

BMG Bearings: an overview

BMG business unit manager for bearings, seals and gaskets, Wayne Holton, summarises his division’s bearing product offering and takes us through some of the different bearing types and their applications.

Bearings are at the heart of all types of machinery. They are essential components for reducing friction and supporting loads wherever two connected parts of a machine are required to rotate or move relative to one another. In addition to enabling low-friction movement, bearings also maintain alignment and accuracy, support the transmission of power and are a key component for the efficient and reliable operation of any equipment that involves rotating shafts or accurate movement.

BMG Bearings’ offering includes the full range of bearing types, including ball, roller and linear bearings ranging in size from miniature to extremely large. “Our product offering is backed by technical expertise to support our customers, firstly with suitable bearing selection to best match both new and existing applications, but also with respect to condition monitoring, reclassification and repairs, bearing modification, manufacturing of assemblies and bearing and housing interchanges.

“In addition, technical training is available to all of our own internal staff, to promote a culture of ongoing learning and expert knowledge of what BMG Bearings has to offer. This

training is also available to our customers to support them in their understanding of our bearing products and the maintenance practices that are likely to extract the best reliability, life and value from an investment,” he tells MechChem Africa.

“Our focus is on each customer’s process needs and the formulation of integrated product solutions using multi-disciplinary approaches enables us to translate an enquiry for a bearing into a comprehensive long-term solution for a machine. On occasions, this may result in a solution to an ongoing problem but, more regularly, we are able to systematically improve machine performance, reliability, maintenance intervals and service life. Ultimately, this approach to bearings drives down the total costs of owning and operating an asset, which in turn maximises investment returns,” Holton notes.

Describing the technical function bearings play, he says that a bearing is used to permit constrained relative motion between two parts, typically rotation or linear movement. While enabling relative motion between two parts, bearings also allow for the transmission of forces while rotating or moving in a linear direction. These forces can be in a radial (per-



pendicular to the shaft axis) or axial direction (parallel to the shaft axis) – or a bearing can be designed to accommodate a combination of both radial and axial forces.

Bearings are classified according to the type of motion they allow (rotating or linear); to their principle of operation (ball, roller, plain or linear bearings); and according to the directions of the applied loads they can support (radial, axial or combined).

“Ball bearings make point contact on the adjacent raceways allowing for high speed operation, while roller bearings offer line contact surface on the raceway giving the ability to carry greater radial loads but at a lower rotational speed, for example,” Holton explains.

Referring to a summary table Holton says that, for high-speed applications that do not require excessive load carrying capacity in either the radial or axial direction, deep groove ball bearings might be ideal, but if very high load carrying capacity in both directions is required, then tapered roller bearing assemblies might be a better fit.

Rolling ball bearings

Going through some of the key features of key bearing types, Holton says that single row deep groove ball bearings are the most

	Radial Load Carrying Capacity	Axial Load Carrying Capacity	Combined Load Carrying Capacity	High Speeds
Deep Groove Ball Bearings	●	↔	↔	●●●
Angular Contact Ball Bearings	●	↔	↔	●●
Cylindrical Roller Bearings	●●	✗	✗	●●
Needle Roller Bearings	●●	✗	✗	●
Tapered Roller Bearings	●●	↔	↔	●●
Spherical Roller Bearings	●●●	↔	↔	●●

A summary table of the relative speed and load carrying capabilities of some different types of bearings.

common of the rolling bearings and are particularly versatile in their use. "Radial and axial loads can be applied in both directions and these bearings are suitable for applications where high speeds are required: electric motors, compressors, idler rollers for conveyors and a host of industrial applications.

These bearings are offered in open type variants or sealed with either steel shields or rubber seals assembled on one or both sides. Both radial and axial loads can be supported and, while generally seen as a solution for high-speed applications, low speeds can also be accommodated. Sealed bearings are pre-lubricated with grease and BMG can offer polyamide, steel or brass cage assemblies.

Angular contact ball bearings are designed to accommodate combined radial and axial loads. These are formed by combining two bearings as a 'duplex pair'. Possible combinations include face-to-face, which have the outer ring faces together, back-to-back, or both front faces in the same direction. Applications include gearboxes, clutches, pumps, machine tools, steel mills and on wind turbines.

Self-aligning ball bearings typically have a double row of bearings, each with its own inner raceway, in an outer ring with a single spherical raceway. These bearings are designed to accommodate minor angular misalignment of the shaft relative to the housing, which could be caused by a machining or mounting error or because of eccentric loading from the application. On the agitator shaft of a mixing system, for example, a self-aligning bearing might be used to compensate for shaft deflection and reduce housing deformation.

"Self-aligning ball bearings generate less friction than other styles of bearings, which allows them to run at higher speeds without building up as much heat," adds Holton.

