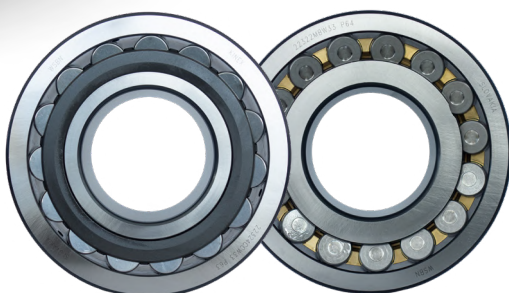


KINEX

120 anniversary



**KINEX BEARINGS**  
Bearings for Mining Industry  
and Vibrating Devices



## Brief introduction

### Reliable partner in creation of new motion solutions

KINEX BEARINGS belongs with its portfolio among important global suppliers of standard and special rolling bearings as well as engineering components aimed for beddings in various industrial applications. The main task and goal is to ensure supplies of complete bearings assortment manufactured in individual plants, to develop cooperation with customers and to provide them services in accordance with their requirements.

In order to achieve maximum customer satisfaction and a flexible response to market requirements, KINEX BEARINGS integrates research and development, planning, production and comprehensive sales and after-sales service.

The required product properties are supported by our own R&D department, testing and material laboratory. We are also experienced in non-destructive quality control of individual parts in the production process.

## Quality

The focus on clients, with the aim of fulfilling their requirements and expectations, is one of the basic foundations of the company's strategy. The implementation of a certified quality management system in all the KINEX BEARINGS companies is an efficient tool for the correct identification of requirements and expectations from clients as well as for monitoring and increasing their satisfaction.

### Quality certificates

- > AS 9100
- > ISO 9001
- > ISO 14001
- > ISO 45001
- > ISO 50001
- > IATF 16949
- > ISO/TS 22163:2017
- > Nadcap AC7102
- > TSI
- > EN 1090-1
- > EN 1090-2



80 Countries  
100000+ Products

115+ Years of experience  
70+ Industry sectors served

### From ideas, through innovations, to perfection ...

- > World's No.1 supplier of special bearings for textile industry
- > European leader in cylindrical roller bearings for railway vehicles
- > One of the world's suppliers of special bearings for water pumps for automotive
- > Stable partner for customers all around the world
- > Manufacturer of high precision engineering components for various industrial sectors

## Historical milestones

- 1906 > **KINEX, a.s.**  
foundation of the plant in Bytca, beginning of the engineering production „Povazsky zelezopriemysel“
- 1948 > **KINEX- KLF, a.s.**  
foundation of the plant in Kysucke Nove Mesto
- 1950 > **Production of balls and ball bearings**  
the first produced bearing in Slovakia was 6204 type
- 1953 > **Production of rollers and cylindrical roller bearings**  
single-row cylindrical roller bearings
- 1959 > **Production of railway bearings**  
single-row cylindrical roller bearings for railway vehicles
- 1964 > **Production of aerospace bearings**  
for various aerospace industry applications
- 1968 > **Production of textile industry bearings**  
special double-row ball bearings
- 1978 > **Production of water pump bearings**  
special double-row bearings
- 1987 > **Production of bottom bracket bearings**  
special double-row bearings
- 2005 > **KINEX BEARINGS, a.s.**  
foundation of a trading company
- 2009 > **New aerospace bearings production area**  
realized in Bytca plant
- 2011 > **Production of minning and vibration bearings**  
realized in Kysucke Nove Mesto plant
- 2013 > **KINEX Trading (Shanghai) Co., Ltd**  
foundation of a subsidiary in China
- 2016 > **Merger of companies**  
KINEX BEARINGS, a.s., KINEX - KLF, a.s. and KINEX, a.s. merge into KINEX BEARINGS, a.s.
- 2016 > **Production of engineering components**  
foundation of Machinery division
- 2020 > **CK Birla Group**  
KINEX BEARINGS enters international industrial group

