CELEBRATING 75 YEARS

CKA Birla Group | nbc®

Build a solid business that grows year after year!

Bearing solutions for the Cement Industry

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

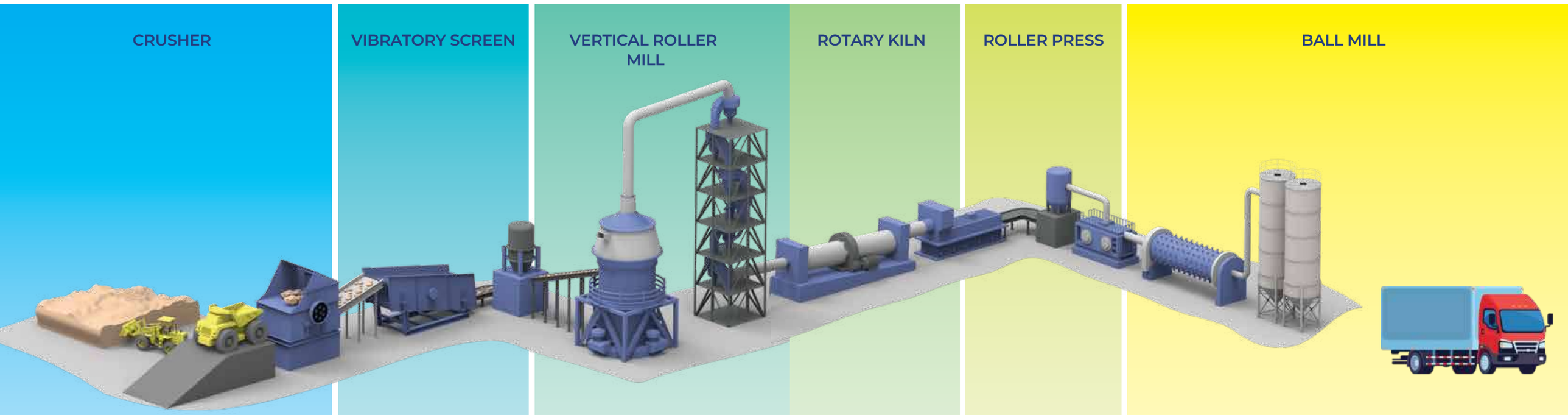
Automotive

Industrial

Railway

Aerospace

CEMENT MANUFACTURING PROCESS



Spherical Roller Bearing

Thrust Tapered Roller Bearing

Tapered Roller Bearing

Spherical Roller Bearing

Cylindrical Roller Bearing

Two Row Tapered Roller Bearing

Spherical Roller Bearing

Four Row Cylindrical Roller Bearing

Spherical Roller Bearing

Spherical Roller Thrust Bearing

Spherical Roller Bearing

Why NBC bearings are important for the Cement Industry

Cement is one of the widely-used construction materials in the world. Its production is a complex process involving both mechanical grinding processes and chemical transformation of raw material at high temperatures.

The preparation of cement starts with quarrying the principal raw material: limestone and clay, followed by primary and secondary crushing. The further process involves fine grinding of crushed material to produce a raw powder consisting of a particle of 1-micron size of defined composition. The output is then fed to a Rotary Kiln, where the raw powder is sintered to form a clinker. Once the clinker is cooled, it is ground and mixed with gypsum to form cement.

Some of the key applications in cement manufacturing are Mining Equipment, Crushers, Vibratory Screen, Vertical Roller Mill, Rotary Kiln, Clinker Cooler, Roller Press, and Ball Mill.

Like in any other industry, bearings play an integral role in almost every strategic machinery used at every stage of cement manufacturing too. A small failure in the bearing can impact the machinery's operation, which can result in unplanned stoppage and increase in production downtime. Therefore, it is essential that bearing is explicitly designed in accordance with the operational challenges of the industry.

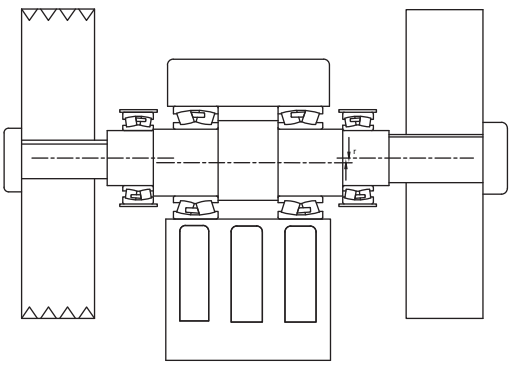
The operating conditions may vary depending upon the application. However, in essence, the bearing must be resilient enough to survive severe operating environments such as:

1. High temperature
2. Contamination: debris, water, and dust
3. Heavy loads
4. High vibrations
5. Hard to reach areas for maintenance and monitoring

NBC Bearings offers standard and special bearing solutions for the stable and continuous working of the equipment and smooth production. With a robust and sustainable design, the bearings will perform in the most demanding conditions and require low maintenance. Furthermore, long service life will substantially maximize the uptime, thereby increasing productivity and profitability.