Cylindrical roller bearings

Cylindrical roller bearings offer high radial load capacity, because each cylindrical roller is in line contact with its raceway. Different types are designated by NU, NJ, NUP, N, NF for single-row bearings, and NNU, NN for double-row bearings, depending on the bearing design.

Cylindrical roller bearings with no ribs on either the inner or outer ring enable the rings to move axially relative to one another. These are used as free-end bearings where no axial load is required. Where the inner and outer rings have ribs, axial loads can be accommodated in either or both directions, depending on the bearing design.

"A variant of the cylindri-

BMG offers a complete bearing re-manufacturing and repair service.



cal roller bearing is the needle roller bearing, which contains many slim rollers with a length of 3 to 10 times their diameter. As a result, the ratio of the bearing's outside diameter to the inscribed circle diameter is small, giving needle roller bearings a high radial load carrying capacity," he explains.

Needle roller bearings offer a low-cost per kg of capacity and are of particular advantage where space is limited. They are widely used on automated assembly equipment.

Spherical roller bearings are another roller bearing variant, which – like spherical ball bearings – have two rows of barrel-shaped rollers running in a single spherical raceway. "Spherical roller bearings are self-guiding and can ac-

commodate angular misalignment. They are particularly suitable for use where there is heavy and/or impact loading," Holton adds.

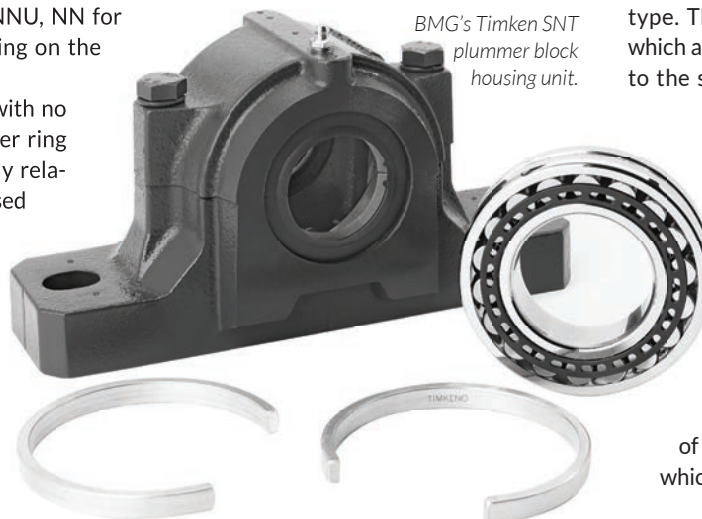
Split bearings are another roller bearing type. These have a split-to-shaft feature, which allows them to be fitted where access to the shaft ends is difficult or where the drive side is challenging or costly to disassemble. Using a split bearing allows the shaft to be raised and the split components to be assembled without having to remove other elements from the rotating shaft.

Tapered roller bearings

Where high axial or thrust forces are required, various variants of tapered roller bearings are available, which use cone shaped rollers guided by a



BMG's NSK HPS spherical roller bearings.



BMG's Timken SNT plummer block housing unit.

backing rib on the cone which runs against a mating outer race called a cup. These bearings are capable of supporting combined radial and axial loads in one direction.

If mounted as opposing pairs, however, axial loads in both directions can be achieved – and double-row and four-row tapered roller bearings are also available to cater for increasing load capacities.

Thrust ball bearings

For axial-only rotating applications, where one ring needs to rotate while in contact with another, thrust ball bearings, needle roller thrust bearings, spherical roller thrust bearings and slewing rings also from part of the BMG range.

Bearing housings and units

As well as the bearings themselves, bearings are often mounted in industry standard housings that securely hold the bearing outer ring in place, preventing it from rotating. The most common of these are plummer block housings, which are bolted onto a support structure to secure the position of the bearing assembly on its rotating shaft.

Typically produced from cast iron, these housings enable easy mounting and dis-

mounting onto pre-assembled shafts. They come with various sealing arrangements to protect the bearing inside and with built-in grease nipples for bearing re-lubrication.

For the most challenging circumstances, spherical roller bearing solid-block housed units are available. These come as assembled bearing units in cast-steel housings with spherical roller bearings. They offer high load capacity and accommodation for moderate misalignment. "The housed bearing units

are easy to mount and align, offer reduced risk of damaging or contaminating the bearing during installation, and multiple levels of sealing to ensure contaminants are kept out, even in the most arduous environments,"

Holton notes.

In addition, housed ball bearing units are available in many formats: as pillow blocks; square, round and oval flanged units; flange bracket units; adjustable flange units; and take up units.

"To enable us to offer a comprehensive range of solutions, BMG Bearings has secured distribution and service agreements with some of the world's most respected manufacturers of bearings, including NSK, NTN, Timken, IKO, TR, Rollway, FSQ and Rollix," says Holton.

"Our extensive bearings portfolio is carefully selected in terms of consistent quality controls, compatibility, standardisation, reliability and extended service life," he concludes. □



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