Double Row Spherical Roller Bearings

Detail Introduction :

The bearing can bear radial load, but also can bear the two-way action of the axial load. Spherical roller bearings have cylindrical and tapered bore, tapered tapered bore taper for 1:30 and 1:12 two, this tapered bore bearing with a tightening sleeve or withdrawal sleeve, can be tapered bore spherical ball bearing convenient, rapid assembly in the light shaft or step machine shaft.
NTN is a leader in the field of bearings, and its long service life and consistent reliability are recognized by thousands of users around the world. NTN is a very famous brand worldwide, and double row spherical roller bearings have been universally used for their reliable quality and excellent performance, and have many advantages.

Features of double row spherical roller bearings?

1, spherical roller bearings mainly bear radial load, but also can withstand the axial load in either direction. There is a high radial load capacity, especially suitable for heavy or vibration load work, but can not bear pure axial load.
2, Double Row Spherical Roller Bearing have good alignment performance, when the shaft is bent by the force or installation of different heart bearing can still be used normally, alignment with different size series and different, the general allowed alignment angle of 1 ~ 2.5 degrees.
3, the type of bearing load capacity, in addition to radial load bearing can also withstand the two-way role of the axial load, has a good impact resistance, generally speaking, spherical roller bearings allow the working speed is low.

Application of double row spherical roller bearings?

Double Row Spherical Roller Bearing main applicable cage: stamping steel plate reinforced cage (suffix E, domestic rarely). Stamped steel plate type cage (suffix cc), glass fiber reinforced polyamide 66 cage (suffix TVPB), machined brass two-piece cage (suffix MB).
Machined brass integral type cage (suffix CA), pressed steel cage for vibration (suffix JPA). Vibration occasion brass cage (suffix EMA). The same structure, bearing on the code or different. For example: M. Some bearing factories say two-piece brass cage, some bearing factories say single-piece integral brass cage.
Double Row Spherical Roller Bearings is mainly used in paper making machinery, speed reducing device, railroad vehicle axle, rolling mill gear box bearing housing, rolling mill wheel, crusher, vibrating screen, printing machinery, woodworking machinery, all kinds of industrial speed reducer, vertical spherical bearing with seat.
Double Row Spherical Roller Bearing are one of the widest range of spherical roller bearings with high end load capacity and speed performance. The product's expertise in design and complete control of the production process guarantee the best results for the most demanding applications, robustness and long service life.
The following are details of Double Row Spherical Roller Bearing.

1.CHARACTERISTICS OF THE RANGE

PRINCIPLE OF SPHERICAL ROLLER BEARINGS

Spherical roller bearings are engineered to offer excellent resistance to high temperatures and loads, meaning that they are capable of withstanding the harshest applications. They are a popular choice for absorbing misalignments, impacts and vibrations, as well as operating in polluted environments.
Misalignment The design of the spherical roller bearings allows for misalignment between the outer ring and the inner ring with no loss of bearing performance. Under normal operating conditions, i.e. where the C/P ratio (dynamic bearing load vs. actual load applied) is greater than 10, the permissible angle of tilt is 0.5. This angle of tilt is permissible in cases where the misalignment of the inner ring is constant with respect to the outer ring and in the case of a rotating inner ring. This value depends on the parts surrounding the bearing or on the type of external seal used. In the case of a rotating outer

ring or variable misalignment, the permissible angle of tilt is reduced. In the case of low loads, the angle of tilt may reach 2°. For these particular cases, please contact your NTN-SNR representative.

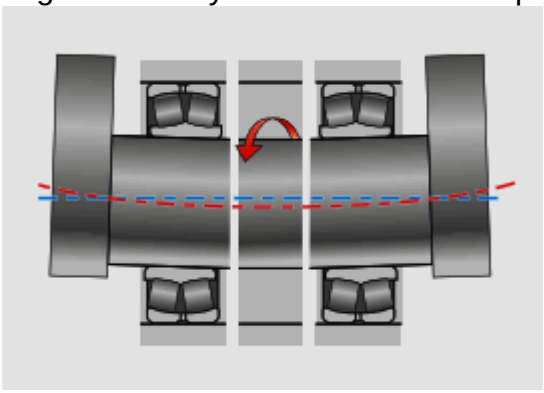


Fig. 1

ULTAGE QUALITY

Maintenance operations due to a fault in a component as simple as a bearing can run into hundreds of thousands of euros depending on the application (unavailability of the user's production tools, repair times and employee downtime due to the repairs).

