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■ **Bearing Solutions for Continuous Casting Plants – the CoCaB Product Range Now Includes Large Spherical Plain Bearings with Plastic Plates**

For decades, Schaeffler has been offering rolling bearing and service solutions for use in plants and applications for producing and forming steel and nonferrous metals. The **Continuous Caster Bearing (CoCaB) range**, which is perfectly suited to the demands of continuous casting machines, includes ELGES large spherical plain bearings for ladle turret lever arms, full complement FAG cylindrical roller bearings, open and sealed FAG spherical roller bearings for strand guide rolls, and INA needle roller bearings for the rolls in the upper segments of a continuous caster. Split FAG spherical roller bearings and INA cylindrical roller bearings are available for installation in driven rolls. Special FAG bearing housings with circulating cooling water complete the CoCaB product range.

Now the CoCaB range has been expanded with the addition of **ELGES large spherical plain bearings with plastic sliding plates**. As with spherical plain bearings that have the proven ELGOGLIDE sliding layer, these radial and axial bearings feature a very long operating life.

ELGES Spherical Plain Bearings for Ladle Turrets

ELGES spherical plain bearings have been successfully installed in ladle turret lever arm steering systems all over the world since 1975. Depending on the turret size, the nominal dimensions range from 180 mm to 600 mm. The advantages of the swiveling bearings subjected to loads on one side can truly shine under these conditions. The bearings have a high load-carrying capacity and a space-saving design and are maintenance-free. The most significant advantage, the extremely long operating life of the plain bearings, comes from the high-performance sliding materials and the optimum product design.

The maintenance-free ELGOGLIDE sliding layer is made of a PTFE fabric with support fibers that is embedded in a resin matrix and firmly bonded to the steel support body. The advantages of bearings with ELGOGLIDE are that they are **absolutely maintenance-free** and have a **very high load-carrying capacity**, especially with extremely one-sided loads and swivel movements. The optional ELGOGLIDE W11 model makes particularly low-friction sliding possible, even at low pressing levels.

The family of ELGES large spherical plain bearings has now been expanded to include a design with plastic sliding plates (1). The **glass-fiber reinforced plastic (GRP)** contains PTFE additives and has a very long operating life. Spherical plain bearings of this GE..-DF series are very easy to maintain and are supplied with initial lubrication. An occasional relubrication increases the operating life even further.



ELGES spherical plain bearings with ELGOGLIDE and seals on both sides (bearings of series GE..-DW-2RS2)



ELGES large spherical plain bearings with a sliding layer (1) made of glass-fiber reinforced plastic (GRP) and PTFE (GE..-DF series bearings)

Depending on the particular application, both sliding materials – ELGOGLIDE and plastic sliding plates – are possible for use in ladle turrets. The application engineering specialists at Schaeffler are on hand to assist you in selecting and designing the correct bearings.

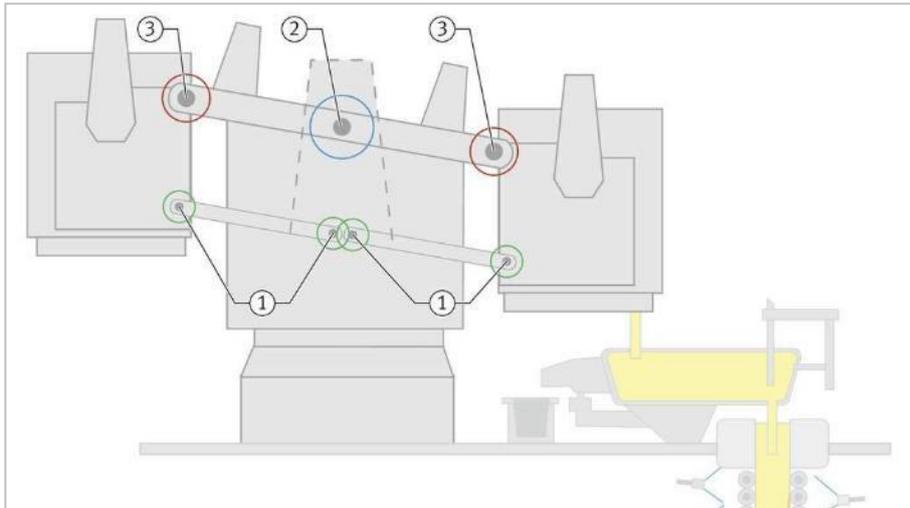


Fig. 1: Example of a spherical plain bearing arrangement (at points 1, 2, and 3) in a ladle turret with ELGES spherical plain bearings

In addition to radial spherical plain bearings, the CoCaB range also includes **axial spherical plain bearings**, which are used in ladle turrets to provide bearing support for the hydraulic cylinders that steer the lever arms.