## Headquaters and production plants



### Slovakia, Bytča (HQ)

Total land area: 86 336 m<sup>2</sup>  
Production area: 41 659 m<sup>2</sup>  
Established from: 1906



### Slovakia, Kysucké Nové Mesto

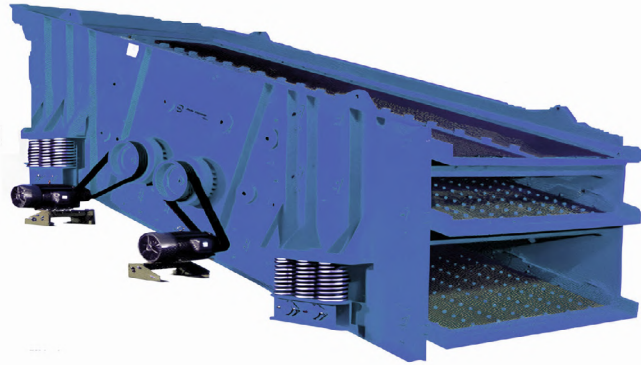
Total land area: 97 713 m<sup>2</sup>  
Production area: 63 571 m<sup>2</sup>  
Established from: 1948





# KINEX vibrating screen bearings (VSB) introduction

Precision and durability for high-vibration applications



## Vibrating screen applications

- Mainly used in mining vibration equipments, vibrating screen machinery, vibration motor.
- It can be used for dry and wet classification of coal preparation, mineral processing, building materials, chemical industry and other departments.
- Diesel locomotives, ships, motorcycles and other means of transportation.
- Tractors, harvesters, threshing machines and other agricultural machinery.

- According to the movement track of the screen frame, the vibrating screen can be divided into two categories: the circular vibrating screen and the linear vibrating sieve.



Vibrating screen is a kind of sieve widely used in mineral processing plant, and it has the following outstanding advantages:

01

The sieve body makes strong vibration with low amplitude and high vibration times, eliminates the phenomenon of material blockage, and makes the sieve have higher screening efficiency and production capacity.

02

The structure is simple, and the operation, maintenance and repair are relatively convenient.

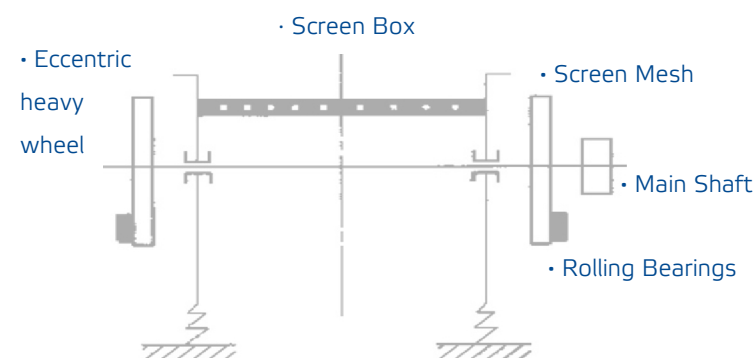
03

Because the productivity and screening efficiency of vibrating screen are very high. Therefore, the required screen area is smaller than other sieves to save the area and height of the plant.

04

Wide range of applications. It is suitable for pre-screening and inspection screening before medium and fine crushing.

