CELEBRATING 75 YEARS

CKA Birla Group | nbc®

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

Bearing solutions for the power 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
- 250+ million bearings manufactured/ annum
- 3100+ 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 are important for the Power Industry?

Thermal power plants are a major contributor to the electricity generation capacity of India, and **Pulverized** coal-fired power generation alone contributes to 75% of the total power generation.

The process starts at **Coal Handling Plant (CHP),** where the coal is crushed in the **Coal Pulverizer** and burned for steam production in Boiler. The air is preheated in **Air Preheater** and injected with pulverized coal in the Boiler to produce steam. The saturated steam produced in the boiler tubes is superheated in the Super-Heater and then fed to the Steam turbine, which is connected with a generator. The rotation of turbine blades by steam generates electricity which is then supplied to the consumers through high-voltage power lines.

Bearings are used in all crucial machinery mentioned above and act as the primary support function in power generation. Since the operating condition inside the thermal power plant, especially in material handling and coal pulverization, is very demanding, most of the bearings used are heavy-duty bearings. They are put through operating challenges such as:

1. High temperature
2. Contamination: Debris, Water, and Dust
3. Heavy loads
4. High vibrations
5. Hard to reach areas for maintenance and monitoring

Due to its inherent characteristics, Power plants have the most severe processing environments, and the bearings must be reliable, tough, and robust to withstand such harsh operating conditions. With NBC product and engineering expertise, we provide a solution to the customer to reduce downtime, enhance productivity and increase reliability.

COAL AND ASH HANDLING

Coal and Ash handling is critical and vital in thermal power plants. To handle the coal and ash, each power station is equipped with a Coal Handling Plant (CHP) and an Ash Handling Plant (AHP). The function of the coal handling plant in thermal power plants is to receive, process, store and feed the coal bunkers. Similarly, the ash handling plant is used to dispose of ash from the boiler as it is hazardous to health and causes environmental problems. Most of the critical equipment used in both plants are rotating types supported by bearings. Therefore, for robust material handling, the bearing should be capable of performing in extreme conditions.

Major Operating Challenges

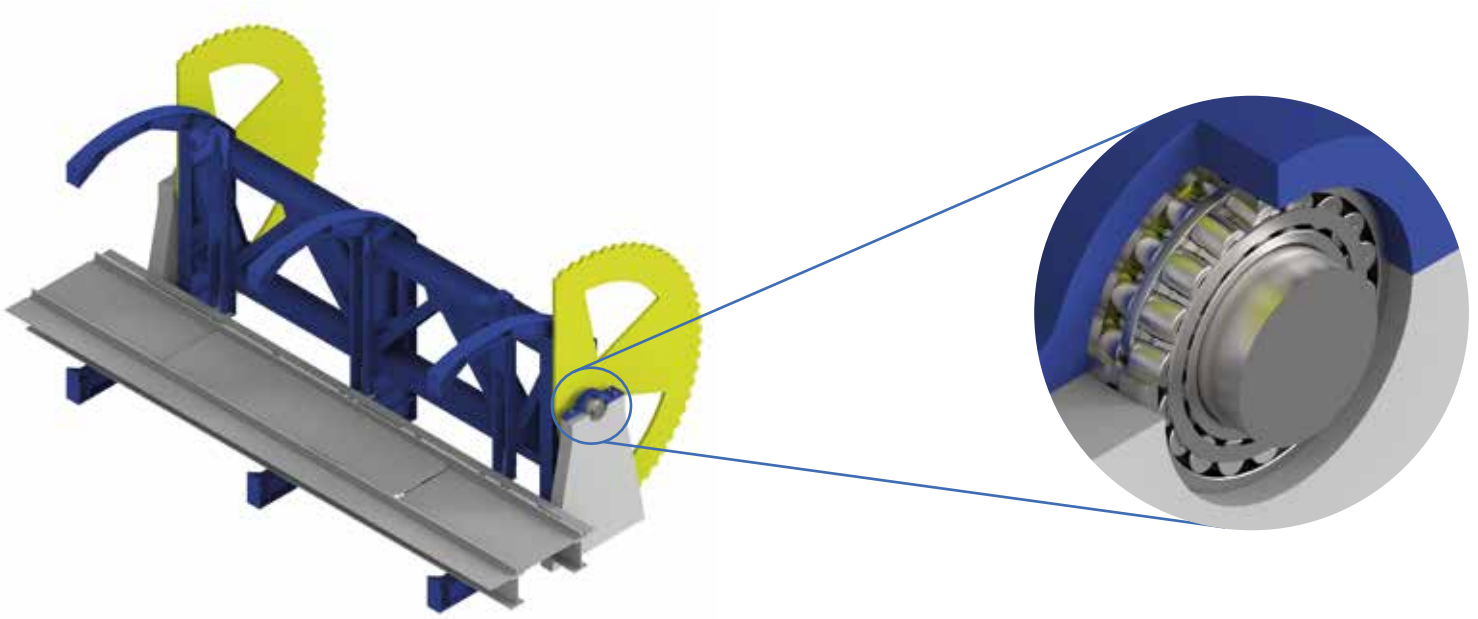
- Unbalance & Impact loads
- Abrasive contamination
- Misalignment & deflection
- Moisture and Coal dust

NBC solutions for Coal and Ash Handling Plant

UNLOADING: Wagon tippler

Commonly used bearings:

Spherical Roller Bearings

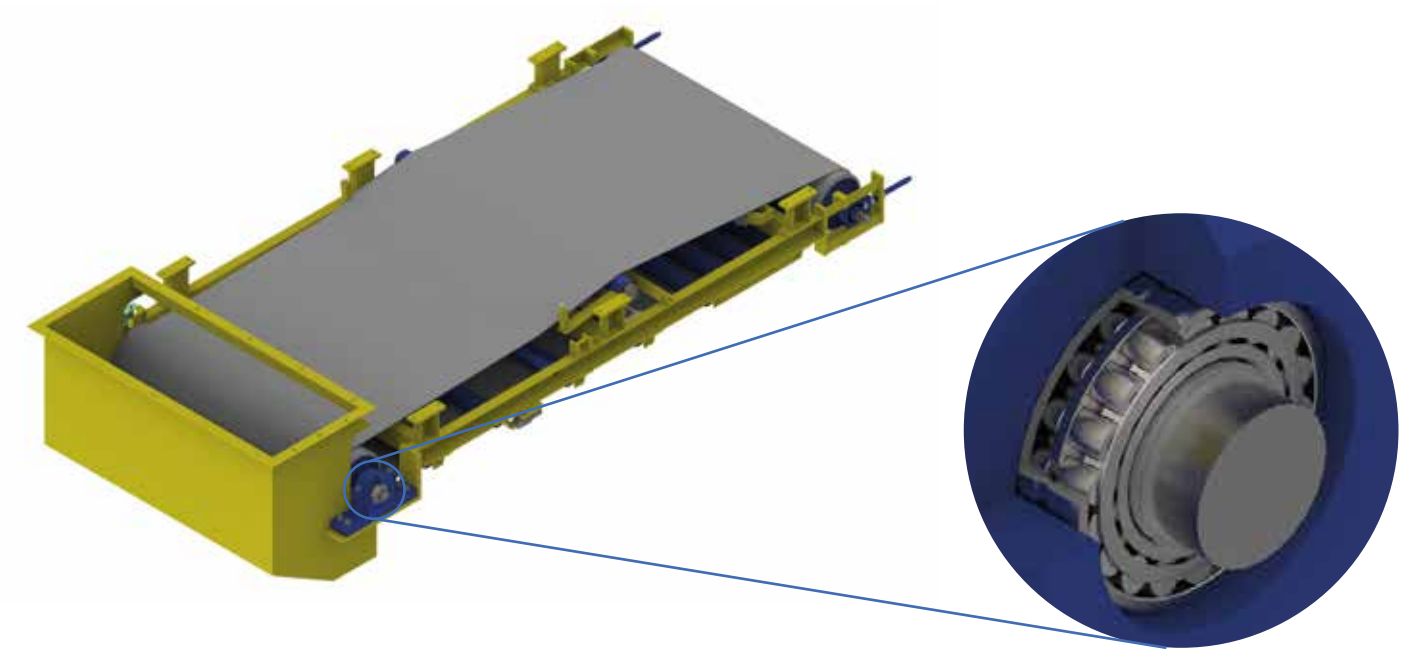


NBC solutions for Coal and Ash Handling Plant

FEEDING: Feeder

Commonly used bearings:

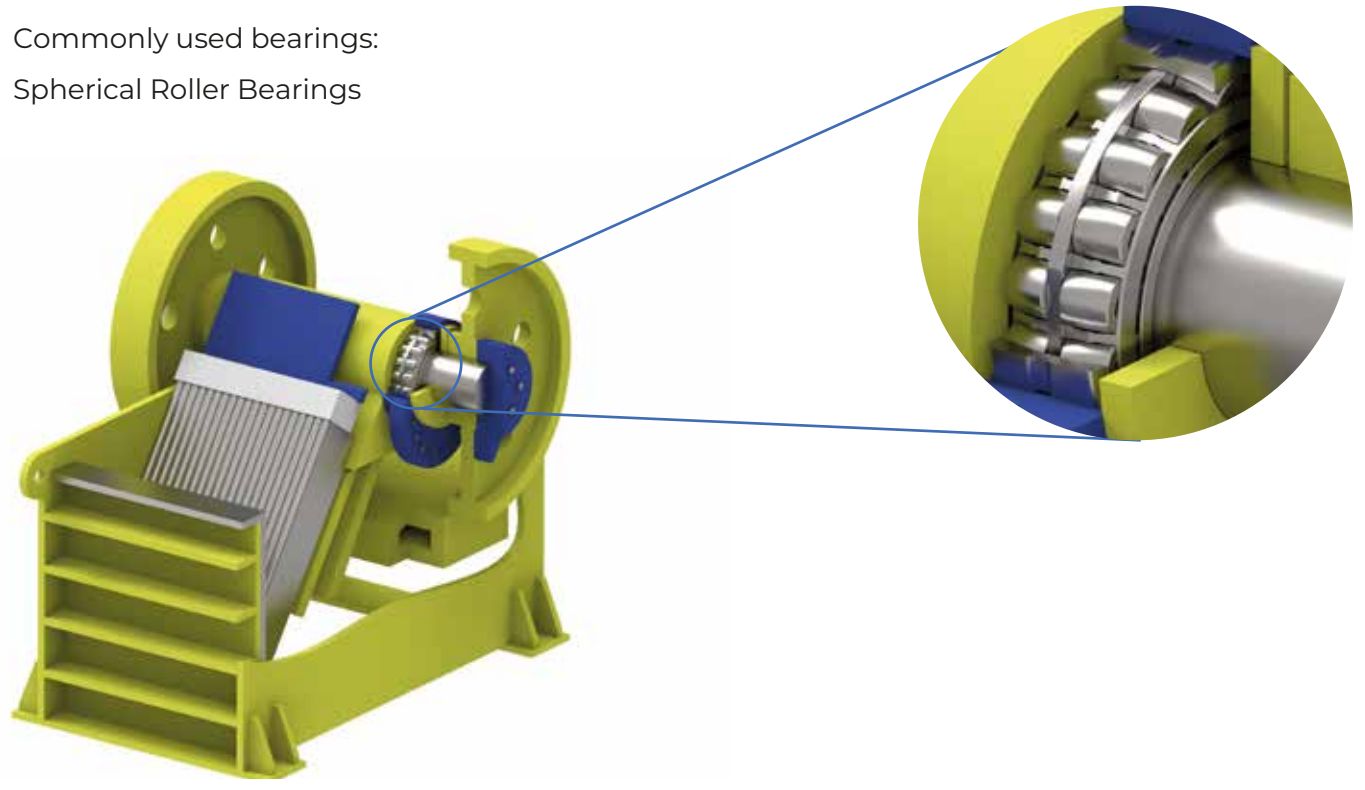
Spherical Roller Bearings



CRUSHING: Jaw Crusher

Commonly used bearings:

Spherical Roller Bearings

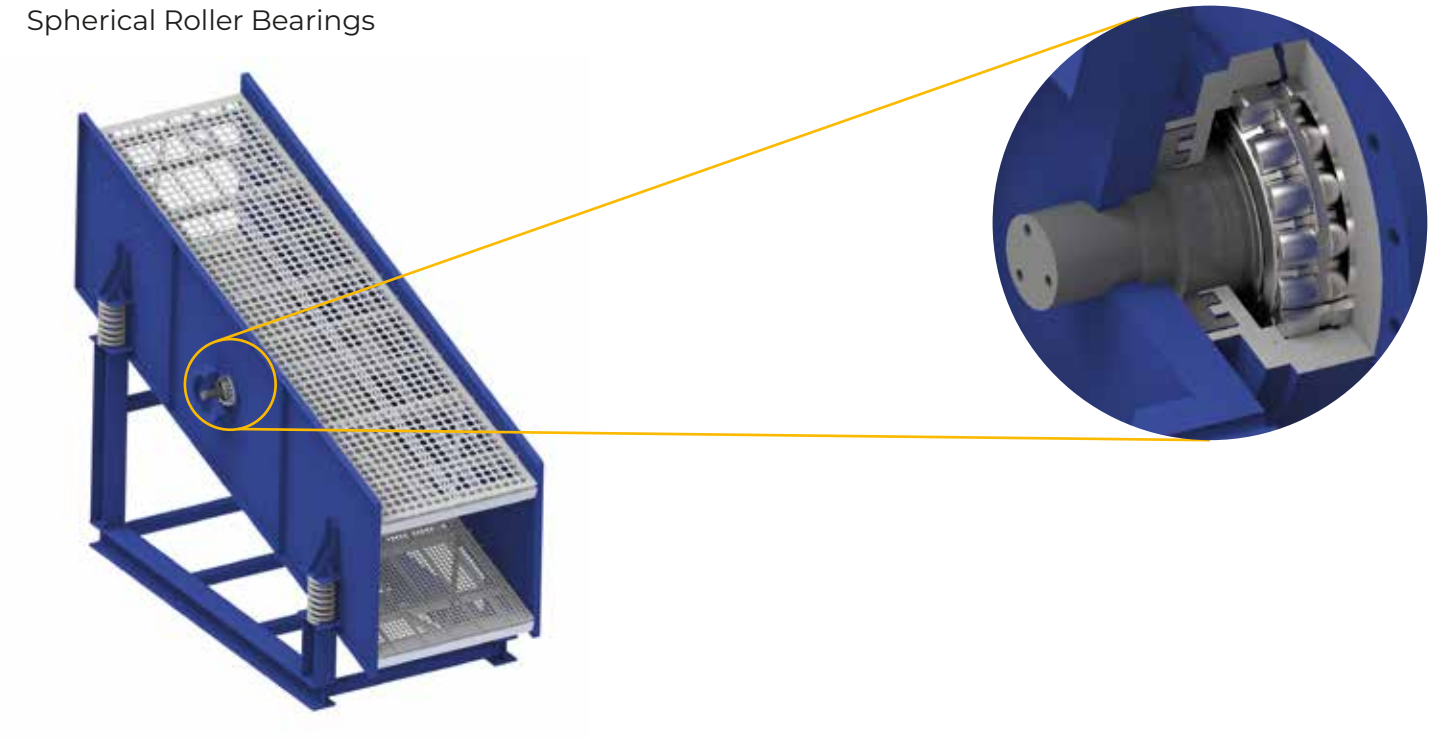


NBC solutions for Coal and Ash Handling Plant

SCREENING

Commonly used bearings:

Spherical Roller Bearings



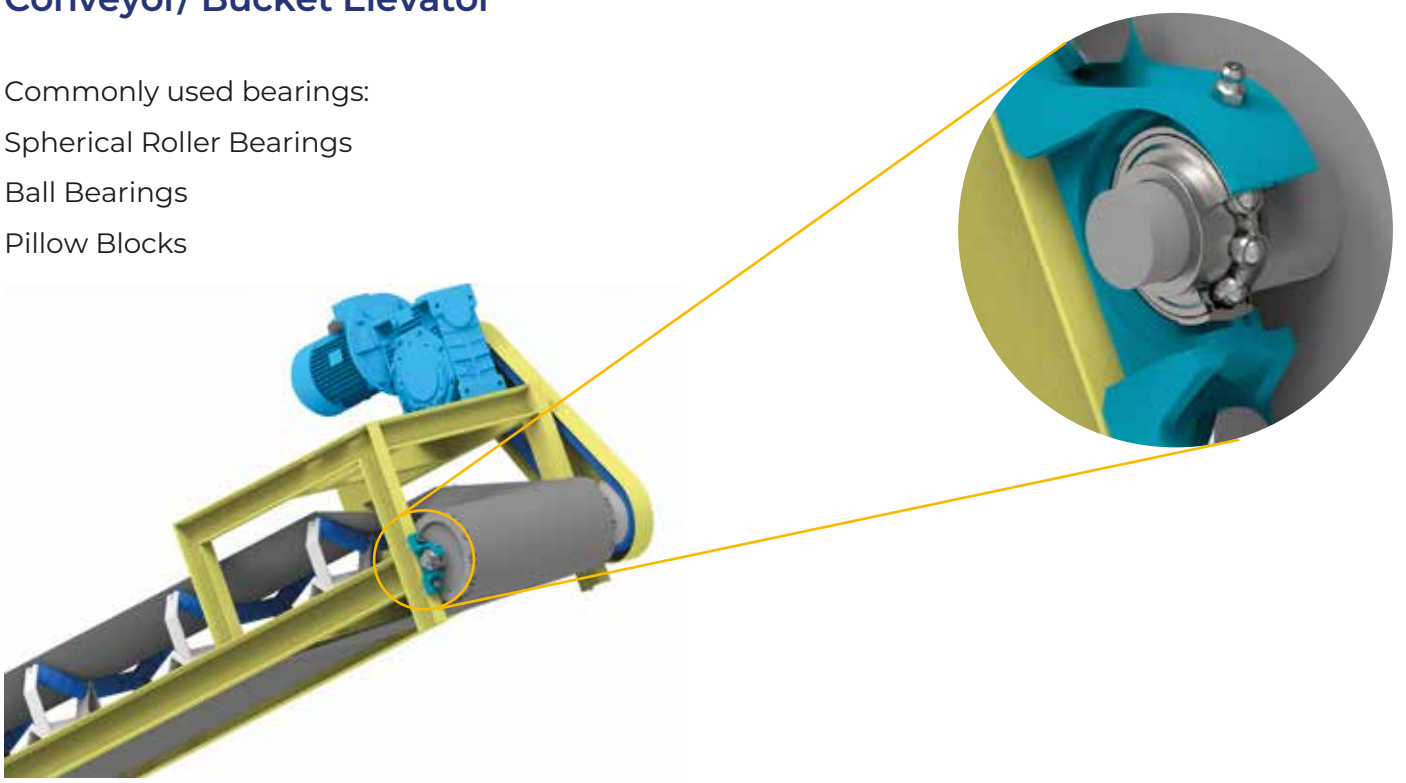
TRANSFERING:
Conveyor/ Bucket Elevator

Commonly used bearings:

Spherical Roller Bearings

Ball Bearings

Pillow Blocks



COAL PULVERIZER

Dynamic Classifier

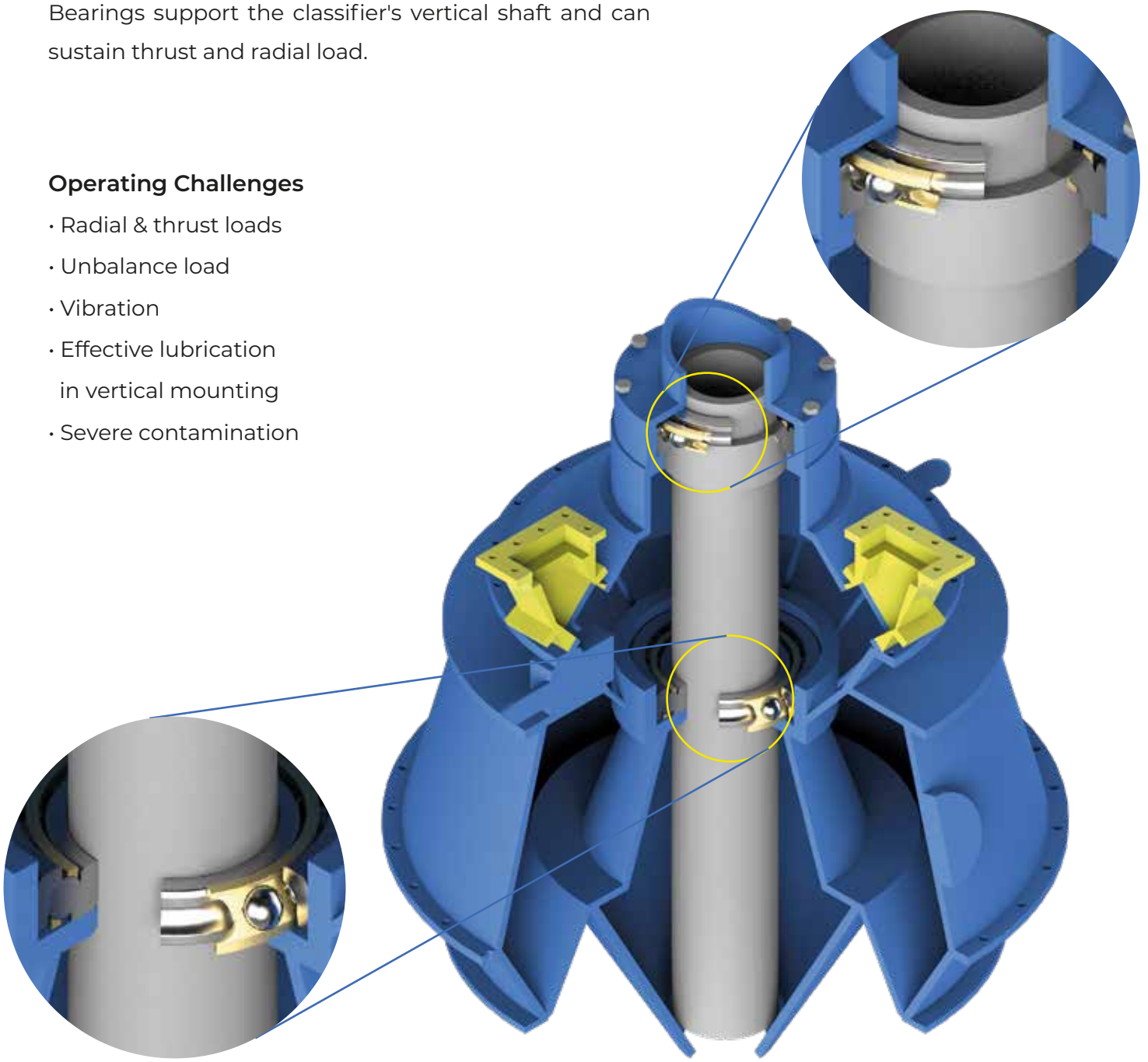
A mechanical structure inside the Coal Pulverizer classifies /segregates fine particles of coal from coarse particles. It has an inner rotating cage and outer stationary vanes, which provide centrifugal action and pushes the coal out of the classifier to the boiler. Bearings support the classifier's vertical shaft and can sustain thrust and radial load.

Key parts

- Coal feeder
- Bearings
- Rotating vanes
- Motor & gearbox

Operating Challenges

- Radial & thrust loads
- Unbalance load
- Vibration
- Effective lubrication in vertical mounting
- Severe contamination



Bearings used

- Angular Contact Ball Bearings
- Four-point Contact Ball Bearings
- Spherical Roller Bearings
- Deep Groove Ball Bearings