Due to the potential of reconditioning the bearings, in both the ELGOGLIDE as well as the glass-fiber reinforced plastic plate design, they can be restored to a practically new condition.

If you have any other questions, please contact your Schaeffler External Sales team.

■ **The New Performance Series for Rolling Mills: Multi-row Tapered Roller Bearings from FAG**

When used in conjunction with carbonitriding heat treatment, Schaeffler's new **high-performance steel Mancrodur** significantly extends the operating life of FAG multi-row tapered roller bearings. As part of the Performance series, they constitute the new standard for rolling mills. Bearings in rolling mills are subjected to high loads from forces, high speeds, and shocks under extreme environmental conditions. During the **carbonitriding** process, the bearing surface is enriched not only with carbon, but also with nitrogen, giving the bearing greater surface hardness and wear resistance.

Increased Performance Thanks to Mancrodur

Enrichment with nitrogen during the carbonitriding heat treatment process forms spherical carbon nitrides in high-performance steel Mancrodur, resulting in a fine and uniform microstructure.

Visible in the material structure in **Fig. 2** are: (1) Coarse-grained carbide distribution; (2) Fine distribution of carbonitrides.

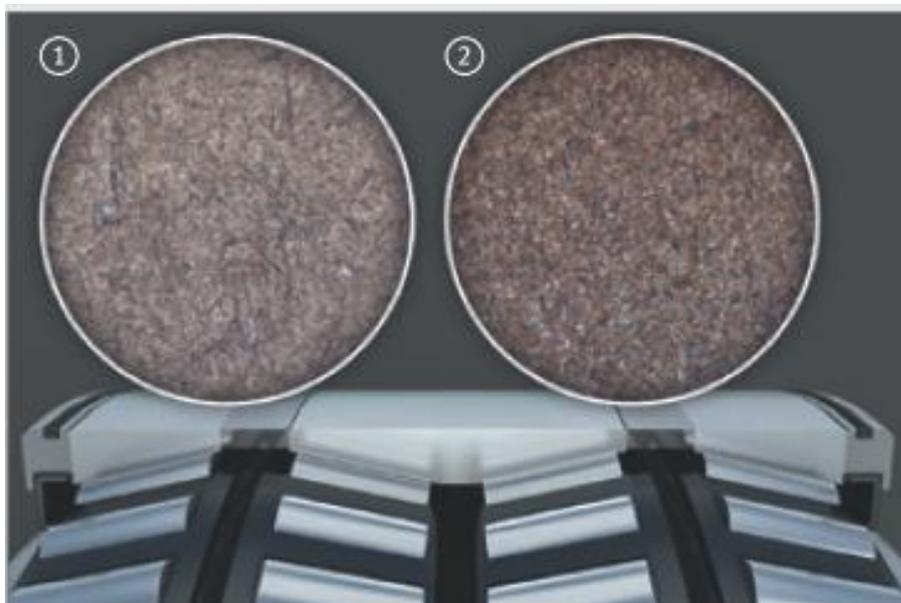


Fig. 2: Material structure of the Performance series



Double-row and four-row FAG tapered roller bearings of the Performance series for use in rolling mills

The wear resistance and improved microstructure during particle overrolling and mixed friction (boundary lubrication conditions) result in a significantly **increased operating life**. In the application, this leads to considerably **higher system efficiency**.

In this way, the tapered roller bearings are provided with greater surface hardness and wear resistance. As can be seen in Fig. 3 below, high-performance steel Mancrodur has great advantages over standard steel: lower **wear** and a **longer operating life**.

