

SKF sealing solutions for industrial gear units

Optimizing performance in any gearbox application environment



Seal performance



SKF sealing application solutions

- Gear motors
- Helical and bevel-helical gear units
- Customized gear units
- Mobile and stationary planetary gear units

is always conditional

Whether you're an OEM or an end-user, you need gearbox seals that do not leak and are long-lasting. But given the tremendously wide range of gearbox applications and operating environments, choosing or developing a seal that can meet those requirements can be difficult.

The same seal that works well in a relatively clean environment can perform poorly in a highly contaminated one. Similarly, a seal designed for use with mineral oil-based lubricants can wear out prematurely if used with synthetic lubricants.

Finding solutions to accommodate these and other sealing requirements has traditionally been a big challenge, particularly for larger, customized transmission applications. With SKF, it's never been easier.

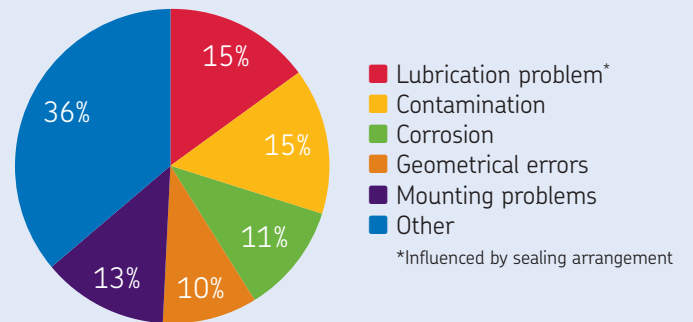
Prepare your transmissions for any challenge with SKF

While SKF is synonymous with high quality bearings, we are also one of the world's leading producers of high quality sealing systems for rotating, reciprocating, static and other applications.

For industrial transmission OEMs and end-users, SKF offers a comprehensive range of standard and customized seals for industrial gear units and gear motors. With both moulded and machined seal manufacturing capabilities available worldwide, SKF can deliver seals in different design styles and in quantities ranging from prototypes to serial production.

Fig. 1

Principal causes for bearing failure



*Influenced by sealing arrangement

≈Sealing arrangements contribute to 41% of bearing failures

A single source for countless requirements

Backed by more than 100 years of industrial applications and rotating machinery expertise, SKF has developed an unmatched understanding of the interaction between bearings, seals, lubrication, shafts, housings and operating environments. By focusing on how these components and conditions function as a system, SKF develops seals that are optimized for any transmission application.

SKF's proprietary elastomeric compounds, for example, have been formulated to resist a wide range of conventional and synthetic lubricants. SKF seals are also available in an array of thermoplastic elastomers, PTFE and plastics. We can work with you to identify and recommend the most appropriate seal material and profile to operate in your application. Additionally, we can work with customers to evaluate sealing performance on site, or at one of our global testing facilities.

Whether you need to develop a new transmission seal or upgrade an existing one, SKF sealing solutions can help deliver:

- **Increased productivity and reliability**
- **Reduced maintenance and downtime**
- **Extended seal and asset service life**
- **Reduced lifecycle operating costs**
- **Shorter product development times**
- **Reduced warranty costs**



Sealing solutions fit for any application



As Figure 1 shows, the sealing system plays a role in around 41% of bearing failures. For industrial transmissions, finding a seal that can withstand harsh and diverse conditions is complicated. Even different seals in the same unit can face very different operating requirements – input shaft seals generally endure high speeds and temperatures, while output shaft seals can face severe contamination.

Fortunately, SKF offers a proven, comprehensive range of sealing profiles, materials and services to support greater uptime in any environment or application.

Radial shaft seals HMS5 and HMSA10

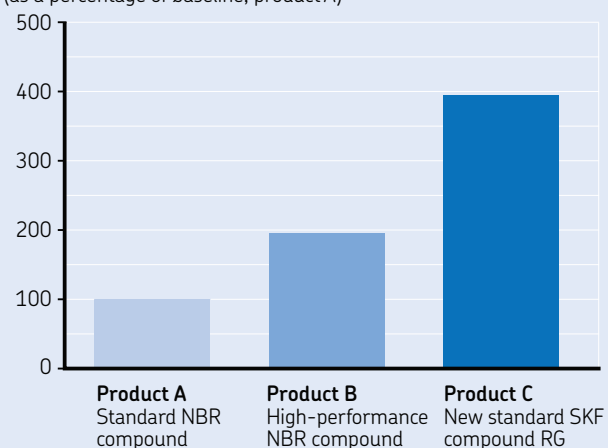
SKF metric rubber outside diameter radial shaft seals HMS5 and HMSA10 combine a spring-loaded sealing lip and a nitrile rubber compound (NBR) developed specifically for industrial gearbox applications. The result is an optimized radial load and wide compatibility with aggressive gearbox lubricants, all of which help contribute to superior seal life (→ fig. 2).

The spring-loaded sealing lip contributes to a quick response in handling dynamic runout and maintaining the sealing performance, even during progressive wear of the lip. The HMSA10 features an auxiliary, non-contacting dust lip that allows the same operational speeds as the HMS5, but with reduced risk of generating the excessive under lip temperatures that typically result with a positive contacting dust lip.

HMS5 and HMSA10 seals are available for the full range of sizes that include many that meet ISO or DIN standards. For higher operational speed applications, the same design and size range is also available in a high performance fluoro rubber compound with a stainless steel garter spring as standard.

