LYC R & D INNOVATION IN ACTION

Overview

Major Overseas Applications for LYC bearings





- Automotive Industry
- Trucking Industry
- Railway Industry
- Agricultural / Tractor Industry
- Conveyor Industry
- Mining Industry
- Aerospace Industry
- Rolling Mill Industry
- Wind-energy Industry
- Heavy Engineering Industry
- Military / Air Force, Navy
- Pump Industry

LYC's Manufacturing Facilities

23 Manufacturing Plants for Roller, Ball, Cages, Turning & Heat Treatment (All In-House)

- Ball Manufacture Factory
- Roller Manufacture Factory
- Railway Factory
- Automotive Factory
- Turning Factory
- Ball Bearing Factory
- Roller Bearing Factory
- Material Preparing Factory
- Large Bearing Factory
- Extra- Large Bearing Factory
- Middle-size Bearing Factory
- Heat Treatment Factory
- Cage Manufacture Factory
- Forging Factory
- High-Precision Bearing Factory
- Military Division
- Tooling Division

Manufacturing





- **Forging**

  Major forging equipment used by LYC includes HBP 160 High Speed Hot Former from Japan; AMP30 High Speed Former, from Switzerland; and a 630T Automatic Forging Production Line with Induction Heating from Germany.

- **Turning**

  Major turning equipment and production line equipment used by LYC includes KDM 14 Ring Turning Production Line from Japan. Ring Turning Production Line for Small-size Ball Bearings.

- **Heat Treatment**

  Major Heat Treatment equipment used by LYC includes Muffle Furnace for Rolling Elements with Protective Gas from Japan; Roller Hearth Heat Treatment Production Lines with Nitrogen Protective Gas, from Austria.

- **Grinding**

  Major Grinding Machine and Equipment used in the LYC production lines include an Automatic Ring Grinding Production Line for Taper Roller Bearings from Germany; Grinding Machines for Extra-large size Bearings; Ring Grinding Production Lines for Ball Bearings, from Italy.

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Manufacture

- **Component Production**

  LYC Manufacture in-house Steel Balls, Rollers and Cages. Equipment used includes, Lapping Machines for Ball, Taper, & Spherical Rollers, including Outside Diameter Sorting Machines.
  Grinding Production Lines from Japan.

- **Assembling**

  Equipment used by LYC in Assembling includes Automatic Washing, Greasing and a Shielding Production Line for Sealed Ball Bearings, designed By LYC; in addition to Marposs Gageing Machines from Italy.

- **Quality Control**

  LYC Quality Inspection and Analysis Equipment includes, Andero Metering from USA; GMN Deflection Meters, from Germany; BK2032 Signal Analyzers from Denmark; Scanning Election Microscope from Britain; Talysurf RTH6 Contour Meter, Model 73 Taylor Roundness Meter (Taylor-Hobson Britain).

- **Automatic Production Line**

  Recently established an automatic production line for Tapered Roller Bearings. This Equipment was sourced from Japan and Germany.

LYC R & D Innovation in Action
Automobile Bearings

LYC currently produces a variety of automotive bearings with inside diameters of 10mm (minimum) and outer diameters up to 430mm P5 class precision and Z3 group noise levels.

LYC's high quality bearings are preferred by major auto makers in China, such as GM and Volkswagen. Unique features of the LYC wheel hub bearing units include :

- Maintenance free applications
- Compact, light weight design
- High reliability
- Long life

LYC's high technical ability and ingenuity is now being applied to developing a fourth generation of auto wheel hub bearings.

In addition to automotive applications, LYC has successfully developed a second generation wheel hub bearing unit for heavy duty trucks and trailers. Wheel hub units are only one of LYC's innovations and areas of expertise. LYC continues to be a world-class supplier of a full-line of standard and custom design bearings for numerous industries.

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LYC R & D Innovation in Action
Wind Turbine Bearings

World-Class WIND TURBINE Bearings

LYC is China's only certified manufacturer of wind turbine bearings (ISO 9001). LYC produces a variety of bearings for small and large scale wind turbine systems. Bearings for systems ranging from 300 kilowatt to 1.5 megawatt are readily available. In addition to custom bearings with diameters up to 5.7 meters (18.7 feet) can be made available.

Yaw Bearing: Slew Rings with internal and external gear
Pitch Bearing: Single or double row 4-point contact ball bearings
Main Shaft Bearing: Thrust or Spherical Roller Bearings

LYC R & D Innovation in Action
Precision Thin Section Bearings

There are three types of thin-section bearings: deep groove bearings, four-point contact bearings, and angular contact bearings. Compared with standard-section ball bearings all three bearing types offer advantages in reduced space requirements and low cost. These bearings are used primarily where shaft location is the major requirement.