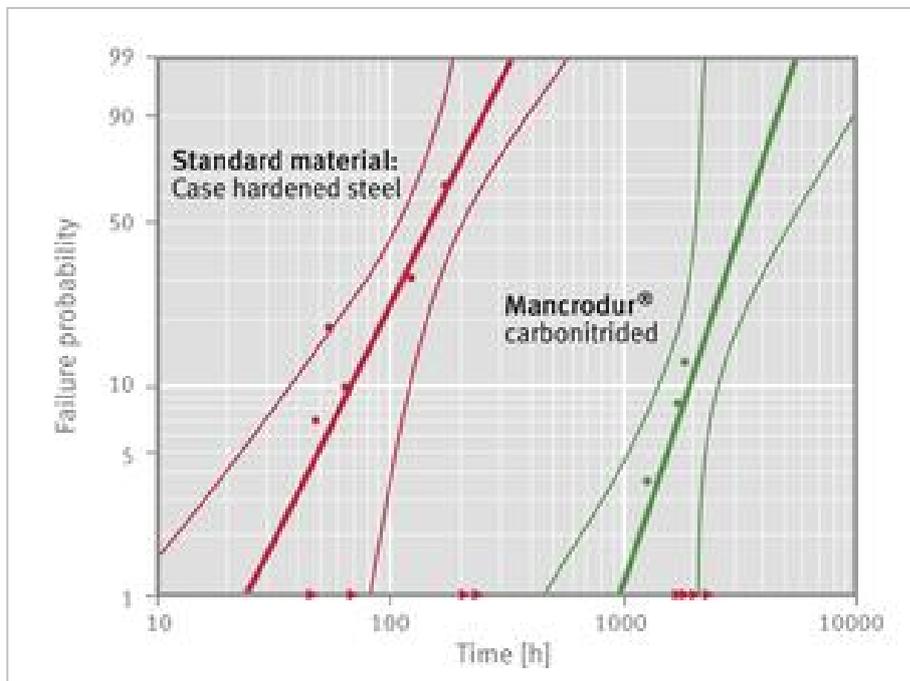


Fig. 3: Increased performance with Mancrodur

Specialist for Large Bearings

When it comes to large-size bearings, Schaeffler is regarded as an absolute specialist. For many years, standard and special bearings from INA and FAG with an outside diameter of 320 mm and larger have been leading the way for applications in heavy industry, such as the metal and nonferrous metal industry. Large-size bearings are machine components whose quality and reliability are of decisive importance for the functionality and cost-effectiveness of the application. The wide range of types and designs and Schaeffler's many years of experience guarantee comprehensive expertise for large-size bearings to meet the special challenges of these applications.

If you have any other questions, please contact your Schaeffler External Sales team.

■ **Comprehensive Monitoring Concept for Trunnion Bearings in Converters**

One of the main demands of the steel-processing industry is for the main production systems to be available as much as possible. Especially with bottleneck systems such as converters in oxygen steelworks, downtimes can often involve costs in the millions for plant operators. Schaeffler is offering a solution to this with a new, comprehensive **online monitoring concept for converter trunnion bearings and gears**. Monitoring concepts such as acoustic emission measurement, time-tested oil particle analysis using **FAG Wear Debris Check**, and testing the grease condition with **FAG GreaseCheck** have all been integrated into a unique condition monitoring system. This allows maintenance measures to be planned, avoiding costly unplanned machine downtimes due to bearing damage. Certified experts provide support with data evaluation and provide customers with recommendations for action.

Besides condition monitoring, Schaeffler also contributes towards an integrated solution approach with its bearings, housings, and assembly services to offer the user optimum total cost of ownership (TCO).

Acoustic Emission Measurement

For the first time, Schaeffler is offering a condition monitoring system that uses the principle of acoustic emission measurement. This procedure is perfect for use with slowly rotating trunnion bearings like those used in converters. In these cases, the otherwise common vibration measuring method cannot be relied on, since the speed is too slow to generate sufficient energy to measure the structure-borne noise during overrolling of damage in the rolling bearing. In the same way, excessively short processes can also reduce the measuring time to such an extent that they make the resolution too low.

Acoustic emission measurement, on the other hand, utilizes the effect that plastic deformation or breakage occurs in materials subjected to loads beyond the elastic limit. This defect results in a concentration of stresses followed by the formation of cracks and, ultimately, to a sudden release of the tension in the material. This brief process produces an acoustic emission event that emanates from the source as an ultrasonic wave and can be measured.

Oil Particle Analysis – FAG Wear Debris Check

Signs of wear in bearings or gears in gear units are evident in the form of metal abraded particles well before impending failure. By measuring and monitoring this abrasion, damage to gear units with circulating oil lubrication as well as to plain bearings can be detected early on. **FAG Wear Debris Check** measures the number of particles in the oil and makes it possible to transmit key values to the upstream monitoring system and to record and evaluate the particle concentration according to size and material.



FAG Wear Debris Check

Monitoring by means of vibration analysis is not possible because of the slower speeds of the large wheel drive of a converter. This is why permanent oil particle analysis using FAG Wear Debris Check is applied.

Grease Quality Measuring – FAG GreaseCheck

More than half of all rolling bearing failures can be directly attributed to lubrication. Lubrication conditions, physical grease aging, or the proportion of solid and liquid contaminants, such as water in the lubricant, have a significant effect on bearing life.