Fig. 2

Average seal life
(as a percentage of baseline, product A)





Low friction seals with SKF Wave lip design



These metal outside diameter shaft seals feature the patented SKF Wave lip design that has a very effective pumping action to return the lubricant towards the bearing as the shaft rotates. Compared to conventional straight edge radial lip seals, SKF Wave seals generate up to 35% less heat and 20% less friction for better lubrication and a reduced risk of premature seal failures.

The seals also feature SKF Bore Tite Coating on the outside diameter, a non-hardening, water-based acrylic sealant that helps fill small imperfections in the housing bore.

Heavy-duty custom shaft seals for large diameters



In heavy industries like metals, construction and mining, keeping lubricants in and contaminants out of transmissions is a serious challenge. SKF can meet this challenge with our comprehensive assortment of heavy-duty custom shaft seals. The assortment includes heavy-duty metal-cased seals, rubber outside diameter seals with metal inserts or rubber reinforcement, polyurethane seals and the recently launched all-rubber reinforced HSS seals.

To handle high temperatures and abrasive contaminants, these seals are available in a broad range of elastomers and polyurethanes. Other key features include SKF Springlock and SKF Springcover for retaining and protecting the spring.

SKF Mudblock seals for Mobile Planetary Drives



Planetary gears are frequently used for powering mobile wheel or track-driven vehicles. The operational environment for these vehicles can often be very severe with immersion into mud and water.

SKF Mudblock is a family of special unitized cassette seals for use in greased or oil-filled applications. This self-contained unit has multiple pre-lubricated sealing

lips and an integral sleeve to provide the optimum running surface, and it can be installed in one piece.

V-ring seals



V-ring seals from SKF offer an easy-to-install solution for transmission shaft applications, including use as a secondary seal in highly contaminated environments. They have no reinforcement, so they can be stretched over the shaft and, depending on size, pushed over other components.

SKF Speedi-Sleeve

Dismantling and re-machining worn shafts can be a time-consuming, costly proposition. With SKF wear sleeves, it's also unnecessary:

SKF Speedi-Sleeve – Standard and Gold

SKF Speedi-Sleeve is a thin-walled shaft sleeve with a detachable flange that allows users to press the sleeve into position over a damaged shaft surface to provide a new sealing surface – without power tools, heating or the need to change seal sizes. For highly contaminated operating conditions, SKF Speedi-Sleeve Gold features a tougher, special metallic coating that reduces abrasive wear.



Large diameter sleeves

Designed for the heaviest industrial applications, large diameter wear sleeves accommodate shaft diameters between approximately 200 mm (8 in.) and 1 143 mm (45 in.). These robust wear sleeves have a thicker cross-section to reduce the risk of distortion and require controlled heating for installation and removal.

Originally developed as a repair tool, SKF wear sleeves also allow OEMs to offer easier replacement options for the end-user, particularly for applications with specialized, expensive materials or for applications with high levels of contamination.

Machined seals concept



Providing a fast, flexible alternative to moulded seal production, the machined seals concept allows SKF to deliver polymer seals quickly in virtually any dimension and design, standard or non-standard, and in virtually any gearbox or gear motor application. The concept combines several SKF strengths:

- **Application engineering support**
- **Wide selection of standard and non-standard seal profiles and materials**
- **A unique CNC manufacturing process**
- **Rapid delivery worldwide**
- **Customized solutions, optimized for customer performance requirements**



SKF – your global development partner



Application engineering

Expert SKF application engineers are available worldwide to assist with seal development projects at every stage. Following a detailed analysis of operational requirements, our engineers use an extensive application database to find the most suitable sealing solution. They can also use SKF Simulator software to explore the non-linear behaviour of various sealing materials, which helps to predict sealing performance under various conditions.

Research and development

Because developing optimized sealing solutions requires sophisticated testing and analysis, SKF operates a global network of dedicated testing facilities. Every year, these state-of-the-art laboratories conduct thousands of tests, including durability, contaminant exclusion, salt fog corrosion, cold fracture, pump rate, friction torque, dry wear and chemical compatibility.



Flexible manufacturing

Spanning North America, Europe and Asia, our flexible seal production footprint combines moulded and machined manufacturing capabilities to accommodate virtually any demand. With competencies in compression, injection and transfer moulding technologies, SKF can apply the most appropriate option for your requirements.

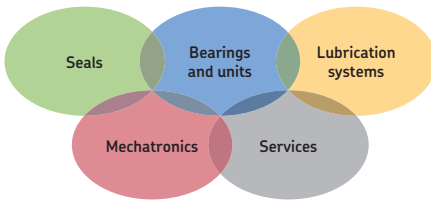
Along with our extensive moulded seal manufacturing capabilities, we offer on-demand machined polymer seal production at SKF SEAL JET centers and SKF Solution Factory locations worldwide.



*See inserts for more details about
SKF solutions for sealing applications
in industrial transmissions.*

The Power of Knowledge Engineering





The Power of Knowledge Engineering

Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.



SKF BeyondZero is more than our climate strategy for a sustainable environment: it is our mantra; a way of thinking, innovating and acting.

For us, SKF BeyondZero means that we will reduce the negative environmental impact from our own operations and at the same time, increase the positive environmental contribution by offering

our customers the SKF BeyondZero portfolio of products and services with enhanced environmental performance characteristics.

For inclusion in the SKF BeyondZero portfolio, a product, service or solution must deliver significant environmental benefits without serious environmental trade-offs.

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