COAL PULVERIZER

Journal Assembly

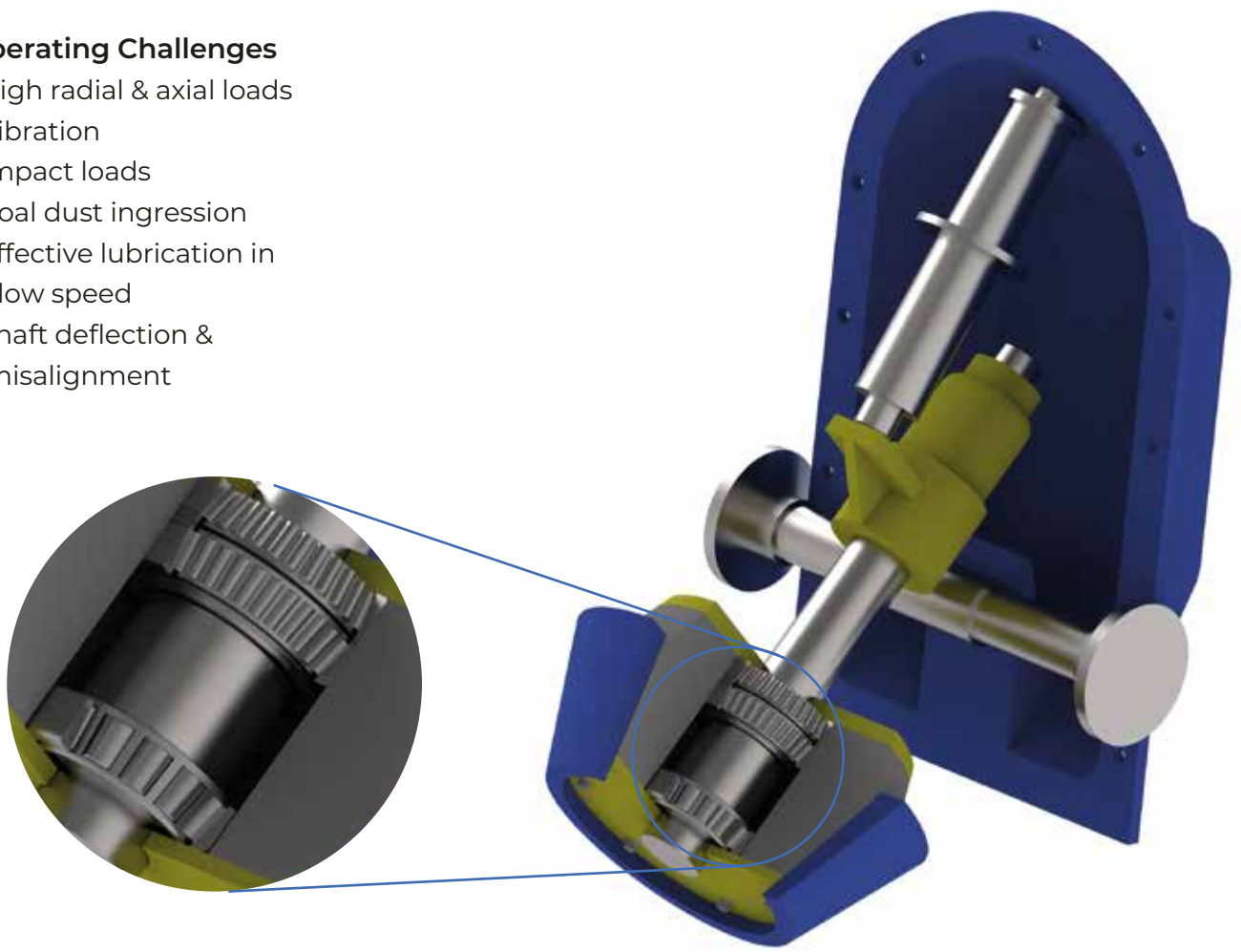
The primary function is to grind the coal by exerting pressure thro' grinding rolls. The Journal shaft is supported by bearings and provides rigidity to grinding roll during the crushing operation. The Journal assembly consists of lower bearing and upper bearings, which support radial and thrust loads during operation. NBC bearings are manufactured with special grade Materials and specific processes to counter Coal Mill operating conditions and enhance bearing service life.

Key parts

- Journal shaft
- Bearings
- Housing
- Seals
- Trunnion assembly

Operating Challenges

- High radial & axial loads
- Vibration
- Impact loads
- Coal dust ingression
- Effective lubrication in slow speed
- Shaft deflection & misalignment



Bearings used

- Single Row & Double Row Taper Roller Bearings
- Cylindrical Roller Bearings
- Spherical Roller Bearings

COAL PULVERIZER

Vertical Shaft & Gearbox

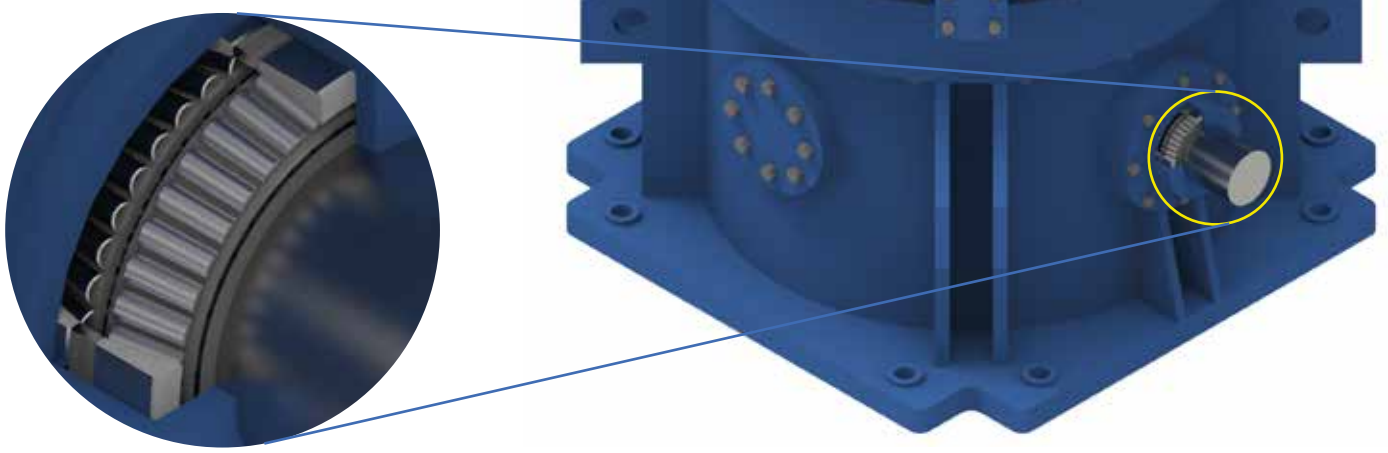
The function of the vertical shaft is to support the grinding table. The gearbox gives drive to the vertical shaft. Bearings mounted on the vertical shaft support the radial and thrust loads. Two types of gearboxes are used – worm and planetary.

