

Super Precision Ball Bearing Range

JESA, the Swiss manufacturer of bearing solutions, uses its flexibility by launching a new product line in the form of Super Precision Angular Contact Ball Bearings.

Super Precision Angular Contact Ball Bearings are essential in numerous different kinds of high-end rotational applications such as: high precision spindles, machine tools, power tools, vacuum pumps, turbo charger, positioning systems, textile machinery, electrical motors... All those applications require top performance and long life ball bearings.

Swiss Made Super Precision Angular Ball Bearings for standard and specific needs

JESA's production capacity covers a size range from bore diameter 8 mm to outside diameter 100 mm. Within that range, the bearings are available in metric and inch sizes up to ABEC 9 (ISO P2).

Depending on the customer application, different bearing cross section ratios can be used: thin (ISO 19 and 18), normal (ISO 10) and heavy (ISO 02 and 03). Each size is divided into two different alternative designs: robust and high speed design and can be delivered with or without seals depending on the application lubrication system.

In addition to the standard range of super precision bearings, JESA is a perfect partner for the development of customer specific bearing. The possibility of direct discussions between JESA's engineering team and the customer's engineering team as well as our flexible production plant are the two key elements that allow a maximum flexibility for new developments.

Special sizes, nonstandard tolerances, flanged bearings, different ring materials (Chrome steel, stainless steel, Steenox...), special heat treatments, custom ball retainer material (PEEK, phenolic resin, polyamide...) and application specific grease types can be provided.

Ball material is to be chosen between steel and silicon nitride. The raw material of these rolling elements as well as their finishing procedure defines their quality (grade and precision class).

Each new design is virtually tested by calculation to achieve the optimum design. JESA's methodology for super precision bearings modelling includes life calculation, thermal variation evaluation which is a critical aspect when dealing with silicon nitride balls and gravity forces mainly due to centrifugal effects at very high speed. For special shaft application like spindles, the simulation of multiple bearings and their mutual effects is taken into account and



for even more advanced cases, finite element modelling can be used.

During the mounting procedure, the bearing rings are individually measured in order to be paired appropriately. Nominal values for outside diameters and inside diameters are marked on the bearing together with the maximum rings radial run-out. With this information marked directly on the bearing and the packaging, it is possible to choose a bearing that fits perfectly with the housing and the shaft.

Quality at its maximum at each production step

For a maximum lifetime and speed capability at a low noise and vibration level, super precisions ball bearings require a very high production quality level, which is part of JESA's DNA. No compromise will be made for the supply chain and during each production phase. Large financial investments have been made by JESA in Switzerland during the last few years to achieve this level of requirement.

The control of the raw material, including microstructure and cleanliness analysis is conducted in partnership with accredited external laboratories. In case of poor lubrication or unexpected extreme operating condition, the steel quality will have a significant effect on the bearing life.

Heat treatment is a key process in the bearing production that requires a deep knowledge and accurate control of the process parameters like temperature, time of treatment and cooling technique.

To prevent grinding burns, JESA uses initial measurement during the grinding machine set-up and barkhausen noise measurement during the production.

All bearing characteristics (forms and dimensions) are monitored during the production using a statistical process control. By doing so, the production capability is ensured and any deviation is dealt with immediately at the factory.

A special measurement rig has been developed by JESA for the measurement of radial and axial run-out for both inner and outer rings.

Finally, a 100% visual inspection and noise test is conducted before final packaging.



JESA is in the process of setting up a test centre within the Swiss HQ to enable continuous improvements and a full assessment of bearing performance

Most of the production measurement systems have been designed, developed and validated in-house by JESA, with the support of industrial partners and top universities in Switzerland, France and Germany. JESA developed its own high-speed vibration measurement test bench for example. For each production batch the bearing vibration signature will be recorded in a database which allow direct assessment of the production batch quality, as well as continuous improvement and monitoring of the production process.

The flexible conception of environmental chambers, life test benches, high speed spindles and acquisition systems (temperature, vibration and torque sensors) makes it possible to reproduce the real case application conditions.

Besides these test capabilities, JESA provides substantial expertise in bearing failure analysis. A large database of photos (raceway, balls, cage...) at various operating conditions, have contributed to understand the bearing operational cycle and to help our customers in improving their systems. Close contacts between the JESA bearing experts and customer engineering teams in various markets and applications together with efficient development steps allow JESA to reach the best solution for any customer application.

Visit www.jesa.com for more information.