





# SKF Explorer angular contact ball bearings

## Designed to run faster, cooler, smoother, longer



# Improve performance and increase service life…

Screw compressors, pumps and gearboxes require bearing arrangements that will provide long service life even under difficult operating conditions.

In these types of applications, where there are frequent rapid starts and stops and contaminated or inadequate lubrication conditions, SKF Explorer angular contact ball bearings can exceed performance and service life requirements of non Explorer bearings.

SKF Explorer angular contact ball bearings are characterized by:

- high load carrying capacity
- 40 degree contact angle*
- six clearance/preload classes*
- high degree of stiffness
- high speed capability
- low heat generation
- low noise and vibration levels
- P5 running accuracy*
- Extremely clean steel
- Unique heat treatment

* Single row angular contact ball bearings only

SKF Explorer angular contact ball bearings combine material and design innovations that can increase bearing service life up to 300% while delivering a number of other performance benefits.



# ...with SKF Explorer bearings

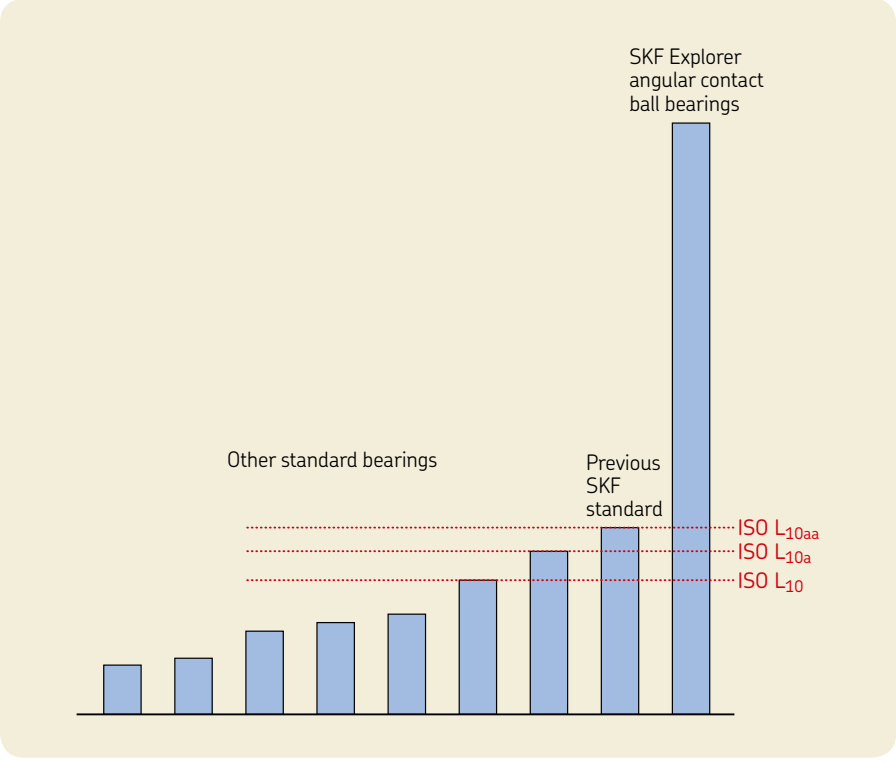
SKF Explorer is a performance class that has expanded the limits for rolling bearings. With SKF Explorer angular contact ball bearings, OEMs and endusers can realize the benefits provided by this performance class.

The benefits of SKF Explorer angular contact ball bearings, when compared to non-Explorer bearings, include, but are not limited to:

- Improved wear resistance
- Less sensitive to axial overloading
- Reduced lubricant consumption
- Reduced vibration and noise levels
- Less heat generated by the bearing
- Extended maintenance intervals
- Extended bearing service life

SKF Explorer performance class bearings last longer and virtually eliminate the risk of premature failure, as verified by the SKF Engineering and Research Centre located in the Netherlands, and has been acknowledged by independent quality audit bodies such as Det Norske Veritas and Germanischer Lloyd.

***Endurance test results***



# SKF Explorer features and benefits

## Unique raceway-shoulder transition

The ground transition between the raceway and shoulder reduces contact and edge stresses, which makes the bearing less sensitive to axial overloading.