Key parts

- Vertical shaft
- Bearings
- Grinding bowl
- Gears

Operating Challenges

- High radial & axial loads
- Effective lubrication
- Shaft deflection
- High temperature
- Contamination



Bearings used

- Thrust Bearings
- Spherical Roller Bearings
- Cylindrical Roller Bearings
- Taper Roller Bearings

Special variants

- Case carburized bearings to absorb shocks
- ASTB (Carbonitrided) bearings to protect against contamination
- Ready to assemble Pre-set bearings with controlled tolerances & BEP
- HCR (Tungsten carbide) Coatigs to protect bearing in boundary lubrication and contaminated environment.

AIR PREHEATER

An air preheater (APH) is a mechanical device that provides heated air to the boiler. It also recovers the heat from the boiler and exhaust gases from the economizer. Two types of bearings support the APH:

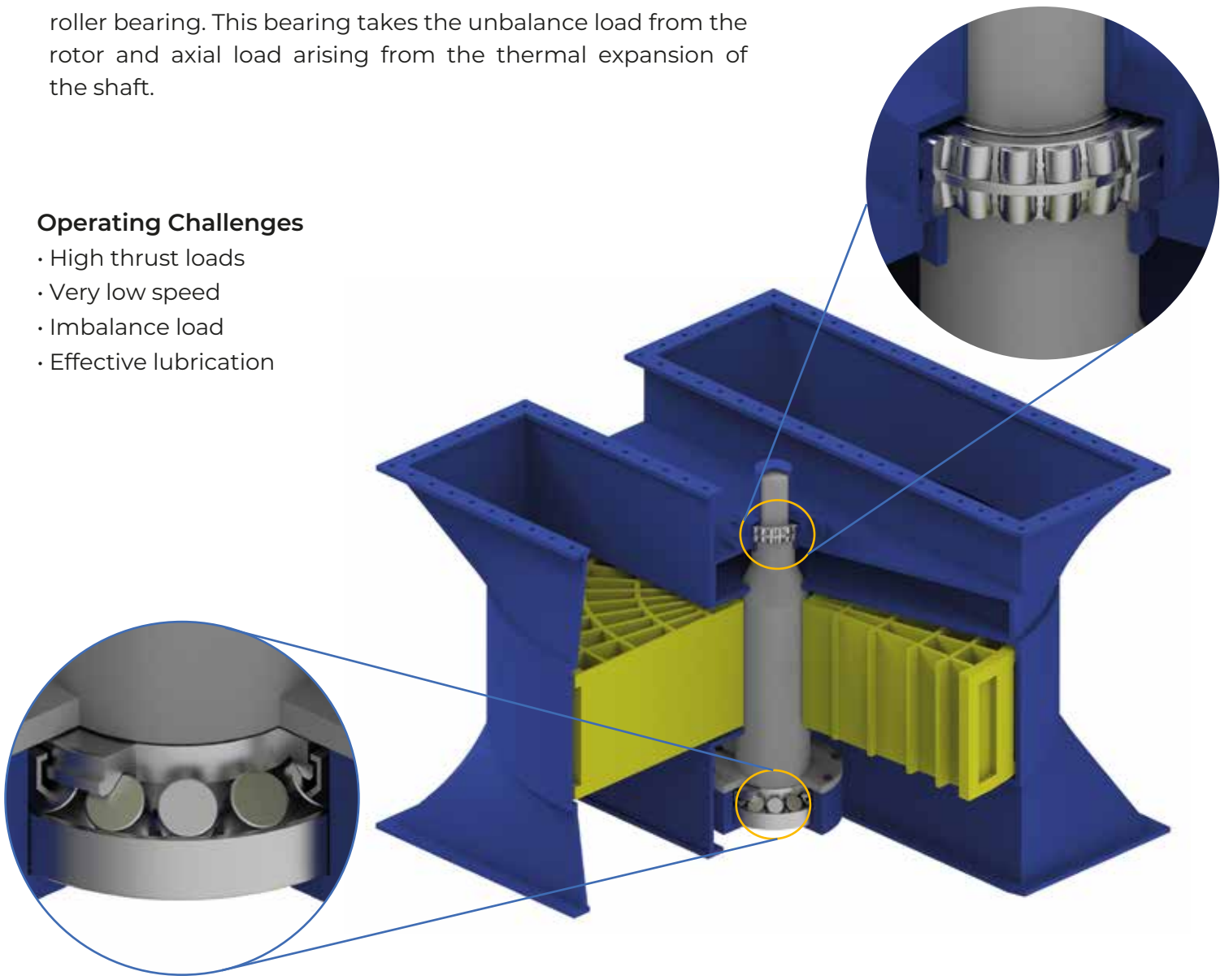
- The lower bearing, called the Support bearing, is a spherical roller thrust bearing supports the weight of the complete rotor assembly and can also take misalignment.
- The upper bearing, called the Guide bearing, is a spherical roller bearing. This bearing takes the unbalance load from the rotor and axial load arising from the thermal expansion of the shaft.

Key parts

- Top shaft
- Upper Bearing housing
- Rotor
- Bottom shaft
- Lower bearing housing
- Guide bearing
- Support bearing

Operating Challenges

- High thrust loads
- Very low speed
- Imbalance load
- Effective lubrication



Bearings used	• Thrust Spherical Roller Bearings • Spherical Roller Bearings
Special variants	• Case carburized bearings for improved toughness & superior performance • Bainitic hardened bearings for enhanced performance