Schematic diagram of working principle of vibrating screen



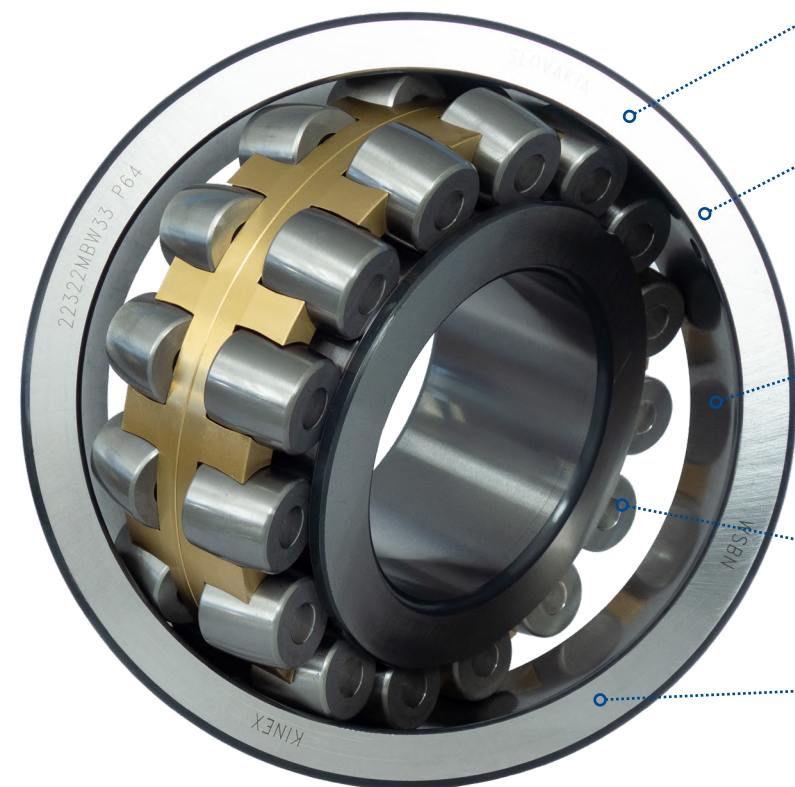
## General situation of vibrating screen bearings

The working condition of these bearings is very bad, not only environmental humidity, dust particles, high speed, high temperature, but there is a strong vibration impact, resulting in a very large workload. Such bearings have the following requirements:

- Bearing design should have good ability to bear radial force and impact force.
- The self-aligning function should compensate the misalignment caused by the deformation of the shaft.
- Can bear two-way axial force.
- Can bear large axial force, the maximum can even reach 1/3 radial force.

## Bearing characteristics

- Vibration screen bearings are generally with symmetrical spherical rollers.
- In general, the dimensional tolerance is P6, and the running tolerance is P5.
- Because of the high increasing of working temperature, big clearance is the best choice. But this clearance are calculated mainly by considering the original clearance, tolerance and temperature rise.
- The application requirements of vibrating screen bearings are very high, and they have certain requirements for bearing steel materials and heat treatment. There are two types cages: brass cage and stamped steel cages, which are usually guided by outer rings, so as to be applicable to the impact loads caused by external eccentric blocks.



**Raw material:** The use of high-quality steel including grinding cast material, northeast special steel.

**Heat treatment:** The most advanced AICHILIN heat treatment equipment is adopted. The salt bath heat treatment in protect the atmosphere, ensure the uniformity and stability of quenching, and enhance the wear resistance and impact resistance of the products.

**Inner ring raceway grinding:** Horizontal five axis high precision double one-time plunge grinding machine can well control the two raceways diameter size difference and position.

**Rollers:** Processing by CNC machining equipments, and after two times size sorting, can guarantee the same bearing roller size tolerance less than 2 μm.

**Outer ring:** To optimize the wall thickness design, there are oil holes and oil grooves on the outer ring surface; the tempering stabilize the dimension and has higher impact resistance



# KINEX vibrating screen bearings (VSB) introduction

Precision and durability for high-vibration applications

In order to better meet the requirements of the vibration screen to the bearings, we are focusing on the development of new special bearings for vibration screen

