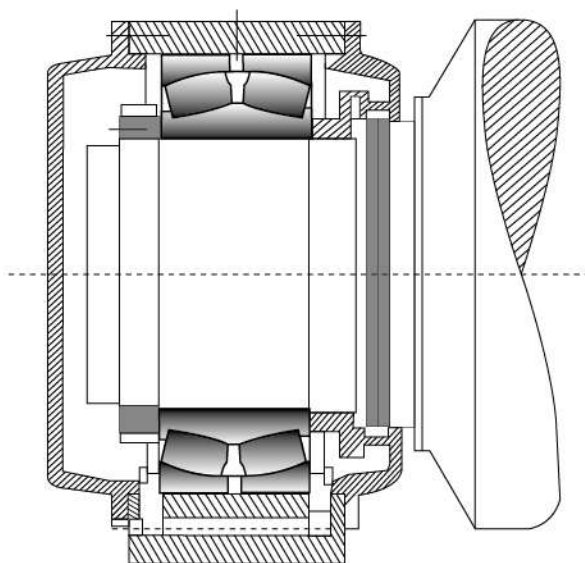
- Tapered Roller Bearings
- Deep Groove Ball Bearings
- Glass Reinforced Polyamide Cage Bearings

MATERIAL HANDLING



Conveyor, Crushers, Screens, Stacker Reclaimer

Material handling is critical and plays a vital role in steel manufacturing. The process entails transporting the material to various production units in the plant. For this, the material handling equipment is exposed to a harsh environment, and therefore, for robust material handling, the bearing should be capable of performing in extreme conditions.



Operating Conditions

- Harsh environment
- Misalignment and deflection
- Unbalanced and shock loads
- Abrasive contamination



Bearings used

- Deep Groove Ball Bearings
- Spherical Roller Bearings

- Tapered Roller Bearings
- Cartridge Tapered Roller Bearings

Special variants

- Sealed Spherical Roller Bearings
- Sealed Taper Roller Bearings
- HCR Coated Roller Bearings

AUXILIARY EQUIPMENT



Auxiliary equipment is an integral part of the industry as several devices rely on it to operate and control the systems that deliver the desired output. Therefore, auxiliary equipment's maintenance and proper functioning become as crucial as that of the primary equipment. NBC provides bearings that can meet harsh conditions and challenges present in the case of secondary equipment, prevent any potential damage, cuts down the amount of energy consumption, and ensures continuous deliverability.

1. Transfer table/ Run out table
2. Vertical edger
3. Coiler
4. Slitter/Trimmer
5. Pickling line
6. Pump and Motors
7. Gearboxes and Pinion stands



- Spherical Roller Bearings
- Tapered Roller Bearings
- 2-row Tapered Roller Bearings
- 4-row Tapered Roller Bearings
- Cylindrical Roller Bearings
- Deep Groove Ball Bearings
- Angular Contact Ball Bearings
- Oil Impregnated Bearings
- Hybrid Bearings
- Insulated Ball Bearings
- Unit Bearings(UCP, UCT, AND UCF)

NBC SOLUTIONS FOR STEEL INDUSTRY

DOUBLE-ROW CYLINDRICAL ROLLER BEARINGS



Features and benefits

- **Clean bearing steel**
for longer bearing service life
- **Optimized geometries of raceway and rolling elements**
for improved load capacity
- **Superior surface finish on raceways**
for reduced friction, lower operating temperature
- **Modified contact geometry and crowned inner ring raceways**
for better compensation for misalignments
- **Modified cage design**
for the enhanced formation of lubrication film
- **Improved design of bearing guiding flanges**
Suitable for taking up higher axial loadings (NJ and NUP)

DOUBLE-ROW TAPERED ROLLER BEARINGS



Features and benefits

- **Optimized geometries of raceway and rolling elements**
for improved load capacity
- **Precise cage play**
for enhanced cage life
- **Logarithmic crowning on rollers/races**
for reduced roller stresses and uniform load distribution
- **Case hardened (on demand)**
for Increased shock resistance, enhanced life
- **Superior surface finish on raceways**
for Reduced friction, lower operating temperature
- **Improved design of large cone flange**
for Reduced friction and bearing torque

NBC SOLUTIONS FOR CONVERTER AND CONTINUOUS CASTER

SPHERICAL ROLLER BEARINGS

Converter, Roll Neck Bearings, Roller Tables, Continuous Caster, Gearboxes



Features and benefits

- **Two-piece cage design**

This allows both rows to run independently, avoiding the risk of roller slippage, smearing, and cage damage.