To raise the reliability bar on your equipment, the NTN Group has developed the ULTAGE quality hallmark for its spherical roller bearings. It combines the use of superior quality materials with an enhanced design and precision manufacturing process.

ULTAGE FEATURES

- Superior grade steel
- Improved roller size
- Enhanced surface finishes
- Cage made from high-performance solid brass or drawn steel without a central guide ring
- Specific heat treatment processes

BENEFITS

- Service life doubled with increased load capacities
- Greater rigidity and stability
- Reduced in-service temperatures with improved lubricant circulation within the bearing
- Dimensional stability up to 200°C without impairing the bearing's mechanical properties
- Speed limits 20% higher than conventional designs due to the excellent surface properties

2.CONTROLLED MANUFACTURING

AN ALL-INTERNAL IRONCLAD PROCESS

Our entire range of spherical roller bearings is developed and manufactured internally in our Japanese and Italian factories. The NTN Group is strongly committed to keeping its production processes in-house as a sign of its superlative quality and expertise, especially since its bearings are widely used in critical and costly applications. This strategy ensures that the Group exercises complete control over its range of spherical roller bearings, from product design through to marketing.

The NTN Group has spearheaded a high-performance quality assurance system for its production processes, supported by self-inspections and continuous oversight. This system assures the highest product quality over time by controlling every component of the process (means, methods, manpower, environment and materials).

Thanks to the continuous improvement approach applied to its production facilities, and its quality assurance system, the NTN Group is able to guarantee bearings with ever more precise surfaces for enhanced performance, reduced friction during operation and, consequently, improved lubrication efficiency.

For several years, NTN-SNR has integrated an environmental approach into its manufacturing processes. Accordingly, numerous initiatives have been undertaken on our production sites:

- Controlled use of the water used for cooling the production units
- Recycling of cutting oils
- Continuous monitoring of CO_2 emissions from the boilers in the thermal power plants

QUALITY: A SHARED VISION

NTN-SNR is committed to the quality of its products. All our bearings comply strictly with the most rigorous of technical requirements. The quality process is closely controlled at each stage:

• Quality of design
• Quality of product development
• Quality of production
• Quality of marketing
• Quality of services

So that you can be sure of the authenticity of our products, we have developed a label featuring a hologram that is easily identifiable and difficult to fake.

3.TYPES OF DESIGN

ULTAGE DESIGN: TYPE E

•Symmetrical rollers
•No central rib for optimal load capacity and optimum lubricant flow in the bearing
•Stabilisation of the steel for use at temperatures of up to +200°C
•Optimised internal geometry to minimise friction and heat build-up
•Cage made from drawn steel (EA), fibre glass reinforced polyamide (EG15) or machined solid brass (EM) for the harshest applications
•Lubrication groove and holes on the outer ring (W33 or D1)

Do not use a product with a fibre glass reinforced polyamide cage over 150°C

AN IMPROVED DESIGN FOR BETTER LUBRICATION

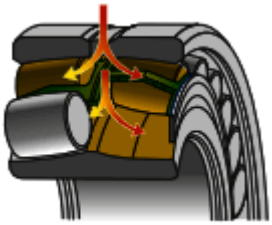
55% of bearing faults are due to lubrication defects, meaning that lubrication plays a major role in ensuring peak performance.

Just like the design, geometry and surface finish of the different bearing components, the viscosity of the lubricant is vitally important for increasing the bearing's operation and service life. The Ultage design represents the enhanced combination of all these factors.

• No central shoulder section: the available volume is higher so that the lubricant can flow more freely, meaning that the different parts of the bearing are constantly lubricated. This design drastically reduces the risk of overheating.