FANS USED IN POWER PLANTS

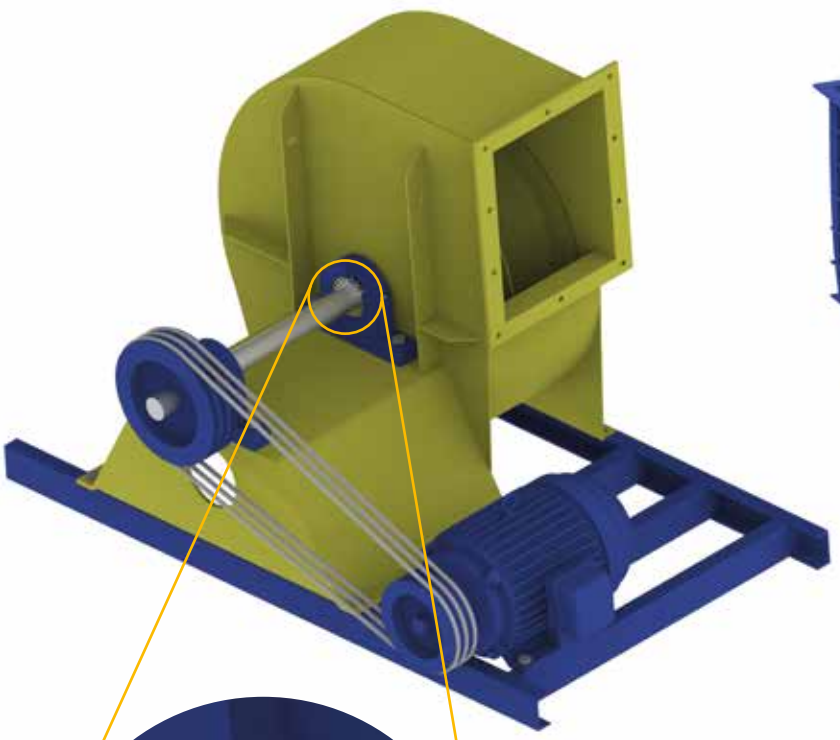
In power plants, fans move air /flue gas through a pressure-driven flow. The main parts of the fan consist of a rotating impeller enclosed in a casing connected to a shaft driven by the motor. Based on the direction of airflow or gas, Centrifugal and axial flow fans are widely used in power plants.

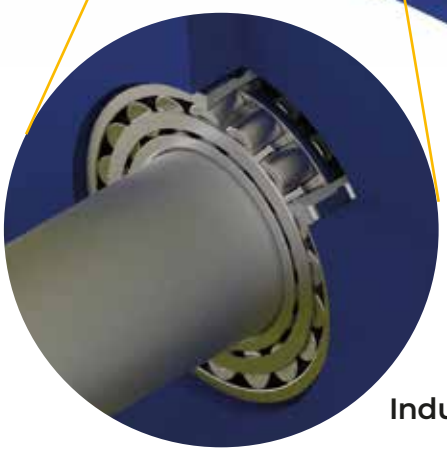
The main function of Fans in a Power Plant

- Supply air for combustion in Boiler
- Extract flue gases from Boiler – economizer
- Deliver fuel to the burner
- Circulate gases for better heat transfer.

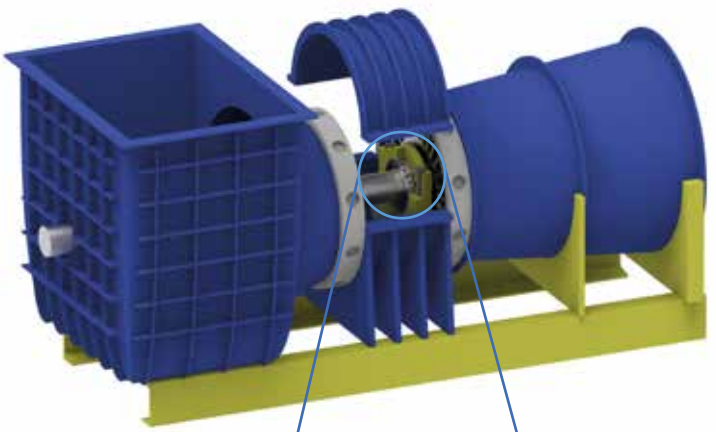
Operating Challenges

- High temperatures
- High vibration
- Unbalanced rotor
- High speed
- Low load

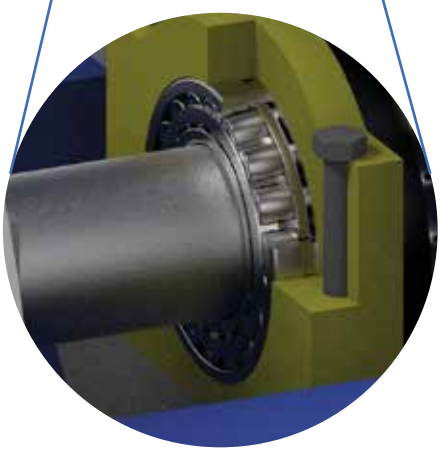




Induced Draft Fans



Forced Draft Fans



Bearings used

- Spherical Roller Bearings
- Angular Contact Bearings

AUXILIARY EQUIPMENT

Gearbox

Gearbox is an essential piece of equipment, and any breakdown would lead to serious implications. Therefore, the main challenge for the bearing is to match the high-reliability demand of the equipment.

NBC Benefits:

- Reduced friction and heat generation
- Better lubrication due to enhanced finishes
- Compact bearing designs

Bearings used

- Tapered Roller Bearings
- Spherical Roller Bearings
- Cylindrical Roller Bearings
- Deep Groove Ball Bearings

Pump

As pumps are exposed to heavy varying loads, it becomes imperative that bearings used shall sustain the stresses generated by these loads for reliable operation.

NBC Benefits:

- Reduced friction
- Reduced noise and vibration
- Less heat generation

Bearings used

- Deep Groove Ball Bearings
- Angular Contact Ball Bearings
- Tapered Roller Bearings
- Cylindrical Roller Bearings

AUXILIARY EQUIPMENT

Fans/blowers

The presence of contamination and unbalanced forces coupled with the problem of high speed and light load requires highly engineered bearings to meet reliability expectations.

NBC Benefits:

- Enhanced bearing life
- Low operating temperature
- Low maintenance

Bearings used

- Spherical Roller Bearings
- Self-aligning Ball Bearings
- Ball Housed Units

Motor

In the case of motors, it is important that the bearings ensure reliable, continuous smooth, and quiet rotation.

NBC Benefits:

- Low noise
- Low vibration
- Current insulation
- Longer operating life

Bearings used

- Deep Groove Ball Bearings
- Angular Contact Ball Bearings
- Cylindrical Roller Bearings

NBC'S SOLUTIONS FOR THE POWER INDUSTRY

2-Row TRB, 1-Row TRB and CRB

Application: Coal Pulveriser

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 avoids edge stresses
- **Robust pin-type cage design**
  Offers enhanced load rating due to increase no of rollers

SPHERICAL THRUST ROLLER BEARINGS

Application: Air Preheater

Features and benefits

- **Higher finishes on roller and races**
  Offers less heat generation and improved lubrication film
- **Maximum roller sizes**
  Offers higher load rating and longer life
- **Optimized contact geometry**
  Offers reduced working temperature, increased lubricant life, and reduced roller skewing
- **Optimized cage design**
  Offers proper lubricant flow and cooler running of the bearing

NBC'S SOLUTIONS FOR THE POWER INDUSTRY

Application: Wagon Tippler, Conveyor System, Crusher, Screening, Rotary Breaker, Ring Granulator, Coal Pulverizer, Air Preheater

STEEL CAGE BEARINGS

BRASS CAGE BEARINGS

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**
  This enhances load carrying capacity.

