12.10 SPLIT ROLLER BEARINGS

Our company currently devotes special attention to particular bearings, designed primarily for heavy industrial applications. Here we refer to split roller bearings, whose design and production technology are validated at ZKL on special cylindrical roller bearings and spherical roller bearings up to an outer diameter of 1600 mm. We are constantly expanding our product line, and ZKL ranks among the world's leading manufacturers.

Split roller bearings are preferred in settings, where axial installation of bearings in housings is unfeasible, which applies, for example, to multiple bearing shafts, crankshafts, long transmission shafting, or in cases, where installation of the bearing in the housing would be too time-consuming and where any prolonged shutdown of equipment could lead to large disruptions in operations.

The most commonly used split roller bearings in the world are single row cylindrical roller (fig. 12.10.1) and double row spherical roller bearings (fig. 12.10.2). ZKL includes both of the specified assemblies in its production program. These bearings have a radially split outer ring, inner ring, and cage for guiding rolling elements. Cages are usually made of massive brass. Both halves of the cage are connected to withstand dynamic forces, which the cage is exposed to during operation. Both halves of the inner ring are secured on the shaft by means of clamping rings with a screw lock element to prevent their release. The separating gap between the halves of the outer ring may be perpendicular to the face of the ring. The dividing plane of the inner ring, in contrast, should be inclined at an angle to prevent shock in the loaded zone at the edge of the dividing plane when the elements are rolling.

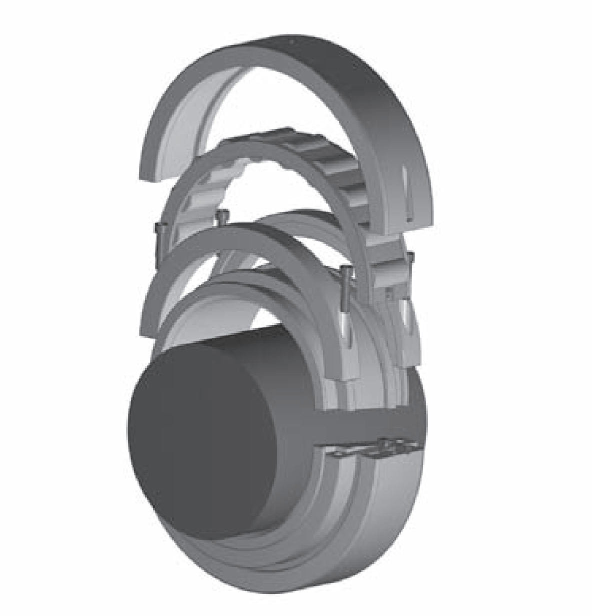

Fig. 12.10.1

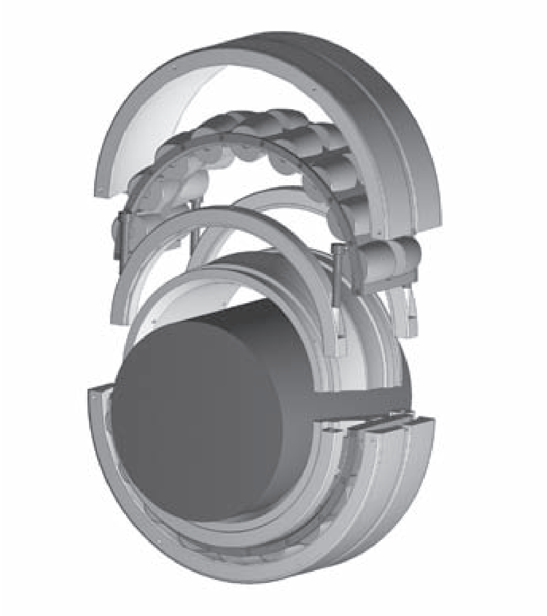

Fig. 12.10.2

Size range of split roller and spherical roller bearings

The size of special split roller bearings ranges, in the internal ring bore from Ød = 150 mm to 1 200 mm and in the outer ring diameter up to 1 600 mm.

ZKL split roller bearings can be designed to manage either radial and axial loads, or only radial loads.

ZKL split spherical roller bearings are able to carry primarily radial, but also partial axial external loads in both directions.

Split spherical roller and roller bearings are designed with clamping rings that fit in the circular grooves of the inner rings. The screw assemblies of the split raceways are connected with special screws and the manufacturer specifies the tightening torque for individual sizes.

Installing bearings

When installing bearings with split rings, we recommend that the shaft diameter have an h6, or in extreme cases, an h7 to h9 tolerance rating. Shape variations of loading surfaces can be utilized at a maximum of up to 50 % of the fitting tolerance. IT6 precision of loading surfaces is most often required. Prior to installing the bearings into the housing, we recommend that fitting paste be sparingly applied to loading surfaces to limit the formation of contact-borne corrosion. Installation of bearings into the loading should be performed by trained and experienced work personnel.

Lubrication of split bearings

Split bearing lubrication is subject to normal roller bearing requirements. Either an oil or grease lubricant may be used. The type of lubricant is selected, based on the operating conditions, the given maximum speed, the operating temperature, and the magnitude of the external load. The Technical and Consultation Services Department can assist in selecting a suitable lubricant.

Housings for split bearings

Comprehensive bearing loading solutions can be designed for individual split bearings and loadings, which consists of a split bearing, the bearing housing, the lubrication system, and bearing diagnostics per customer specifications. Comprehensive solutions may be applied to both new loadings, which are in the prototype design phase, as well as for existing loadings that require substitution of a regular non-split bearing for a split bearing. Complete specifications are needed in both cases to achieve the optimal loading design. A complete specifications form, on the basis of which we produce an optimal structural design of the given loading, is available from the supplier upon request or, as necessary, following consultation by the ZKL Technical and Consultation Services Department.

Recommendations

Manufacturing of split bearings is a demanding process, and ZKL achieves this by mastering specialized steel heat-treatment procedures and individual component separation techniques, which eliminate any undesired stress and subsequent deformation of the material. The special approach in designing personal loadings and creating installation procedures demands close cooperation with the customer. For example, the standard equations usually cannot be used when calculating the bearing durability without first determining the correcting factors. We therefore recommend that the loading design and installation procedures always be consulted with ZKL Technical and Consultation Department personnel.

Split roller bearings may also be offered in different types and designs (e.g. radial ball, thrust ball, etc.).

When substituting an original non-split bearing with a split bearing, we recommend that the customer also contacts ZKL Technical Office personnel.