• Wider lubrication holes and grooves: this design feature simplifies bearing maintenance and relubrication. The number of lubrication holes on the outer ring may be 3, 4 or 8 depending on the

bearing brand and size (information specified in the product tables on page 54).
• Improved cage materials and design: the cage is a risk-prone part of the bearing and is often the cause of faults. Special attention has been taken over the cage design (see p.14).



4.CAGES

ULTAGE EA DESIGN - DRAWN STEEL CAGE

"Minimal friction and heat build-up, increased service life and reduced maintenance costs"

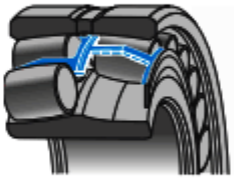


Fig. 8: Ultage design bearing with EA cage

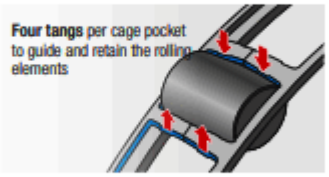


Fig. 9: Unique guidance system for perfect control

• Two steel plate window cages centred on the ground surface of the inner ring
• Precise guidance of the rollers with a unique four-tang system for perfect control of the position of the rolling elements The steel plate cages are reinforced with a specific surface treatment process, which may either be nitriding or phosphating depending on the bearing dimensions.

CAGES WITH NITRIDING SURFACE TREATMENT

• Increased surface hardness of the cage for superior wear resistance
• Maintained resistance in the cage core to improve impact resistance
• Lower friction coefficient for greater in-service performance at high speeds
• Good corrosion resistance

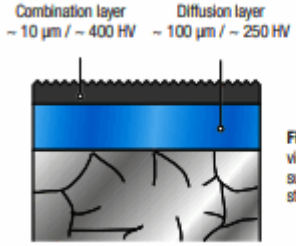


Fig. 10: Cross-sectional view of the nitriding surface treatment for a steel plate cage

CAGES WITH PHOSPHATING SURFACE TREATMENT

• Lower friction coefficient for greater in-service performance at high speeds
• Good corrosion resistance

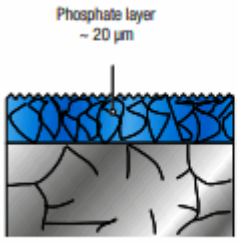


Fig. 11: Cross-sectional view of the phosphating surface treatment for a steel plate cage

Double Row Spherical Roller Bearings complete guide.

Bearings have common application in all walks of life, this guide mainly talks about double row spherical roller bearings, if you want to know more about this, this guide will bring you great help.

1?What are the classifications of spherical roller bearings?

Spherical roller bearings are divided into symmetrical spherical roller and asymmetrical spherical roller according to the shape of the roller cross-section, asymmetrical spherical roller bearings are early products, mainly for the mainframe maintenance services, the new design of the mainframe is rarely used symmetrical spherical roller bearings, internal structure after comprehensive improvements in design and parameter optimization, compared with the early production of spherical roller bearings, can withstand greater axial load. The operating temperature of this bearing is lower, so it can adapt to the requirements of higher speed.

According to the inner ring with or without baffle and the use of different cage can be divided into C type and CA type two, C type bearing is characterized by the inner ring without baffle and the use of steel plate stamping cage, CA type Terrain bearing is characterized by both sides of the inner ring have baffle and the use of car solid cage. In order to improve the lubrication of the bearings, we can supply the spherical roller bearings with annular oil groove and three oil holes in the outer ring, which are indicated by the bearing rear code/W33.

According to the user's requirements can also be supplied with inner ring oil hole spherical roller bearings, in order to facilitate customer loading and unloading and replacement of bearings, can also be provided with a tapered inner hole spherical roller bearing bearings, tapered hole taper for 1:12, the rear code for K, in order to meet the requirements of special users can also be provided with a tapered inner hole 1:30 bearing, its rear code for K30. The bearings can be installed directly on the tapered journal, also can be installed on the cylindrical journal with the help of clamping sleeve or withdrawal sleeve.

