CKA Birla Group | nbc®

# Build a solid business that grows year after year!

## Role of bearings in chemical processing equipment

# 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.

77 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 manufacturing capacity
- 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

# BEARINGS FOR CHEMICAL PROCESSING EQUIPMENT

Spherical Roller Bearing

Deep Groove Ball Bearing

Pillow Block

Tapered Roller Bearing

Self-aligning Ball Bearing

Angular Contact Ball Bearing

# ROLE OF BEARINGS IN CHEMICAL EQUIPMENT

Chemical processing equipment refers to a wide range of machines and devices used in various industries to handle, transform, and process chemical substances. These processes can involve mixing, separating, heating, cooling, reacting, and other operations to produce desired products or achieve specific chemical changes.

It's important to note that different industries have unique requirements, so the selection and design of bearings for chemical processing equipment depend on the specific needs and characteristics of the processes involved.

Bearings play a crucial role in chemical equipment by providing support and enabling smooth rotational or linear movement of various components. They are essential for the proper functioning and reliability of machinery used in chemical processing. The main roles of bearings in chemical equipment include:

- Reducing Friction to prevent energy losses
- Supporting Rotational and Linear Motion
- Handling Heavy Loads to prevent premature failure
- Alignment and Stability for reducing vibration and ensuring stable operations
- Contaminant exclusion ensuring the equipment's longevity and reliability
- Resistance to corrosion to that equipment can withstand harsh environment

In conclusion, bearings are integral components in chemical processing equipment, providing support, minimizing friction, and enabling the smooth movement of various components. Proper selection, installation, and maintenance of bearings are critical to ensuring the efficiency, safety, and longevity of chemical processing machinery.

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## BELT CONVEYOR

Bearings have a critical role in the functionality of belt conveyors employed in chemical processing equipment. These bearings are strategically positioned in the rollers and pulleys along the conveyor belt's path, thereby facilitating the smooth movement of the conveyor belt.

By doing so, bearings contribute significantly to minimizing energy consumption and wear, ensuring the conveyor operates efficiently in handling chemical materials.

**Bearings used**

- Spherical Roller Bearing

## BUCKET ELEVATOR

In a bucket elevator, bearings play a critical role in supporting and maintaining the stability of the rotating shafts, pulleys, and buckets throughout the material lifting process. These bearings withstand heavy loads and provide a smooth rotational movement.

The proper functioning of bearings in a bucket elevator is vital for reducing friction and preventing excessive wear on moving parts, leading to longer equipment.

**Bearings used**

- Spherical Roller Bearing
- Deep Groove Ball Bearing
- Pillow Block
- Self-aligning ball bearing

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## PADDLE MIXER

In Paddle mixer the bearings support the rotating shaft and paddles. These bearings endure the dynamic forces generated during mixing, providing smooth and efficient rotational movement.

Properly functioning bearings reduce friction, prevent excessive wear, and contribute to the mixer's overall reliability and ensure optimal performance.

**Bearings used**

- Pillow Block Unit

## DISC PELLETIZERS

In Disc Pelletizers, bearings are essential for supporting the weight of the rotating disc and the material being pelletized. The bearings enable smooth and efficient rotation, which ensures uniform pellet formation and optimal pelletizer performance.

Regular maintenance and proper lubrication of the bearings are crucial to prevent downtime, minimize wear, and maintain a reliable and productive chemical processing operation.

**Bearings used**

- Spherical Roller Bearing
- Tapered Roller Bearing

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## HAMMER MILL

The bearings play a critical role in supporting the rotating hammers and the main shaft. These bearings endure heavy and shock loads and impacts during the pulverization process, providing smooth and reliable rotational movement.

Properly functioning bearings contribute to the hammer mill's overall efficiency and maintain consistent particle size reduction in chemical processing operations.

Bearings used

- Spherical Roller Bearing
- Taper Roller Bearing

## ROTARY DRYER

In a Rotary Dryer used in chemical processing, bearings serve as critical components that support the rotating drum's weight. The drum, containing the chemical material to be dried, relies on the bearings to endure the substantial loads and provide stable rotation throughout the drying process.

Properly functioning bearings not only ensures the Rotary Dryer's optimal performance but also extends its operational life, contributing to cost-effectiveness.

Bearings used

- Pillow Block Bearing

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## ROTARY KILN and COOLERS

In chemical processing, the Rotary Kiln relies on bearings to support its rotating drum, enduring substantial loads and extreme temperatures. The bearings play a crucial role in facilitating smooth and reliable rotation, crucial for effective heat transfer and chemical reactions within the kiln.

Proper maintenance of the bearings is vital to minimize friction and prevent excessive wear, ensuring the Rotary Kiln and cooler's reliability and extended lifespan.

**Bearings used**

- Spherical Roller Bearing
- Pillow Block Bearing

## AGITATORS

The function of agitators is to mix or blend substances within a vessel, promoting uniformity and enhancing reaction rates. Bearings in the agitator facilitate the smooth rotation of the shaft, enabling the agitator to perform its mixing function effectively.

By reducing friction and providing support, bearings ensure the agitator operates efficiently and reliably, allowing for consistent and precise mixing in various chemical processes.

**Bearings used**

- Angular Contact Ball Bearing
- Taper Roller Bearing

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## CENTIFUGE

Bearing plays a vital role in centrifuge equipment used in the chemical processing industry, providing support, and reducing friction for components like the centrifuge bowl and shaft. Their reliable and well-maintained presence allows for high rotational speeds.