- **Enhanced roller finishing to reduce friction**

Enhanced race/roller surface finish results in improved lubrication film, which avoids metal-to-metal contact and lowers bearing operating temperature.

- **Improved and robust cage design**

Helps in better roller cage interaction and can accommodate more rollers and longer cage life by providing surface treatment.

- **Central Guide Ring/Flange**

The central guide ring/flange provides optimal guidance to the rollers and limits rollers skew thus, avoids unnecessary force on the cage.

- **Maximum and Larger Rollers**

enhanced load carrying capacity

Special variants

- High Temperature Bearings
- Sealed Spherical Roller Bearings filled with special grease
- HCR Coated Bearings

NBC SOLUTIONS FOR ROLLING MILLS

MULTIPLE ROW TAPERED ROLLER BEARINGS

*Roll Neck Bearings, Gearboxes,
Coilers, Finishing Equipment*



Features and benefits

- **Case carburized heat treatment**
 - Offers enhanced bearing life in extreme operating conditions, accommodates shock/impact loads, and provides better performance in boundary lubrication conditions.
 - Reduced possibility of catastrophic damage due to surface crack
- **Premium grade bearing alloy steel**
 - Improved toughness and fatigue resistance
- **Logarithmic profile on rollers**
 - Offers even load distribution and reduced bearing stresses
- **Robust pin-type cage design**
 - Offers enhanced load rating due to increase no of rollers
- **Spiral groove on cone bore (4-Row Tapered Roller Bearing)**
 - Helps in lubricant retention between the cone bore and roll neck, which improves lubrication and reduces roll neck and bearing bore wear

SEALED TAPERED ROLLER BEARINGS

Roll Neck Bearings, Guide Rollers



Features and benefits

- **Double lip design of Side seals**
 - To withstand high speed, misalignment and grease retention
- **Fluoroelastomer material of side seals**
 - To withstand high operating temperature and chemicals
- **H-NBR seal at cone bore**
 - To provide sealing from the bearing bore-roll neck interface
- **'O' rings on seal carrier OD**
 - To provide sealing from bearing OD-chock interface
- **Completely sealed from all interfaces**
 - To reduce contamination, downtime, maintenance cost, lubricant wastage and metal strip contamination.

NBC SOLUTIONS FOR ROLLING MILLS

MULTIPLE ROW CYLINDRICAL ROLLER BEARINGS

Roll Neck Bearings, Gearboxes,
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- **Logarithmic profile on rollers**
 - Offers even load distribution and reduced bearing stresses
- **Robust pin-type cage design**
 - Offers enhanced load rating due to increase no of rollers
- **Increased lead in chamfer on inner ring OD (4-Row Cylindrical Roller Bearing)**
 - For easy mounting of outer assembly on the inner ring and avoid gouging damage of inner ring and rollers.

THRUST ROLLER BEARINGS

Roll Neck Thrust Bearings



Features and benefits

- **Two-row design**
 - To take thrust load in both directions
- **Case carburized rings/rollers**
 - To absorb shock loads and enhance bearing performance
- **Spring integration (Optional)**
 - To avoid smearing damage on unloaded row
- **Pure axial design (Thrust Taper Roller Bearing)**
 - For very high thrust load capability
- **Steep angle design (Steep Angle - TDI Bearing)**
 - For enhanced axial load capacity

SPECIAL SOLUTIONS

HCR- WEAR RESISTANT BEARINGS

Wear resistance coating on rolling elements helps avoid metal to metal contact in low film thickness and protects against adhesive and abrasive wear.