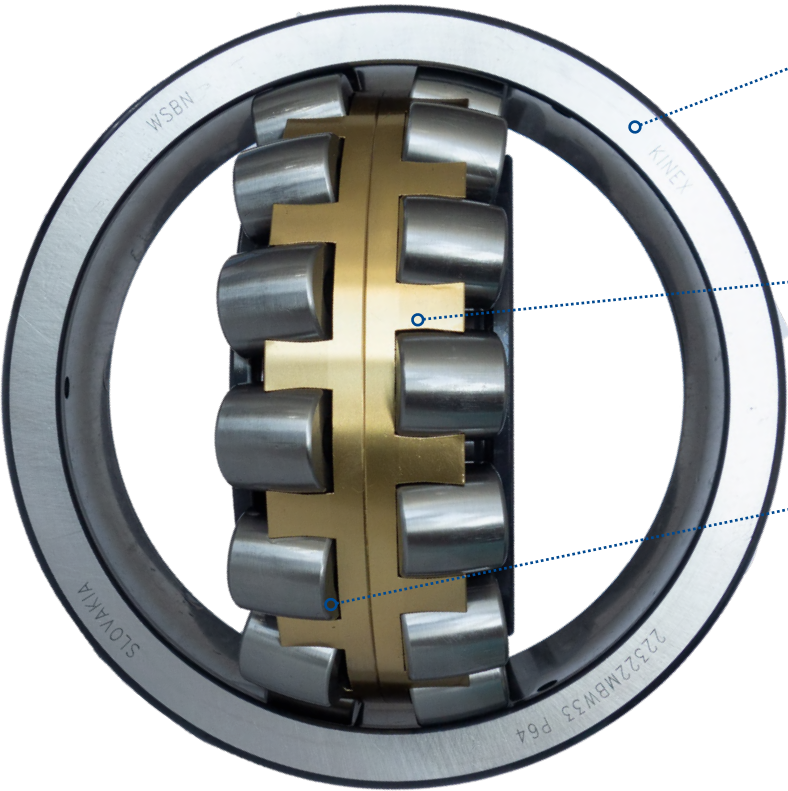
**Internal Clearance:** The special clearance Standard enables the bearing to have longer service life on mining equipments. (Actual clearance will be 80% of the standard clearance.)

**Contact rate:** By controlling the roller’s radius to achieve the best condition between the roller and raceway contact surface. That means, to avoid bearing working temperature increasing due to big contact rate, meanwhile to maximum the bearing load. (profile were checked by Taylor profiler).

**Roughness:** The rollers and inner race raceway roughness can be less than 0.2µm with super-finishing to enhance the roller surface and raceway surface accuracy, which can increase more than 20% of the entire bearing service life.

**Cages:** The centrifugal casting method and full sets of numerical control equipments are used to process the reinforced cage, the pocket hole and the cage claw are optimized to make less heat generation, and better roller stability

**Roller endface:** The end face of the rollers are optimized design, to make the rolling element and the center rib of inner ring forming a good lubricating oil film, reducing the heat, and reducing contact stress, which can improve the service life of the bearings. The endface of the rollers are processed on CNC equipments to ensure consistency of size and roughness.



## MB structure:

The inner ring with centre rib, symmetrical spherical roller with spherical endface, two pieces brass cage inner ring guided, can bear large radial and axial load. Two rows of rollers can rotate separately with different line speed, which is conducive to the complex conditions of load partial load.

## MA structure:

The inner ring with centre rib, symmetrical spherical roller with spherical endface, two pieces brass cage outer ring raceaway guided, , can bear larger radial and axial load. Two rows of rollers rotate separately with different line speed, which is conducive to the complex conditions of load partial load. Due to its internal structure the structure, MA is suitable for very high speed, big impact load, outer ring rotating applications.

## Tolerances

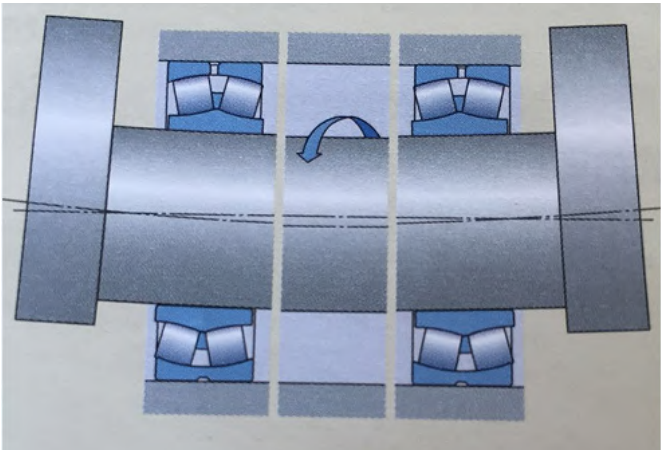
The special tolerances of the bore, OD, and radial internal clearances are designed to accommodate the heavy press fits typically used for the vibrating screen application. This results in a more consistent radial clearance after mounting.