CRUSHER: JAW CRUSHER, CONE CRUSHER, IMPACT CRUSHER

Machinery widely used in the cement production industry, crusher grinds limestone and other materials into proper size pieces. In the first step in cement making, the large boulders of rock are directly fed to the crusher. As the machine used for the crusher must operate with high efficiency and reliability, the supporting bearings must be capable of withstanding all operating parameters and requirements. The standard crushers used in cement manufacturing are the Jaw crusher, Cone crusher, and Impact crusher.



Operating Challenges

- Contamination
- Overloading
- High impact forces
- High temperature

Bearings used

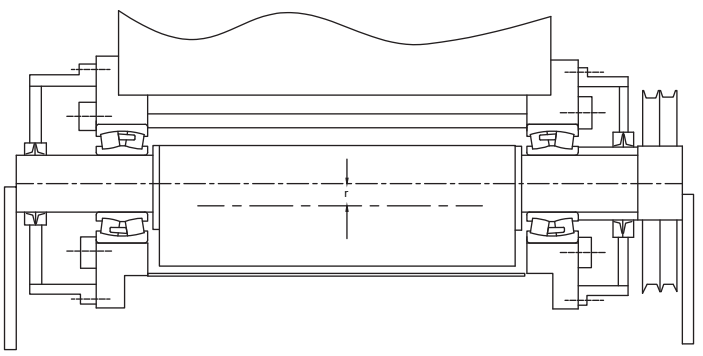
- Spherical Roller Bearings (Jaw Crusher and Impact Crusher)
- Thrust Cylindrical Roller Bearings (Cone Crusher)
- Thrust Taper Roller Bearings (Cone Crusher)
- Tapered Roller Bearings (Cone Crusher)

Special Variants

- HCR (Tungsten Carbide Coating)
- Case Carburized

CLASSIFYING: VIBRATORY SCREEN

Vibratory screens are used for grading solid matters such as limestones, ores, coal, etc. The primary function entails separating granulated material as per the required size. The rolling bearings used in vibratory screens require to perform a circular, elliptical, and linear motion in addition to severe working conditions.



Operating Challenges

- High vibration
- High radial and centrifugal forces
- Moisture & contamination
- High acceleration in rollers
- Housing deformations

Bearings used

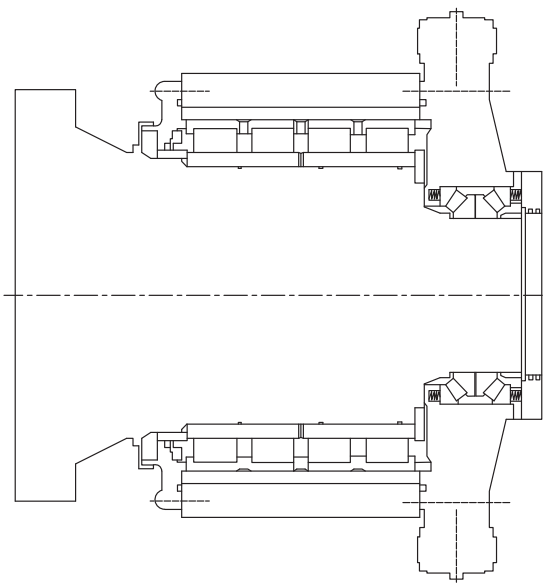
- Spherical Roller Bearings

Special Variants

- Black Oxide or PTFE coating on inner ring bore to avoid fretting corrosion

ROLLER PRESS

Also known as horizontal mills, roller presses are primarily used for coarse and fine grinding of high-size material to moderate-size before the material is fed for final nano-size grinding. As the rollers are used for high-pressure grinding, the roller press must be supported by reliable and high-performance bearings for uninterrupted operation.