Features

- Optimized coating with metal-containing amorphous carbon with a multilamellar structure
- No columnar structure provides high adhesion strength
- High dimensional accuracies

Benefits

- Low coefficient of friction even in dry condition: Resistant to adhesive wear and micro pitting
- Enhanced fatigue life in insufficient lubrication condition
- Debris tolerance: removes dents created in the contaminated application

OIL IMPREGNATED BEARINGS

Oil impregnated bearings composed of 70-80% of lubricating synthetic oil. Oil is moulded and solidified with polymer to form a casing which acts as a lubricant reservoir throughout bearing's life.



Features

- Improved lubrication with consistent lubricant supply
- Superior lubricant: Synthetic oil
- Excellent performance in water and dusty environment
- Environment-friendly molding process

Benefits

- Long life and maintenance-free
- Higher operational reliability
- No re-lubrication needed
- No lubricant washout issue

SPECIAL SOLUTIONS

SEALED SPHERICAL ROLLER BEARINGS

Sealed Spherical Roller bearings are like conventional spherical roller bearing in design and features, however for extra protection of bearing and lubricant from any external agents it has contact seals in the recesses of the outer ring.



Features

- Effective and high-performance contact seals
- Different seal materials to suit different operating temperatures

Benefits

- Reduced lubricant consumption
- Lower operating and maintenance costs
- Excellent protection against water splashes and contamination

INSULATED BALL BEARINGS

Electrical insulation coating prevents electrical pitting in the bearings and improves bearing life in motor application.



Features

- Aluminium oxide coating using plasma spraying technology
- Current insulation
- High thermal stability

Benefits

- Extending bearing service life by avoiding damage caused by electric current flow.
- Higher operational reliability of electrical machinery

SPECIAL SOLUTIONS

HIGH TEMPERATURE BEARINGS

NBC has developed unique heat treatment solutions for high temperature applications to provide superior dimensional stability for operating temperatures as high as 250°C.



Features

- Special heat treatment
- Excellent performance under hot environments

Benefits

- Dimensional stability at high temperatures.
- Enhanced bearing service life at elevated temperatures

HYBRID BALL BEARINGS

Hybrid bearing also known as anti-friction ball bearing consists of rolling element made of Silicon nitride in place of steel. Silicon nitride rolling elements perform exceptionally well in high-speed operating conditions.



Features

- Lower friction
- Reduced weight
- Current insulation
- Higher hardness

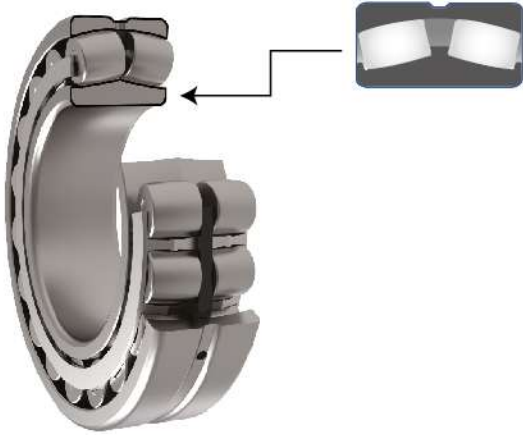
Benefits

- High speed capability
- Less wear under slippage
- Extended bearing service life
- Higher operational reliability

SPECIAL SOLUTIONS

CASE CARBURIZED BEARINGS

Case carburized bearings have a tough ductile core and a hard wear-resistant outer surface.



Features

- Made of ultra clean low carbon steel
- Ductile core helps enduring heavy shock loads
- Compressive residual surface stresses

Benefits

- Reduced possibility of catastrophic damage due to surface cracks
- Better performance in boundary lubrication condition
- Ability to handle/manage some level of debris
- Sustains higher level of hoop stress

POLYAMIDE CAGE FOR TAPERED ROLLER AND DEEP GROOVE BALL BEARINGS

Polyamide cage bearings are conventional bearings with glass fiber reinforced polyamide cage material instead of metal. These bearings offer some excellent benefits for certain demanding applications against metallic cage bearings.