2?What is the difference between single row spherical roller bearings and double row spherical roller bearings?

Double row spherical roller bearings outer ring raceway is spherical, inner ring double raceway (two raceway force centerline through the outer ring raceway ball center), each raceway force centerline and bearing width of the middle plane into an acute angle of pressure angle of about 10 degrees. Single row spherical roller bearings, outer ring raceway is also spherical, inner raceway force centerline (pressure line) parallel to the width of the middle plane.

The rolling body of radial ball bearing is ball, the rolling body of radial roller bearing is roller. Single row spherical roller bearing means only one row of rolling body, double row spherical roller bearing means two rows of rolling body. In addition, the load bearing of double row is bigger than that of single row.

3?What is the installation method of double row spherical roller bearings?

Spherical roller bearings are assembled with drum rollers between the inner ring with two raceways and the outer ring with a spherical raceway. The center of curvature of the outer ring raceway surface is the same as the center of the bearing, so it has the same alignment function as the self-aligning ball bearing. In case of deflection of shaft and housing, it can automatically adjust the load and axial load in two directions. Radial load capacity is large, suitable for situations with heavy load and shock load. The inner ring inner diameter is tapered hole bearing, can be directly mounted, or use tightening sleeve, disassembly cylinder mounted on the cylindrical shaft.

For self-aligning bearings, the use of intermediate mounting rings can prevent the outer ring from tilting and rotating when mounting the bearing with shaft into the box shaft hole. It should be remembered that some sizes of self-aligning ball bearings have balls protruding from the side of the bearing, so the intermediate mounting ring should be recessed to prevent damage to the balls.

A large number of bearings are generally mounted using mechanical or hydraulic press-in methods. For separable bearings, the inner ring and outer ring can be installed separately, which simplifies the installation process, especially when the inner and outer rings are required for interference fit. In the inner ring has been installed in place of the shaft into the outer ring bearing box, must pay attention to see whether the inner and outer ring is correctly aligned to avoid scratching the bearing raceway and

rolling parts.

4?How to check double row spherical roller bearings?

(1) Operation inspection

After the installation of spherical roller bearings, in order to check whether the installation is correct, a running check should be carried out. Small machinery can be rotated by hand to confirm whether the rotation is smooth. Check items are caused by foreign objects, scars, indentations and poor operation, due to poor installation, mounting seat processing and torque instability, due to small clearance, installation errors, seal friction and torque caused by excessive, etc.. If there is no abnormality, power operation can be started.

(2) Power operation check

Large machinery can not manually rotate, so no-load start immediately cut off the power, mechanical idling, check whether there is vibration, noise, rotating parts have contact, etc., to confirm that no abnormalities, into the power operation. Power operation, starting from no-load low speed, slowly increase to the rated operation of the set conditions. During the test run, check whether there is any abnormal sound, temperature change, lubricant leakage or discoloration, etc. If abnormalities are found, the operation should be immediately suspended, check the machinery, if necessary, to remove the spherical roller bearing inspection.

(3) temperature check

Temperature can generally be based on the external temperature of the bearing housing speculation. But the use of oil holes directly measure the temperature of the outer ring is more accurate. Gradually increase from the start of operation, usually 1 ~ 2 hours after the temperature is stable. If the installation is poor, the temperature will rise sharply and abnormally high temperature will appear. The reasons for this are, for example, too much lubricant, too little clearance, poor installation, too much friction in the sealing device, etc. The occasion of high speed rotation, the structure, the wrong choice of lubrication method, etc. are also its causes.

(4) Rotation with stethoscope and other checks

Strong metallic noise, foreign sound, irregular sound, etc. indicates abnormal, the cause of poor lubrication, shaft or bearing seat precision, bearing damage, foreign body invasion, etc., can be checked with a stethoscope.

5?How to adjust the clearance of double row spherical roller bearings?

