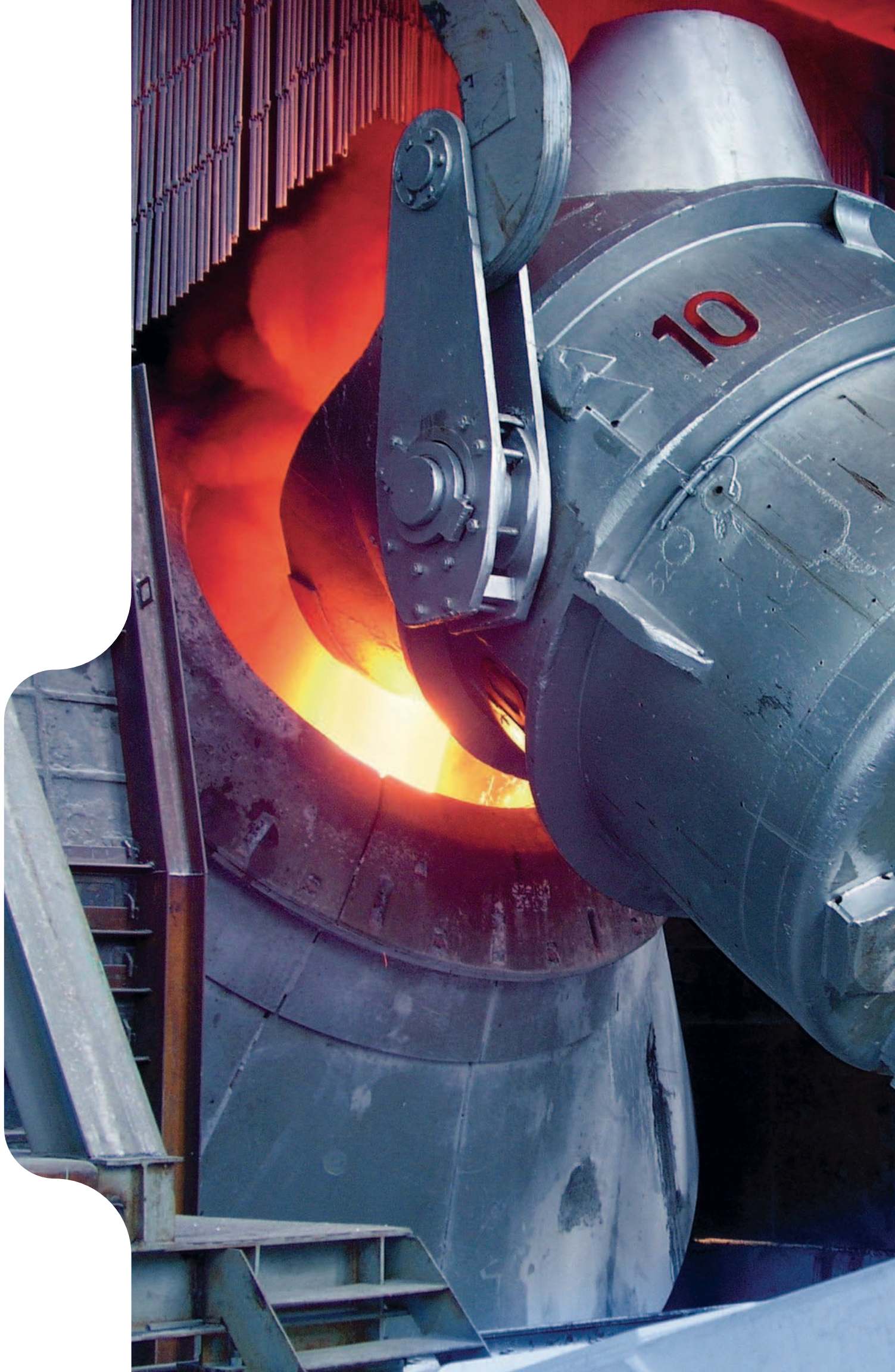


The total trunnion solution

Enhance performance of LD and AOD converters with solutions from SKF





Solve multiple challenges with the total trunnion solution from SKF

Whether you manufacture LD or AOD converters, the design of each component used to support the trunnion ring is driven by the challenges of contamination, heavy radial loads, misalignment and induced axial loads that result from expansion and contraction of the trunnion ring.