Reduced Bore Tolerance	
Bore Diameter	Bore Tolerance (mm)
d ≤ 80 mm	0 ~ -0.010
80 < d ≤ 120 mm	0 ~ -0.013
80 < d ≤ 120 mm	0 ~ -0.015
80 < d ≤ 120 mm	0 ~ -0.018

Reduced OD Tolerance	
Nominal OD	OD Tolerance (mm)
D ≤ 150 mm	-0.005 ~ -0.013
150 < D ≤ 180 mm	-0.005 ~ -0.018
180 < D ≤ 315 mm	-0.010 ~ -0.023
315 < D ≤ 400 mm	-0.013 ~ -0.028

Spherical roller bearing can automatically adjust without affecting the bearing performance, so it can allow a certain angle error between the inner and outer rings. The vibrating screen belongs to the condition of unbalanced rotation, so the shaft will appear the deflection after a period of time’s working

## Series of self-aligning bearings for vibrating screen:



> Allow 3 °self-aligning

## Vibrating screen maintenance

### 01

In normal operation, the temperature of the bearings should be paid close attention. Generally, the temperature should not exceed 40 degrees. The maximum temperature shall not exceed 60 degrees.

### 02

During the operation, attention should be paid to whether the screen has strong noise. The sieve vibration should be stable and abnormal swinging phenomenon is not allowed. When the sieve is shaking, it is necessary to check whether the elasticity of the four supporting springs is consistent, whether the fracture is broken or not.

### 03

During the running of the equipment, the wear condition should be checked regularly. If it has been worn excessively, it should be replaced immediately.

## Vibrating screen operation

### 01

Check before starting the sieving machine. Transmission belt, tyre coupling, screen mesh, other parts, etc

### 02

Start and stop of sieving machine.

### 03

Lubrication of sieving machine. Mainly refers to the lubrication of vibrating screen bearings.

### 04

Frequently observe whether the screen mesh is loose or not because of the partial wear of the screen, resulting in ore leakage.

### 05

The bearings must maintain good lubrication, when the bearing in good installation, no fever, leakage, every one week should be lubricated with oil injection. Every two months shell axis should be opened to clean the bearings, re-injection of clean oil.



# Mining machinery bearing application

Reliability and durability in tough environments



## Requirement for the Jaw Crusher

KINEX Bearings used for jaw crusher is recommended to use spherical roller bearing with radial clearance C3 group.

- The recommended product structure is CA, MB, CC structure. The size range of products can be processed: inner diameter is greater than 60mm, outer diameter is less than 1600mm.