## Superior cage designs

Through a process of continuous improvement, all SKF Explorer angular contact ball bearing cages have been re-engineered to promote the formation of a lubricant film and reduce heat, vibration and noise levels generated by the bearing. The polyamide and PEEK* cages were also upgraded to better withstand the inertial forces caused by frequent high-speed starts and stops.

* PEEK = polyetheretherketone

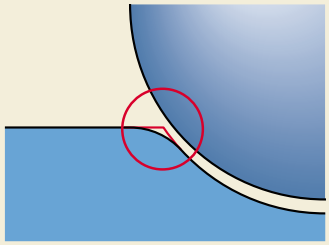
## High quality steel and unique heat treatment

Manufactured from extremely clean steel and using a unique heat treatment process, SKF Explorer angular contact ball bearings offer maximum hardness for optimum wear-resistance and dimensional stability up to +150 °C *(+300 °F)*.

This keeps the predefined clearance or preload constant over time to significantly extend bearing service life.

## Improved running accuracy

The high-quality balls, combined with advanced manufacturing techniques used on SKF Explorer angular contact ball bearings, improves running accuracy. These improvements also reduce heat, vibration and noise levels generated by the bearing.

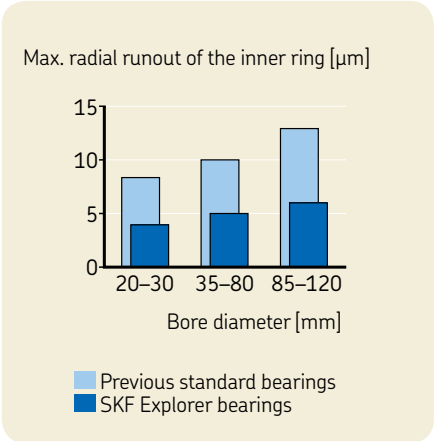


***Raceway-shoulder transition***



***Polyamide cage***

***Improved running accuracy***




***Unique heat treatment***



# Special features and benefits

## Single-row, universally matchable bearings

SKF Explorer universally matchable bearings have a stand-out tolerance as narrow as + 3 µm. They are specifically manufactured so that when mounted in random order, but immediately adjacent to each other, a given internal clearance or preload and/or an even load distribution is obtained without the use of shims or similar devices.

## Double row angular contact ball bearings : improved cages and shields

The SKF Explorer crown cage provides excellent ball guidance while promoting the formation of a lubricant film. Increased stiffness prevents cage failures or ejection at higher speeds. The improved shield design provides better grease retention while reducing the ingress of contaminants, especially in vertical shaft applications.

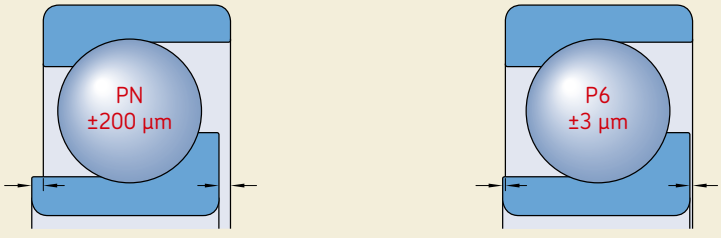
## Four-point contact ball bearings : improved ring marking

All rings are marked with a unique serial number to avoid the mix-up of components. An asterisk marking on one of the outer ring side faces and one of the inner ring halves enables mounting the bearing in the same position as originally manufactured, to maximize accuracy. Laser markings ensure readability and traceability for many years.

## Four-point contact ball bearings: unique inner ring shoulder

The inner ring has specially-designed recessed shoulders to improve the oil flow into the bearing, which can influence cooling and reduce operating temperatures significantly. The optimized inner ring cross section improves stress distribution and minimizes ring deformation after mounting, as the clamping force is only applied in defined areas.