The challenges haven't changed too much over the years, nor have the solutions.

Don't fix it again

One of the most complex issues today deals with the induced axial loads on the bearings resulting from thermal expansion and contraction of the trunnion ring. The traditional solution uses two spherical roller bearings – one on each trunnion. On one side, the bearing is secured in the housing and to the shaft. On the other side, the bearing is secured to the trunnion but is “free” to move on a special bushing within the housing to accommodate axial movements of the trunnion.

When everything works properly, bearing loads are normal; but as components start to wear, bearing loads increase due to induced axial loads. Consequently, as converters have increased in size and weight, so have the bearings and housings and the complexity of the additional components.

Today, there is a simple solution to the challenge of induced axial loads.

Fix it forever

It's the total trunnion solution from SKF®, which consists of a unique bearing arrangement, combined with a re-designed housing and a new seal. The total shaft solution goes to the heart of the matter and avoids induced axial loads, eliminating the need for expensive additional components. The result: converter manufacturers have an opportunity to downsize, eliminate components, and realize substantial cost savings.

Engineered solutions

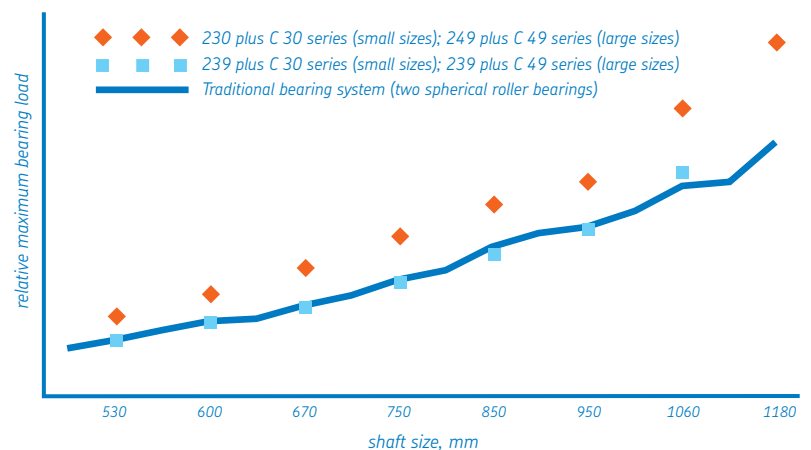
Designed for increased bearing service life

For decades, the most common way to accommodate axial expansion and contraction of the trunnion ring was to enable the non-locating bearing to slide in the housing. That became the industry standard. Today, however, there is a much better alternative – the CARB® bearing solution available from SKF.

The CARB bearing solution features an innovative bearing arrangement that combines a CARB toroidal roller bearing in the non-locating bearing position, with an SKF spherical roller bearing in the locating position. When compared to the traditional self-aligning bearing arrangement, the CARB bearing solution provides the following benefits:

- The same size bearing accommodates heavier radial loads.
- Eliminates the problem of induced axial loads created by thermal expansion of the trunnion ring.
- Simplifies the assembly.
- Reduces friction.
- Reduces vibration levels.
- Improves reliability.
- Eliminates the need for bushings and other custom components.
- Reduces maintenance costs.

Relative maximum bearing load in converters



The SKF total trunnion solution provides three options depending on customer need.