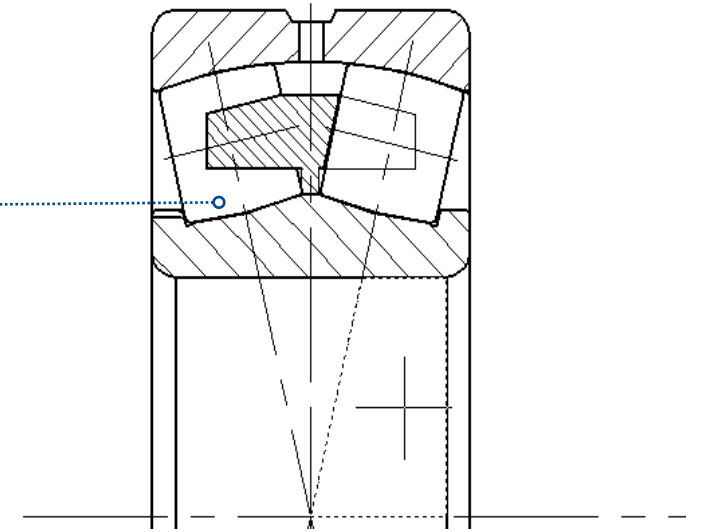
## KINEX BEARINGS for Jaw Crusher

- Most of the jaw crushers are used outdoors, and its working condition is very difficult, which brings many unfavorable factors to the installation, use and maintenance for bearings.
- Because of the broken stone, the dust is particularly large. If the seal fails, dust entering the bearing will aggravate bearing wear.
- The bearing in the jaw crusher mainly bears a large radial load. In particular, it is often subjected to irregular and sudden impact loads, which are very destructive to the bearing and easy to cause the fracture of the inner ring or the outer ring.
- The bearing lubrication conditions in the jaw crusher are also relatively poor, and lack of lubricants or irregular replacement of grease is the main cause of early bearing abrasion.

## CA structure

**Roller:** The CNC machining equipment is used for single processing, and through two dimensional sorting, to ensure that the diameter difference between the rolling body in the same set of bearings is less than 2um.

The super finishing treatment of the rollers and the raceway surface of the ring converts the grinding tensile stress in the grinding process into compressive stress, improves the wear resistance and wear resistance of the rolling surface, and is more conducive to the formation of a lubricating oil film between the raceway surface when the bearing is working, thus improving the bearing life.



## Vibrating screen rolling bearing process innovation

Vibration machinery, usually the screen body with high vibration times to do strong vibration, screening of materials, in order to meet the vibration application, supporting bearings need to bear more load than the corresponding standard bearings, while the need to have vibration resistance, low noise and other characteristics.



## In order to better meet the requirements of jaw crusher bearing

- Increase bearing life through design and process innovation

# 01

**Design:** CA type product structure is usually used, and through internal optimization design, the diameter and length of the rolling element are increased to improve the radial bearing capacity of the whole bearing.

# 02

**Steel:** We use high-quality steel to ensure durability, strength, and superior performance in every component.

# 03

**Inner raceway grinding:** Using a horizontal five-axis linkage high-precision outer surface grinding machine. (to ensure the consistency of the position and size of the double raceway processing, so that the bearing working raceway surface contact state to achieve the best).



- According to the actual condition of vibration machinery, KINEX BEARINGS primarily manufactures vibration mechanical bearings, specifically two types of self-aligning roller bearings: MA and MB structures.

- These bearings are designed to withstand high-impact loads, minimize friction, and ensure stable performance in harsh operating environments. The MA-type bearings feature a brass cage, offering enhanced durability and heat resistance, while the MB-type bearings utilize a precision-machined steel cage for superior strength and load-carrying capacity.



# Mining machinery bearing application

Reliability and durability in tough environments

## Vibrating screen rolling bearing process innovation

➤ Through the innovation of the process, KINEX BEARINGS have made new breakthroughs for vibration mechanical bearings, common noise and heat problems, and the quality is stable.

By studying the bearing inside the “every detail” of the process.

➤ Through the introduction of advanced testing instruments, the contact position of the bearing is precisely controlled, and the dimensional accuracy can be accurate to 0.001mm.

➤ Through special optimization process, the rolling surface roughness is improved to further reduce the internal friction coefficient of the bearing.

Summary: Strictly control the contact state between rolling body and raceway working face, control bearing vibration speed, reduce bearing internal friction coefficient

➤ At the same time, bearing vibration speed  $V$  is controlled, and a large number of data are collected to study the influence of low frequency, medium frequency and high frequency values on bearing noise.

➤ Strictly control the ring raceway, roundness and waviness of the rolling body. Ensure overall bearing accuracy.

## Quality control during whole process

Quality control during the entire process ensures that every stage of production meets strict standards for reliability and performance. From raw material inspection to final product testing, rigorous checks are conducted to identify and eliminate defects. Advanced monitoring systems, precision measurements, and continuous improvements help maintain consistency and compliance with industry regulations.

➤ UT detection before forging.