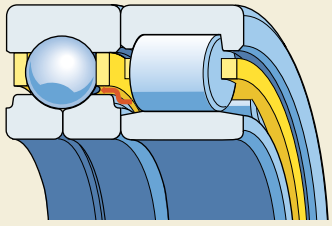
***Bearings for universal matching***




Conventional bearings

SKF Explorer bearings, universally matchable

***Unique inner ring shoulder***



# New developments for new challenges

## Special cage materials

Polyetheretherketone (PEEK) is a high-tech polymer, suitable for high speeds and temperatures up to 200°C *(390°F)*. It has excellent mechanical properties and can be used in aggressive media. Compared to brass cages, PEEK can be a cost-effective alternative. PEEK cages are available for a wide range of single row angular contact ball bearings, four-point contact ball bearings and cylindrical roller bearings.

## Ceramic rolling elements

For demanding applications, rolling elements made from bearing grade silicon nitride define performance standards for high speeds, poor lubrication conditions, wear resistance and service life. Furthermore, the electrical insulation properties are the ultimate solution to prevent electrical erosion.

## Customized designs

SKF can provide customized bearing solutions with special dimensions or features – from locating slots in the outer ring to matched bearing sets.

## Special steels

Sour gas compressors and media lubricated pumps are extremely demanding, and even the best standard bearing steel has a very limited service life in these types of applications. SKF can provide bearing rings made of a high-nitrogen corrosion resistant steel (suffix VC444) to substantially improve performance and service life. VC444-bearings have been used successfully in sour gas compressors and deep sea pumps.

For additional information, contact your local SKF representative.

***Oil refinery***



***Bearing with PEEK cage***



# Application examples

## Screw compressors

Bearings in twin screw compressors must accommodate axial and radial loads while maintaining the precise position of the rotors. To meet these requirements, clearance and stiffness are key operational parameters. Working with leading compressor manufacturers, SKF has been able to meet the highest requirements for bearing service life, using SKF Explorer angular contact ball bearings.

Matched bearing sets make mounting easier and improve running accuracy.

## Submersible pumps

For submersible pumps, reliability and long service life are essential.

To attain these performance requirements, leading pump manufacturers turned to SKF. Using shielded SKF Explorer double row angular contact ball bearings, which are greased for the life of the bearing, manufacturers were able to increase the service life of their pumps.

These bearings, which are greased and sealed at the factory, contain the proper amount of the correct grease. The shields reduce the risk that contaminants will enter into the bearing, reduce the number of components and simplify assembly.

## Gearboxes

For wind park owners, trouble-free operation is vital. This is particularly true for the gearbox in a wind turbine. For these demanding applications, SKF Explorer four-point contact ball bearings are an obvious choice. Their superior performance and extremely long service life are unparalleled in the market.

In smaller gearbox applications, e.g. elevator or industrial transmissions, four-point contact ball bearings with a PEEK cage are available. When compared to conventional brass cages, PEEK cages not only reduce vibration and noise levels, they are also more cost-effective.

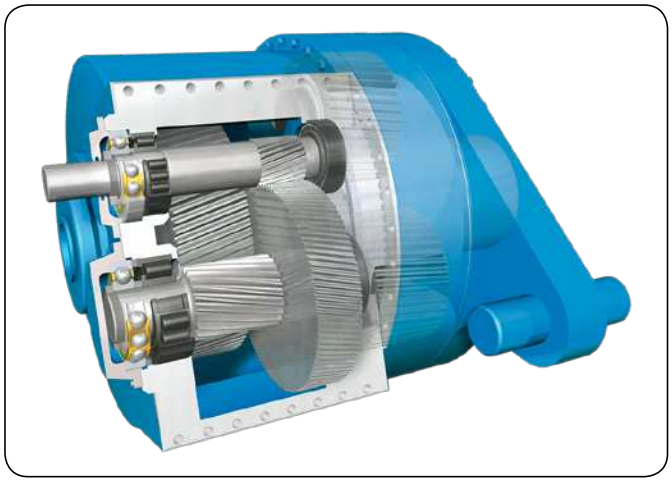


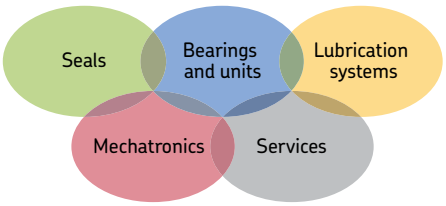
*Atlas Copco screw compressor*



*Flygt submersible pump from ITT Water & Wastewater*

*Wind turbine gearbox*






**The Power of Knowledge Engineering**

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

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