As structural components these thin-section bearings behave differently to standard bearings because their bearing rings are quite flexible. Under load the rings follow the imperfections of shaft and bores, consequently, it is essential that these components be geometrically accurate.

The four-point contact bearings support thrust loads in either direction these are much more effective in resisting moment loads than the deep-groove design bearings.

Two other bearing designs use an axial split in the outer ring to increase ball complement and radial capacity without sacrificing thrust capacity. One is a full-complement design, the other uses alternating full-size balls and spacer balls. The latter type also has high shoulders on the outer ring to provide integral shields for grease lubrication. Both types of bearings are held together with wire bands after assembly.

LYC thin-section bearings are used widely in Aircraft, Aerospace, Textile printer, Medical devices, Radar Communication, Astronomy instrumentation and Industrial robotics etc. because their characteristics such as small space, light weight and low friction.

LYC R & D Innovation in Action
Slew Ring Bearings

Slew Ring Bearings combine, supporting, revolving transmission, fixing and seal all together, especially suitable for Engineering machinery, Excavation equipment, Wind turbine generation, Medical equipment, Radar etc.

LYC have the expertise in design and can produce any type and size of slewing bearing sized up to 6 meter dia, including the various kinds of the no-gear design eg: internal gear and external gear four-point-contact ball bearings in any tolerance classes eg: The double-row thrust angular contact thrust ball bearings, the three-row composed cylindrical roller bearings, the cross cylindrical roller bearings and other series of slewing bearings etc. These are widely used in applications such as ports, metallurgy, mine, food, coal, cement, wind-power generation, engineering mechanism etc. At present, the extra large slewing bearings with the largest dimension, heaviest weight, highest precision in China are all produced by LYC. The design and manufacture of these LYC slewing bearings have been awarded the technology prizes from State and Ministries.

LYC R & D Innovation in Action
Split Bearings

Split bearings are the maintenance solution to downtime problems.

Split bearing units consist of a split housing, a split bearing and two split seals. The bearing may be either a spherical or cylindrical roller bearing. Due to the split design of all components, this greatly facilitates the easy bearing replacements. The units are typically used in continuous casting, long propeller shafts etc.

LYC has gained new achievements in the area of non-standard bearing production by successfully manufacturing large cylindrical roller split bearings. LYC began researching and evaluating this product in 2004. LYC's Technical staff optimized the inner structure of the bearing as well as improving the performance and extending the service life. LYC has received praise from their customers for these new Bearing Developments in these large cylindrical roller split bearings.

LYC R & D Innovation in Action
Electric Spindle Bearings

These are ready-to-mount work spindle units, they are easy to install and come equipped with LYC high precision bearings in well proven arrangements. They maintain high running accuracy, rigidity and maintain high speed operation. Typically used in lathes, grinding, milling, drilling and boring machines.

With 40 years experience, LYC was the first manufacturer to produce these spindle units in China. Today, LYC can produce six series types with more than 30 varieties being available.





LYC R & D Innovation in Action

High-speed precision Ceramic Bearings

Typically bearings with rings and rolling elements of ceramic material are available as ball and roller bearings including sealed versions. Main application areas are pumps and compressors where the bearings are lubricated by their own process liquid.

Benefits of the ceramic (Si3N4) silicon nitride ball bearing:

- Higher Speeds
- Corrosion Resistant
- Higher Temperatures - 800ºC
- Little to No Lubrication Required
- Longer Life/Low Friction & Less Heat
- Non-Magnetic

High-speed precision ceramic ball bearings are widely used in the aerospace, navigation, marine and chemical industries, because of their rigorous manufacturing requirements. In the past China was predominantly dependant on importing these Ceramics. LYC has begun working on production of these high speed precision ceramic ball bearings, their first results have been extremely successful. LYC has developed a new design concept for these bearings, including the utilization of new materials and technology to meet customers exacting application requirements. They have received customer recognition for their outstanding efforts in this development area.