Features

- Light weight
- Improves the flexibility of bearing
- Self-lubricity
- Low friction

Benefits

- Excellent performance in high-speed applications
- Excellent performance in high acceleration and deceleration
- Low noise in application
- Better performance in marginal lubrication

NBC TECHNICAL CONSULTATION AND SERVICES: CONDITION BASED MONITORING



NBC provides intelligent solutions for Condition Monitoring in order to improve the reliability of your assets.









Our expertise in various streams of Condition Monitoring helps industries maintain their machinery failure-free.

With a result-oriented approach towards avoiding machinery failure, the scope of CMS largely consists of Vibration Analysis and Lube Oil Analysis.

Our offerings

- **Vibration monitoring & analysis**
- **Bearing condition monitoring**
- **In-situ dynamic balancing**
- **Laser shaft alignment**
- **Thermography**
- **Annual maintenance contract / On-call service**

BEARING DAMAGES

BEARING DAMAGE	APPLICATION	CAUSE OF DAMAGE	COUNTER MEASURES
FLAKING 	<ul style="list-style-type: none"> • Material Handling • Sintering • Rolling Mill 	<ul style="list-style-type: none"> • Contamination • Inadequate lubrication 	<ul style="list-style-type: none"> • Replace worn out seals and correct seal orientation • Use proper seal material • Use correct lubricant • Follow adequate relubrication interval • On-time service of bearings • Replace/rectify deformed/worn housing and shaft • Maintain recommended shaft and housing dimensions • Use proper mounting methods and tools
PEELING 	<ul style="list-style-type: none"> • Rolling Mill • Sintering 	<ul style="list-style-type: none"> • Inadequate lubrication 	
WEAR 	<ul style="list-style-type: none"> • B.O.F. • Material Handling 	<ul style="list-style-type: none"> • Hard particle contamination 	
LUBRICANT WASHOUT 	<ul style="list-style-type: none"> • Caster • Rolling Mills 	<ul style="list-style-type: none"> • Water ingress • Improper sealing 	
ETCHING 	<ul style="list-style-type: none"> • Rolling Mills • Caster 	<ul style="list-style-type: none"> • Coolant ingress 	
GAUGING 	<ul style="list-style-type: none"> • Rolling Mills 	<ul style="list-style-type: none"> • Improper mounting 	
RING CRACK 	<ul style="list-style-type: none"> • Rolling Mills 	<ul style="list-style-type: none"> • Excessive roll neck wear • High point on shaft • Improper housing 	
ROLLER POPOUT 	<ul style="list-style-type: none"> • Rolling Mills 	<ul style="list-style-type: none"> • Roller impact with inner ring during mounting 	

OTHER PRODUCTS FROM NBC

Since the challenges faced by industry are many, NBC offers a diverse range of exceptional bearings. NBC bearings are available in sizes from 06 mm bore to 2000 mm outer diameter.

- Deep Groove
- Gen - 1
- Gen - 3
- Angular Contact

Ball Bearings



Needle Bearings



- Ball thrust
- Roller thrust



Thrust Bearings



Pillow Block Bearings



Special Products & Technology

- Oil Impregnated Polymer Lubricated
- EMB Series High Speed (EV application)
- SIB Series Sensor Integrated
- Bearing with Conductive Wire
- TRB Hub Unit
- Low Torque TRB
- Pre-set Hub
- Insuohm Series (Insulated)
- Ceramic Rolling Element (Hybrid)
- TRB Matched Set
- Black Oxide Treatment
- HCR Series

- UCP
- UCF
- UCT

- Single Row
- Double Row
- Four Row
- Unitised Tapered
- Roller Bearing
- Cartridge Tapered
- Roller Bearing (Railways)

Tapered Roller Bearings



Cylindrical Bearings



- Single Row
- Double Row
- Four Row
- Cylindrical Bearing Unit (CBU)