For the installation of spherical roller bearings axial clearance, available on the journal adjustment nut, adjust the shim and bearing seat hole thread, or use the preload spring and other methods to adjust. The size of the axial clearance, and bearing installation arrangement, bearing distance between, shaft and bearing seat material, can be determined according to the working conditions. For high load high speed spherical roller bearing, adjust the clearance, must consider the temperature rise on the axial clearance, the temperature rise caused by the clearance reduction is estimated, that is to say, the axial clearance to be properly adjusted to a larger. For the low speed and bear the vibration bearing, should take no clearance installation, or apply preload installation. The purpose is to make the spherical roller bearing roller and raceway to produce good contact, load uniform distribution, to prevent the roller and raceway by the vibration impact was destroyed. After adjustment, the size of the axial clearance with a micrometer test. The method is to fix the micrometer in the body or bearing seat, make the micrometer contact tip top shaft clean surface, along the axial left and right push axis, the maximum swing of the needle is the axial clearance value.

6?What do I need to consider when setting the preload of double row spherical roller bearings?

Spherical roller bearing preload force is carried out at room temperature, but in working condition, the system micro-stretch temperature rise generated by the drive shaft, bearing preload force will change. Therefore, the setting of the preload force should take into account the size of the capacity it needs, speed, and other conditions set by the reasonable use of the spherical roller bearing preload force to ensure the smooth operation of the transmission process.

7?What is the working principle of double row spherical roller bearings?

The basic working principle of spherical roller bearings is that the inner ring of the rolling bearing is

used to assemble with the journal, and the outer ring is used to assemble with the bearing. Usually the inner ring rotates with the journal and the outer ring is fixed, but it is possible to make the outer ring rotate while the inner ring does not move, or the inner and outer rings rotate at the same time. When the inner and outer ring relative rotation, the rolling body that is in the inner and outer ring rolling between.

8?What do I need to pay attention to when using double row spherical roller bearings?

Spherical roller bearings, if the operation, bearing load is too small, the ratio of axial load and radial load exceeds e value (recorded in the bearing size table), do not bear the axial load - between the roller and raceway will produce sliding, will cause slight abrasion. This is especially true for large spherical roller bearings with high roller and cage weights.

Compared with general mechanical parts, spherical roller bearings have a higher precision, so they should be used with corresponding care. Users should be familiar with the bearings. Usually keep the bearing and its surrounding clean, use carefully and conscientiously, if use carelessly to spherical roller bearings with strong impact, will make the bearing appear scars, indentations, fractures and other injuries. Also pay attention to the bearing rust, should avoid using in wet places, and in order not to make sweat on, should wear gloves.

9?What are the factors that cause damage to double row spherical roller bearings?

About the damage state of the bearing such as roller bearing collar, retaining edge of the jam, as the cause can be considered, insufficient lubricant, unsuitable, the defect of the oil supply and drainage structure, the intrusion of foreign objects, double row spherical roller bearings installation error, shaft deflection too large, there will also be these reasons overlap. Operating conditions such as installation conditions, speed, the direction of the load borne by the axial, the amount of value, etc. Generally if the correct use of double row spherical roller bearings, can be used until the fatigue life is reached. But there will be accidental premature damage, can not be resistant to the use of the situation. This early damage, and fatigue life, is called the quality of failure or accident use limit. Mostly due to the installation, use, lubrication on the inattention, from the external invasion of foreign bodies, for the shaft, shell of the thermal impact of the study is not enough.

Double row spherical roller bearing structure design parameters determined by the steel, flexibility, quality, damping, etc. constitute the vibration system in the operating conditions to produce its mechanics of vibration. The vibration caused by the deviation in bearing manufacturing and processing, the smaller the deviation, the smaller the vibration. The roundness, corrugation and surface roughness of the steel ball surface are the factors that have the greatest influence on vibration in bearing parts, followed by the shape error and surface roughness of the inner and outer ring grooves, and again the cleanliness and lubricant quality of double row spherical roller bearings.

Video: https://www.youtube.com/watch?v=bOvezlRvkCk

PDF.

https://www.ntn-snr.com/sites/default/files/2020-06/DOC_I_SRB_CAT2_GBa-web.pdf