➤ Reinspection of the materials, physical & chemical microstructure and the nonmetallic inclusion, Ti content less than 0.003%.



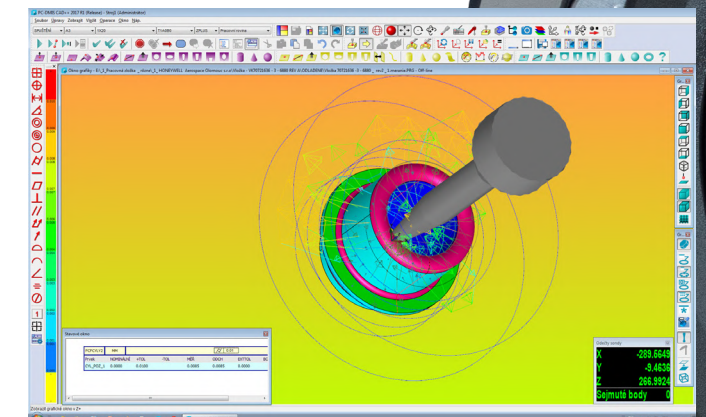
➤ UT detection after rough turning.



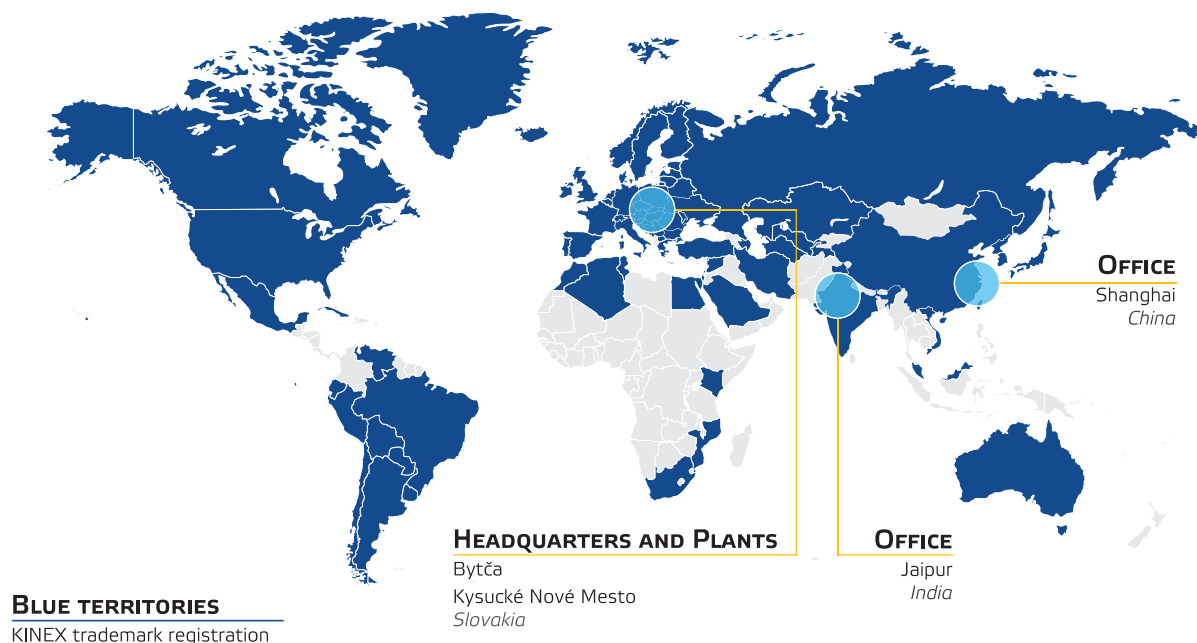
➤ Detailed inspection record after soft turning.



➤ Provide heat treatment test report and KINEX BEARINGS retest report after heat treatment.



## YOUR PARTNER FOR INDUSTRY



### > Contact

KINEX BEARINGS, a.s.  
1.mája 71/36  
014 83 Bytča  
Slovakia  
+421 41 5556 620  
marketing@kinexbearings.sk  
www.kinex.sk