Operating Challenges

- Heavy and shock loads
- Low speed
- Contaminated ambience
- High misalignment due to shaft deflections
- High temperature

Bearings used

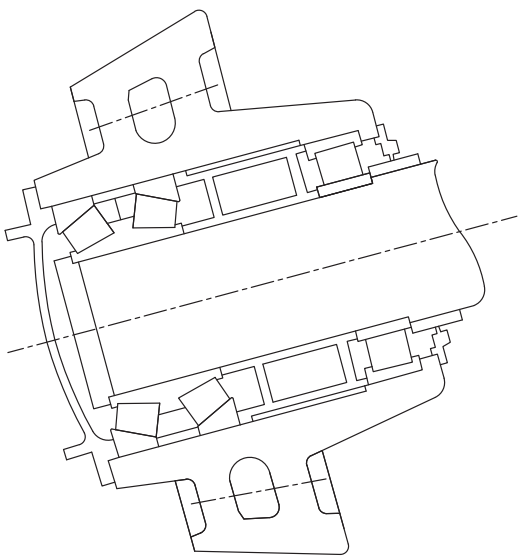
- Four Row Cylindrical Roller Bearings
- Spherical Roller Bearings
- Thrust Spherical Roller Bearings

Special Variants

- HCR (Tungsten Carbide Coating)
- Case Carburized

RAW MATERIAL GRINDING: VERTICAL ROLLER MILL

A type of grinder, a vertical roller mill, is used for grinding bulky granular material into powdery material. This is accomplished by feeding the material between the grinding roller and the rotating bed, where the bed has a vertical axis, and the rollers have an inclined or horizontal axis. The grinding roller operation is supported by high-quality bearings to endure the critical operating cycle.



Operating Challenges

- High grinding forces
- High moment loads
- High temperature
- Contamination
- Shock loads

Bearings used

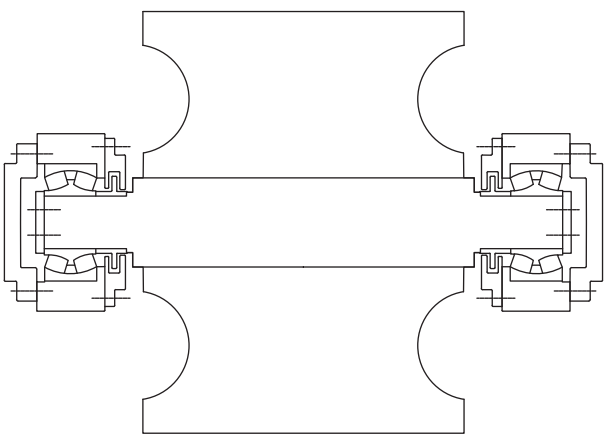
- Cylindrical Roller Bearings
- Two-row Tapered Roller Bearings (face to face)
- Spherical Roller Bearings

Special Variants

- HCR (Tungsten Carbide Coating)
- Case Carburized Bearings

ROTARY KILN

An essential piece of equipment used for calcining cement clinker, the rotary kiln is a large process unit where limestone and clay are decomposed at high temperatures to form clinker. The rotary kiln is backed by supporting rollers that are in line contact with kiln tyres. The supporting roller assembly consists of spherical roller bearings that not only bear the load of the rotating part but also ensure smooth and flexible rotation.



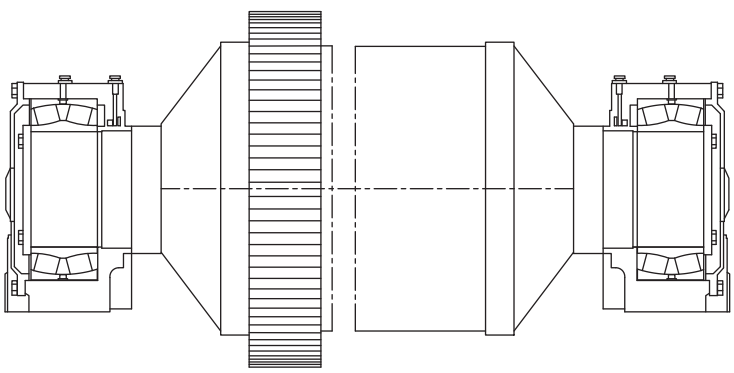
Operating Challenges

- Very low speed
- High temperature
- High load
- Axial load due to kiln displacement (Kiln Floatation)

Bearings used	• Spherical Roller Bearings
Special Variants	• HCR (Tungsten Carbide Coating)

CEMENT MILLING – BALL MILL

A grinding mill, the cement ball mill, is used to grind the clinker and raw material to produce finished products through rotatory motion. The rotation of the mill causes tumbling motion, thereby generating fluctuating loads on the bearings. The ball mill is supported by a trunnion which consists of oil bearings or spherical roller bearing, whereas the driveshaft pinion is supported by spherical rolling bearings.



Operating Challenges

- High temperature
- Heavy loads
- Low speed rotation
- Restricted outer ring floating in housing (trunnion bearing).