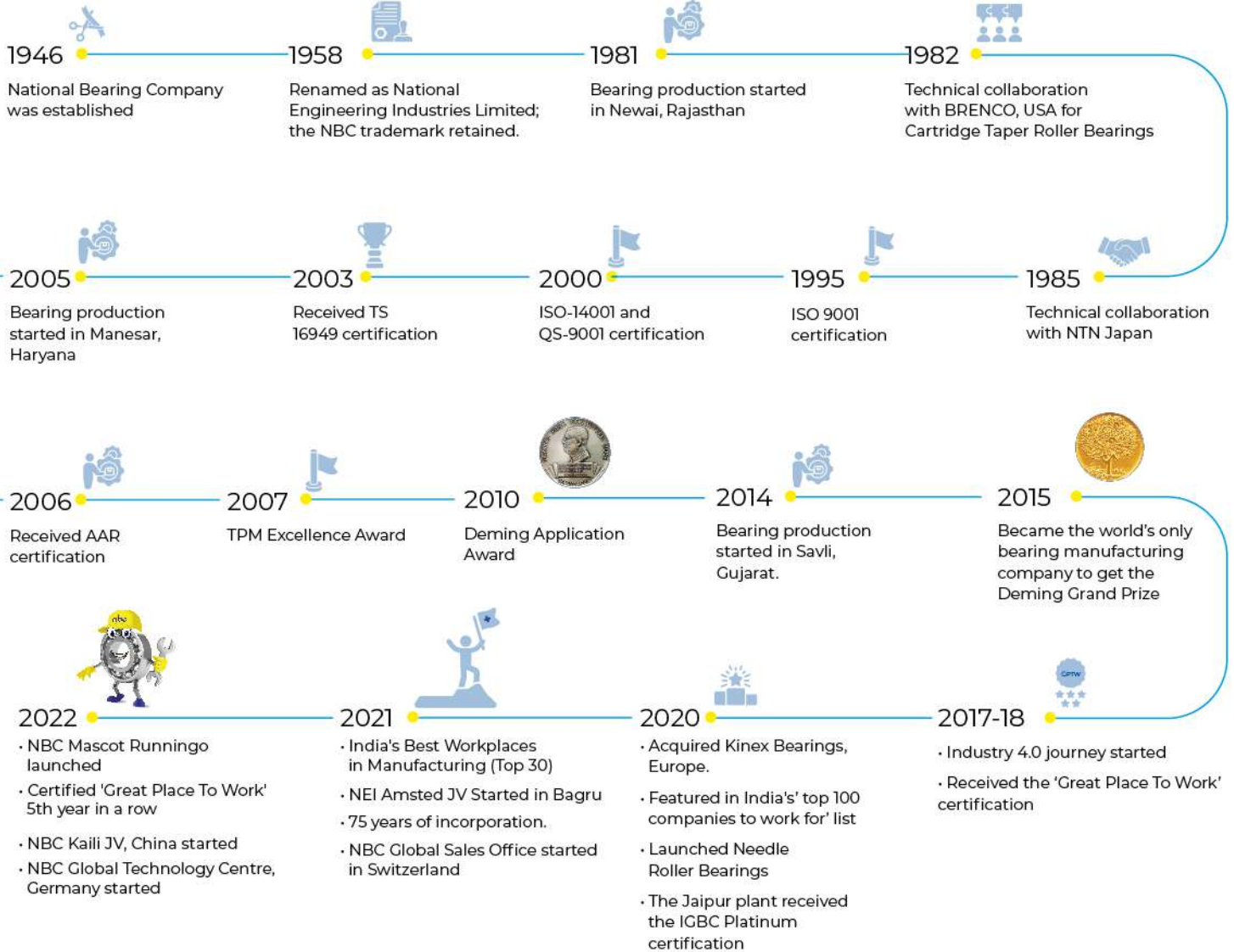
Spherical Bearings



- Roller
- Plain

* Products with special features like high temperature application, special heat treatment, coated roller/races and cage options are also available across product range.

NBC MILESTONES



OUR GLOBAL REACH

The NBC Bearings: Product, Technology & Services

NBC provides a wide range of bearings and associated service solutions to diverse industries such as Industrial, Automotive, Railways, and Aerospace. As a company that has been established for over 75 years, NBC Bearings has an international presence with offices and R&D centers across the globe. For us, engineering goes beyond manufacturing; it is the fusion of Product, Technology, and Services that make us different and the most preferred choice of our customers worldwide.



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