- ◆ ◆ ◆ **The “stronger” solution:** Using the same bearing dimensions, the stronger solution can accommodate heavier radial loads which means a higher safety factor and increased reliability.
- ■ ■ **The “cost-effective” solution:** By incorporating a 239 series spherical roller bearing, housing and shaft dimensions remain the same, but the width of the bearing is decreased – providing approximately the same load values as a traditional bearing arrangement and resulting in a lower overall cost.

The “sized-down” solution: Comparing load values, designers can choose to use a smaller shaft and bearing to accommodate heavier loads. For example, the bearings and housings used for the 670 mm “stronger solution” can accommodate higher load values than either the traditional or the “cost-effective” solutions for a 750 mm shaft.

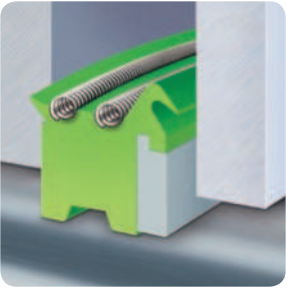
provide maximum reliability

The new housing is better, not bigger

Because the CARB bearing accommodates thermal expansion and contraction of the trunnion ring, the bearing system can support heavier radial loads. This unique solution paves the way for new housings that are lighter, simpler in design, and more cost effective.

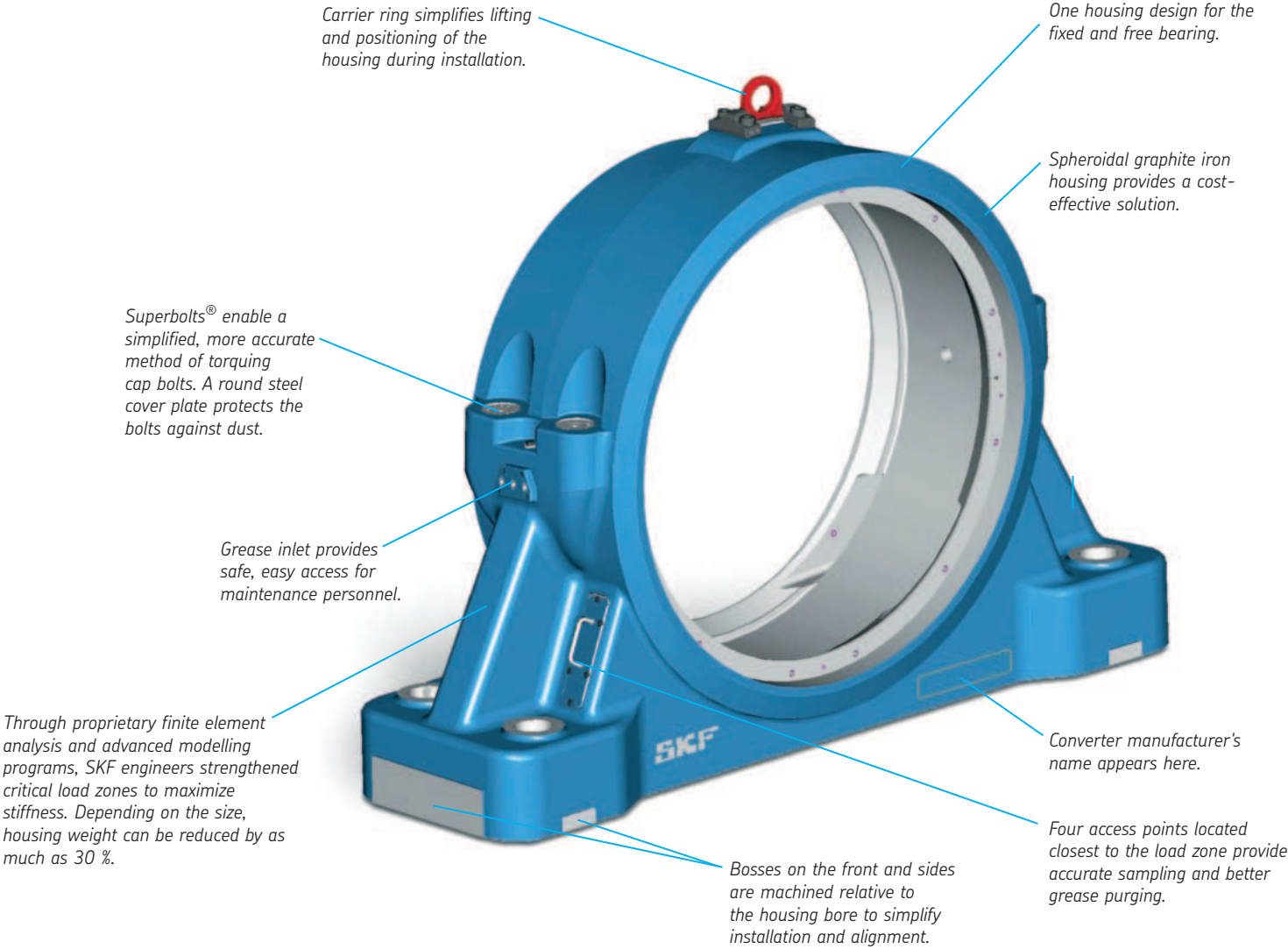
To take advantage of these opportunities, design engineers using proprietary SKF finite element analysis programs were able to identify critical load zones in converter bearing housings so that the new design is more efficient – adding strength where it's needed most.