Bearings contribute to the overall performance and the productivity of centrifuge in chemical processes, by ensuring consistent and effective substance separation.

**Bearings used**

- Angular Contact Ball Bearing

# NBC SOLUTIONS FOR 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

## PUMPS

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

# NBC SOLUTIONS FOR AUXILIARY EQUIPMENT

## MOTORS

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

## 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

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## TAPERED ROLLER BEARING

### Features and benefits

- Optimized geometries of raceway and rolling elements
  for improved load capacity

- Precise cages
  play for enhanced bearing life

- Modified crowning on rollers/races
  for reduced roller stresses and uniform load distribution

- Case hardened
  (on demand) for Increased shock resistance and enhanced life

- Superior surface finish on raceways
  for reduced friction and low operating temperature

- Improved design of large cone flange
  for reduced friction and bearing torque

## PILLOW BLOCK BEARING

### Features and benefits

- **Robust cage design**
  for better performance

- **Nitrile Rubber seal**
  with excellent resistance tone contamination

- **Lubrication groove**
  provides uniform distribution of lubricant

- **Outer ring with spherical outside diameter** to accommodate misalignment between shaft and housing

- **Lubrication hole**
  for adequate & frequent re-lubrication

- **Flinger Ring**
  provides primary resistance to coarse contamination

- **Robust housing design**
  provides adequate support to a wide range of loads

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## STEEL CAGE SPHERICAL ROLLER BEARING

## BRASS CAGE SPHERICAL ROLLER BEARING

### 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 |

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## 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

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## 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

# NBC SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## 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 SOLUTIONS FOR CHEMICAL PROCESSING EQUIPMENT

## 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

# 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**
- **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)

## Spherical Bearings

- Roller
- Plain

## Pillow Block Bearings

- UCP
- UCF
- UCT

## 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
- 77 years of incorporation.
- NBC Global Sales Office started in Switzerland

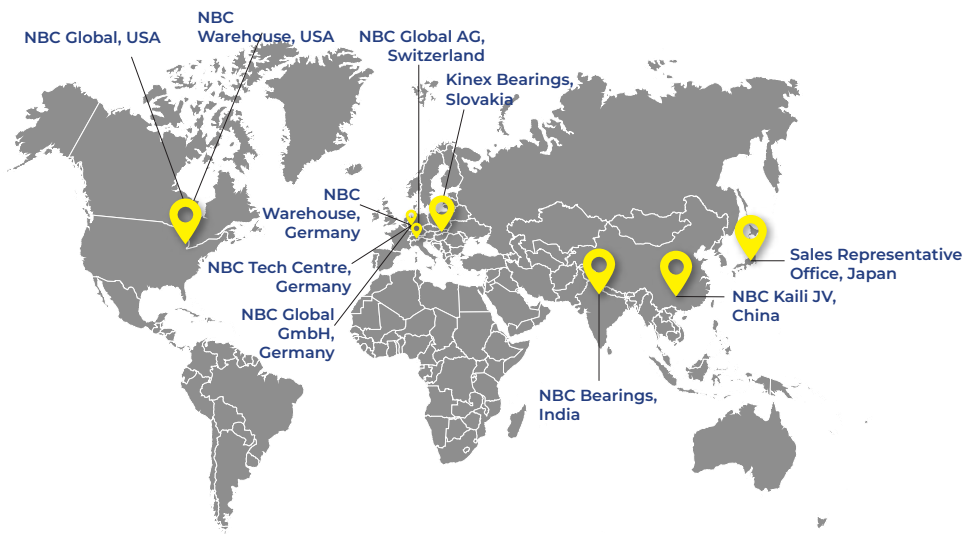
**2022**

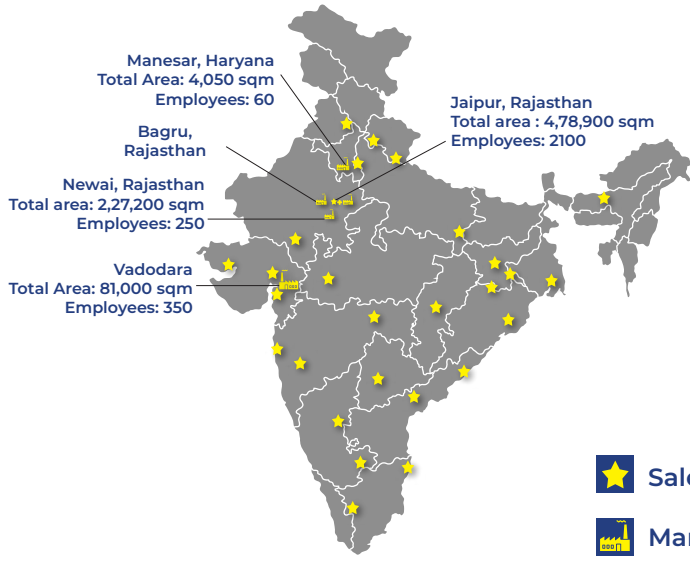
- NBC Mascot Runningo launched
- Certified 'Great Place To Work' 5th year in a row
- NBC Kaili JV, China started
- NBC Global Technology Centre, Germany started

# 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 77 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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