With the **FAG GreaseCheck** grease sensor and the accompanying electronic analysis unit, it is possible to detect changes in the grease's condition during operation – long before any damage occurs in the rolling bearing. This makes it possible to plan exactly when to replace the lubricating grease, thereby extending the rolling bearing's useful life. In addition, it is possible to switch from time-based to need-based relubrication. Along with measuring points for the acoustic emission sensors, the new FAG spheroidal graphite cast iron housings for converter bearings already have integrated bores for measuring the grease quality.



FAG GreaseCheck

Consolidating and Evaluating the Measurement Data – FAG ProCheck

In addition to the total of 60 ascertainable key values, the process parameters also need to be recorded as part of the monitoring strategy. **FAG ProCheck** monitors representative key values and processes them for system visualization. FAG ProCheck's alarm function reports fault and error messages. Schaeffler service engineers can then evaluate and analyze them via remote access at the necessary depth and make detailed recommendations for action.

Our marketing materials at the following links will provide you with more information on FAG monitoring devices:

Catalog: IS1

<http://www.schaeffler.de/content.schaeffler.de/de/mediathek/library/library-detail-language.jsp?id=3445007>



FAG ProCheck



Brochures:

FAG Wear Debris Check: WL 80 366A

<http://www.schaeffler.de/content.schaeffler.de/de/mediathek/library/library-detail-language.jsp?id=64326336>

FAG GreaseCheck: WL 80 380

<http://www.schaeffler.de/content.schaeffler.de/de/mediathek/library/library-detail-language.jsp?id=22224320>

FAG ProCheck: WL 80-69

<http://www.schaeffler.de/content.schaeffler.de/en/mediathek/library/library-detail-language.jsp?id=1258858>

Global technology solution:

Acoustic emission measuring: GTS 0077

<http://www.schaeffler.de/content.schaeffler.de/de/mediathek/library/library-detail-language.jsp?id=63364482>

For further information, please contact your Schaeffler Sales team.

■ **Schaeffler’s Product Portfolio for Increasing Energy Efficiency – Now Available on the Internet**

Energy-efficient production offers up both challenges and opportunities for all companies. Our portfolio of energy-efficient products creates ideal conditions for increasing energy efficiency. And that in turn opens up wholly new perspectives for the ongoing improvement of competitiveness and productivity.

Friction-reduced rolling bearings form an important part of our energy-efficient portfolio and increase the effectiveness of machines and systems. Smooth running and a compact design are always paramount for our products. Thanks to innovative **surface coatings**, we have managed to reduce friction and wear even further.

We have set up a new Internet page on this topic to inform you of our energy-efficient product portfolio. [LINK](#)

www.schaeffler.de → Products & Services → Energy Efficiency

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- Events

Energy Efficiency

On the path towards more energy efficiency

The world’s population and energy requirements are both growing – and natural resources are becoming increasingly scarce. Acting in a way that is energy-efficient, environmentally conscious, and sustainable at the same time is an important objective for our company, both today and in the future.

As one of the world’s leading suppliers of technology and innovations, we have a comprehensive portfolio of energy-efficient products for this field. At the same time, we also assist you in achieving your targets in terms of high productivity, maximum energy efficiency, and sustainable competitiveness.

Our energy-efficient product portfolio

BLUeCOMPETENCE
Alliance Member
Partner of the Engineering Industry Sustainability Initiative

PUBLICATIONS

Fig. 4: How our energy-efficient portfolio is represented on the Internet



The newly conceived Internet site provides comprehensive information on the **advantages, characteristics, benefits, and application possibilities** of our energy-efficient products.

On the basis of **comparative calculations of frictional torque and power loss**, you can easily see the energy savings that can be achieved with our energy-efficient products.

As of today, our energy-efficiency portfolio on the Internet includes the following products:

[Generation C deep groove ball bearings](#)

[Cylindrical roller bearings in TB design](#)

[Twin Tandem wheel bearings](#)

[Cronitect hybrid bearings](#)

[Slimline drawn cup needle roller bearings](#)

[Energy-efficient coatings](#)

We are currently in the process of expanding the portfolio and will keep you updated.

Take advantage of our energy-efficient product portfolio in order to successfully achieve your long-term goals, such as boosting productivity, energy efficiency, and ongoing competitiveness!

You can contact us directly at the email address energy.efficiency@schaeffler.com to receive quality advice and evaluation of energy saving potentials.

For further information, please contact your Schaeffler Sales team.