Bearings used

- Spherical Roller Bearings

Special Variants

- HCR (Tungsten Carbide Coating)
- Case Carburized 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 PRODUCT OFFERINGS

SPHERICAL ROLLER BEARING

Application: Crusher, Roller Press, Vertical Roller Mill, Vibratory Screen, Rotary Kiln, Ball Mill

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
For enhanced load carrying capacity

TWO ROW TAPERED ROLLER BEARING (TDI)

Application: Vertical Roller Mill

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

Modified 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

NBC PRODUCT OFFERINGS

FOUR ROW CYLINDRICAL ROLLER BEARING

Application: Roller Press

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

Modified 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.

SPHERICAL THRUST ROLLER BEARING

Application: Roller Press, Cone Crusher

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

SPECIAL PRODUCTS

HCR - WEAR RESISTANT BEARING

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

Features

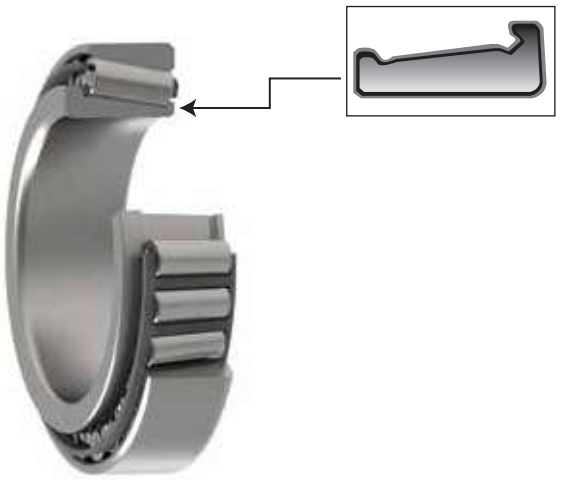
- Optimized coating with metal-containing amorphous carbon with a multilamellar structure
- No columnar structure provides high adhesion strength
- High dimensional accuracies

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

CASE CARBURIZED BEARING

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

SPECIAL PRODUCTS

BLACK OXIDE BEARING

The black oxide conversion treatment is applied to the rings and rolling elements to improve lubricant adhesion on the raceway, which enhances the performance of bearings by reducing smearing wear and micro pitting, especially during run-in periods.

Features

- Increased wear resistance during initial running-in period
- Improved adhesion properties of lubricant
- Repels chemical attack from aggressive oil additives
- Reduced hydrogen permeation

Benefits

- Increased performance under lubricant oil starvation condition
- Longer operating time
- Higher machine availability
- Increased wear resistance

OIL IMPREGNATED BEARING

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 PRODUCTS

SEALED SPHERICAL ROLLER BEARING

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 BEARING

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 PRODUCTS

HIGH TEMPERATURE BEARING

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 BEARING

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

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)

Cylindrical Bearings

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

Spherical Bearings

- Roller
- Plain

Needle Bearings

Thrust Bearings

- Ball thrust
- Roller thrust

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

2022

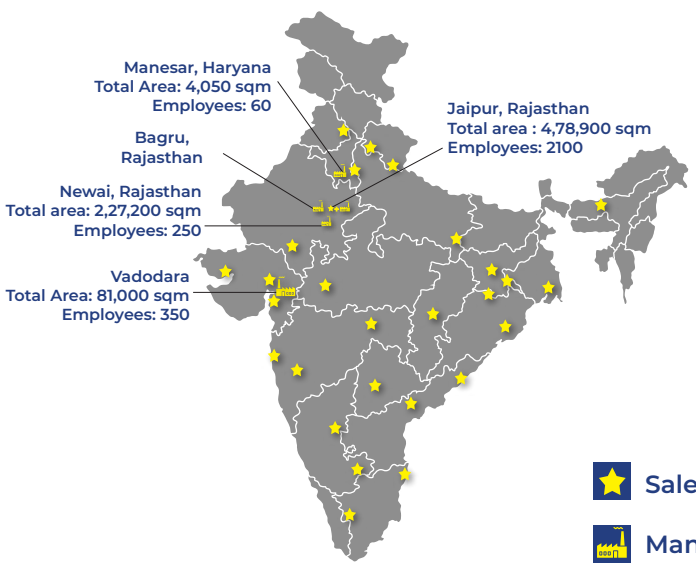
- NBC Mascot Runningo launched
- Certified 'Great Place To Work' 5th year in a row
- NBC Kaili JV, China started
- NBC Global Technology Centre, Germany started

WHO IS NBC

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

National Engineering Industries Ltd
Khatipura Road, Jaipur, Rajasthan, India 302 006
T: +91 141 2223 221 | F: +91 141 2222 259 | Toll free: 1800 3000 6222
E: neilsales@nbcbearings.in

Follow us on: | /nbcbearings | www.nbcbearings.com

WINNER DEMING GRAND PRIZE