Size range	30-2000 mm OD
Variants	Straight bore, Tapered bore (1:12, 1:30)
Cage	Brass, Steel
Clearances	C2, CN, C3, C4, C5

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

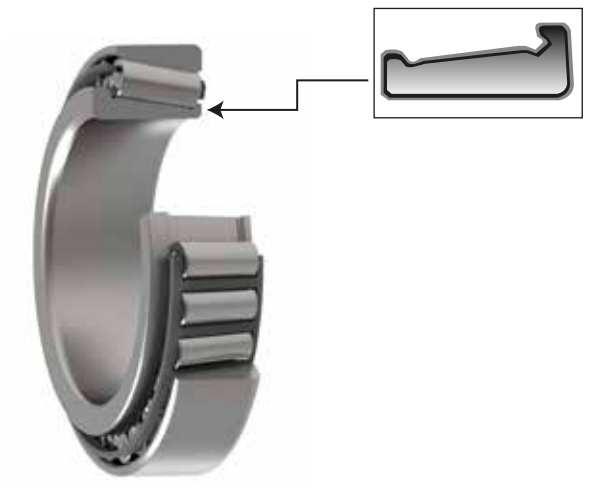
Benefits

- 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

CONDITION MONITORING SERVICES FROM NBC

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**
- **In-situ dynamic balancing**
- **Laser shaft alignment**
- **Thermography**
- **Annual maintenance contract / On-call service**

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.

Ball Bearings

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

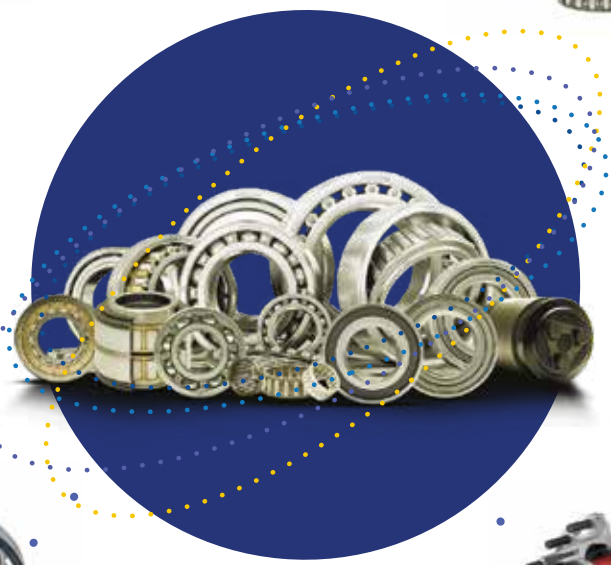
Tapered Roller Bearings

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

Needle Bearings

Thrust Bearings

- Ball thrust
- Roller thrust



Cylindrical Bearings

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

Pillow Block Bearings

- UCP
- UCF
- UCT

Spherical Bearings

- Roller
- Plain

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

* 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

1946
National Bearing Company was established

1958
Renamed as National Engineering Industries Limited; the NBC trademark retained.

1981
Bearing production started in Newai, Rajasthan

1982
Technical collaboration with BRENCO, USA for Cartridge Taper Roller Bearings

1985
Technical collaboration with NTN Japan

1995
ISO 9001 certification

2000
ISO-14001 and QS-9001 certification

2003
Received TS 16949 certification

2005
Bearing production started in Manesar, Haryana

2006
Received AAR certification

2007
TPM Excellence Award

2010

Deming Application Award

2014
Bearing production started in Savli, Gujarat.

2015

Became the world's only bearing manufacturing company to get the Deming Grand Prize

2017-18
- Industry 4.0 journey started
- Received the 'Great Place To Work' certification

2020
- Acquired Kinex Bearings, Europe.
- Featured in India's' top 100 companies to work for' list
- Launched Needle Roller Bearings
- The Jaipur plant received the IGBC Platinum certification

2021
- India's Best Workplaces in Manufacturing (Top 30)
- NEI Amsted JV Started in Bagru
- 75 years of incorporation.
- NBC Global Sales Office started in Switzerland

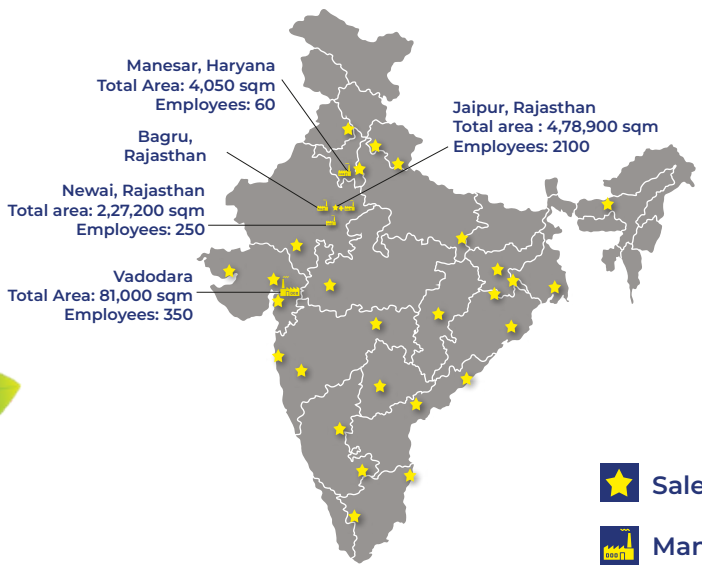
2022

- NBC Mascot Runningo launched
- Certified 'Great Place To Work' 5th year in a row
- NBC Kaili JV, China started
- NBC Global Technology Centre, Germany started

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.



Over 550 stockists and thousand of retailers across India

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