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LYC R & D Innovation in Action
Railway Bearings

- LYC manufacture a full range of cargo and passenger train bearings. Supplying China MOR high speed train and their heavy duty cargo train with 30 years of service. Additionally to the USA with E, F and K class bearings with 7 years of service.
- The base load capacity for the E class Tapered Journal Roller Bearing is 27,000 ibs-f with a Gross Rail load equivalent to 220,000 lbs-f
- The base load capacity for the K class Tapered Journal Roller Bearing is 35,750 ibs-f with a Gross Rail load equivalent to 286,000 lbs-f
- The class E has life mileage equivalent to 536,531 miles
- The class K has life mileage equivalent to 689,894 miles

LYC R & D Innovation in Action

- **Bearings For the Steel & Mining Industries**

  For over 40 years LYC has developed more than 300 types of bearings for rolling mills. For many years steel producers in China such as Wuhan Steelworks and Shanghai Baoshan Steelworks had to import these types of bearings, today these bearings are supplied by LYC, these bearings are equal in quality and performance to our counterparts in Germany and Japan. LYC supply four-row adapter bearings to Panzhihua Steelworks, these are used in the support roller system of their surface-finishing machine, LYC continues to seek out these and other market applications including but not exclusively Paper Mills.

- **Bearings For the Petrochemical & Hydro-Elec Industries**

  The LYC XLD & SX series self lubricating bearings have successfully been installed in the Longyangxia project (three gorges project). This is the largest Hydroelectric project in the world, Additionally the Xiaolangdi water conservancy hinge works project also uses these LYC Bearings, (this is the second largest project in China).

  The key operating parameters for these innovational designs are:

- Operation under extreme environmental conditions.
- Engineered for extended service intervals.
- A lubrication system that is integrated into the Bearing Material itself, rather than the conventional methods of Grease or Oil.

LYC部分海外新闻发布:

LYC完成制造中国最大的插齿设备
LYC Group Developed the Largest Gear-Hobbing Machine

As the Chinese economy continued to expand in 2000 this saw an increasing demand for Slewing Ring type bearings, LYC's Development division were engaged to design and manufacture a Hobbing Machine in order to manufacture these large scale bearings, some of the main considerations of this design were that the machine should be able to withstand Static, Dynamic and Thermal Stability. After two years and an investment of $ 500,000 this was accomplished, commissioning & statutory testing took place on November 9th 2002.

This large scale Hobbing Machine was one of the national technical improvement projects for the LYC Group. The key statistics for this machine are its, 12 meters in length, with a weight of 104 tons, its design allows bearings of up to 6 meters in diameter to be produced, the tolerances held by this Hobbing Machine are in the Grade 7 precision accuracy. The ability of this equipment allows LYC to produce large scale quality bearings for the domestic market and the opportunity to compete competitively in international markets.

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外经5米的转盘轴承刚下LYC生产线

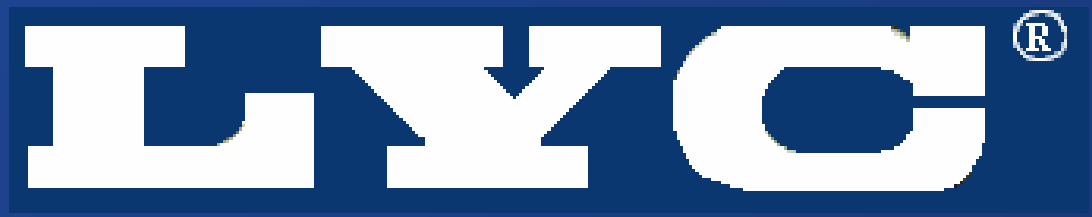
5-metre super-huge bearing rolls off the production line at LYC

LYC extol the virtues of their Hobbing Machine Development. It was with great pride on the morning of November 29th 2004 that their first 5 meter diameter Slewing Bearing rolled off the production line, the bearing was to undergo continuing intensive quality control inspections before being packaged and sent for special shipping to their customer in Shanghai. The completion of this bearing was a momentous occasion for staff involved in the Hobbing Machines success. Management showed their appreciation to all those involved in the project by allowing celebrations to take place.

中国神州6号飞船使用LYC轴承

LYC Helps Shenzhou-6 Cruise in Outer Space

The Shenzhou-6 manned spacecraft was successfully launched and returned to earth in 2005, LYC takes great pride in contributing to these projects, as their bearing products play a major role in these successful missions. Since 1992 LYC have been awarded the responsibility of developing bearings for the Shenzhou Series spacecraft. LYC's high-tech & high precision bearings generally have Thin-Section rings for these special applications. LYC's related departments have received many accolades for their contribution to these outstanding missions. LYC's products are now recognized as the only authorized Bearing components used in the Shenzhou series spacecraft. The bearings for these missions have to face the challenge of extended working in weightlessness with the extremes of temperature gradients, commonly know as hostile conditions. Confidence in the LYC product was gained only after extensive endurance testing.



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