Seal reliability in and contaminants out



The SKF total trunnion solution includes a new acrylonitrile-butadiene rubber (NBR) seal. The seal, which can accommodate 1,5° of misalignment, incorporates a metal ring to protect against hot dust and slag. This new seal can accommodate temperatures up to 100 °C (212 °F).

A cutaway grease pocket facilitates sliding on the shaft during axial expansion and contraction of the trunnion ring. SKF's exclusive design incorporates springs on the outside of the seal for easy installation.



Carrier ring simplifies lifting and positioning of the housing during installation.

One housing design for the fixed and free bearing.

Spheroidal graphite iron housing provides a cost-effective solution.

Superbolts® enable a simplified, more accurate method of torquing cap bolts. A round steel cover plate protects the bolts against dust.

Grease inlet provides safe, easy access for maintenance personnel.

Through proprietary finite element analysis and advanced modelling programs, SKF engineers strengthened critical load zones to maximize stiffness. Depending on the size, housing weight can be reduced by as much as 30 %.

Converter manufacturer's name appears here.

Bosses on the front and sides are machined relative to the housing bore to simplify installation and alignment.

Four access points located closest to the load zone provide accurate sampling and better grease purging.

Explore the possibilities

Improve your product's performance with SKF engineering and application knowledge, design and testing expertise, and a wide range of solutions.

Your customers are continually raising their expectations of product performance and reliability – demanding equipment that consumes less energy, runs quieter, faster and longer, and requires less maintenance. Frequently, this also means lighter, more compact designs.

To meet these growing challenges and stay competitive, you need a trusted source of knowledge and application experience to provide you with solutions that work.

And for long-term results, you need a working partner that offers one source of responsibility from the design stage right through to delivery. That source is SKF.

Knowledgeable solutions

From a position as the world's leading bearing manufacturer, SKF has evolved to being a provider of cost-effective and knowledgeable solutions. You can take advantage of SKF knowledge through our proprietary services and software to shorten the time required to develop and test your product.

SKF knowledge-engineering services, for example, include life calculation analysis, dynamic systems modelling, and 3-dimensional virtual test rigs to simulate and troubleshoot system vibration. SKF product solutions go beyond bearings, housings and seals, to include complete lubrication systems, industry-leading condition monitoring systems, advanced linear and rotary actuation systems, and unique solutions in mechatronics – combining mechanical and electronic elements in a single design.

Install with confidence

When you install SKF products, it tells your customers that your resources include the best in state-of-the-art technology, and that your products contain some of the very best components available on the market.



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