



SKF Energy Efficient double row angular contact ball bearings

Reduced friction for reduced energy use



SKF Energy Efficient bearings

Engineered to promote sustainability

As the need to conserve energy grows more apparent every day, any technology that enables even a small reduction in energy consumption is big news.

Drawing on over 100 years of engineering knowledge and unmatched expertise in the field of tribology and related sciences, SKF has created a new, low-friction performance class.

Reduce friction – reduce energy consumption

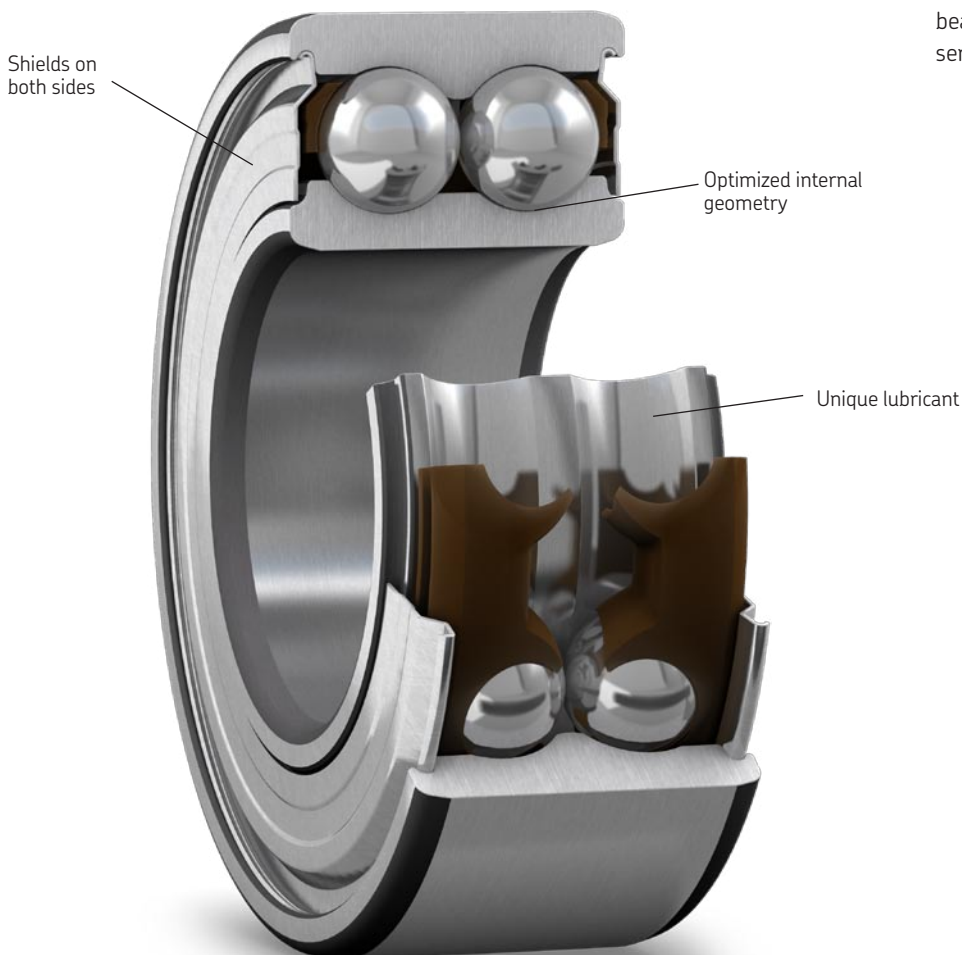
The SKF Energy Efficient (E2) performance class is characterized by a minimum 30% reduction in the bearing's frictional moment when compared to an SKF basic design bearing. This substantial friction reduction is achieved by optimizing the internal geometry of the bearing and applying a new, low-friction grease.

Longer service life lowers cost of ownership

Optimized to reduce frictional losses in the bearing, shielded SKF Energy Efficient double row angular contact ball bearings can last as long as comparably sized shielded basic design bearings.

Depending on the operating conditions, the bearing can run anywhere from 5 to 30 °C (40 to 85 °F) cooler when compared to an SKF basic design bearing. This will increase the service life of the grease, with the potential to also prolong bearing service life.

SKF Energy Efficient bearings are dimensionally interchangeable with SKF basic design bearings – enabling, easy upgrades of existing applications as well as improving the energy efficiency of new applications. SKF E2 double row angular contact ball bearings are available in the 32 A and 33 A series.



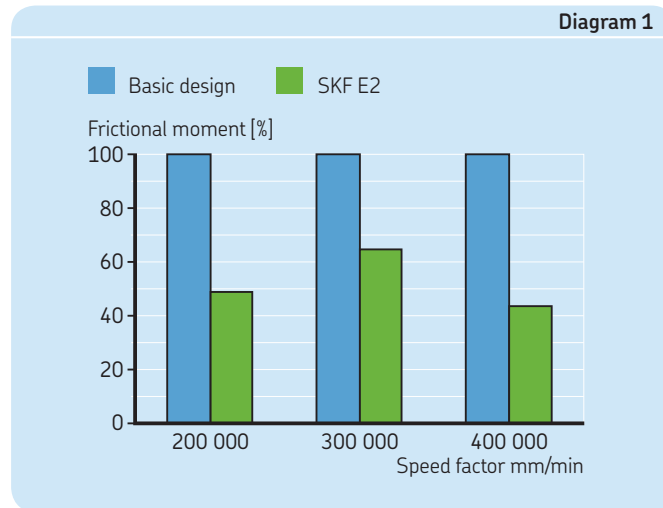
SKF E2 double row angular contact ball bearings

Test results

Tests conducted at the SKF Research Centre measured the frictional moment of SKF Energy Efficient bearings under various operating conditions to simulate common applications such as pumps and motors.

Frictional moment

Test results confirmed that when compared to basic design shielded double row angular contact ball bearings, shielded SKF E2 angular contact ball bearings showed a reduced frictional moment in the bearing by an average of almost 50% (→ **diagram 1**).



Comparison of the frictional moment with combined loads for SKF basic design and SKF E2 angular contact ball bearings

Operating temperature

The operating temperatures of SKF Energy Efficient bearings and SKF basic design bearings were measured at certain speeds and compared (→ **diagram 2**).

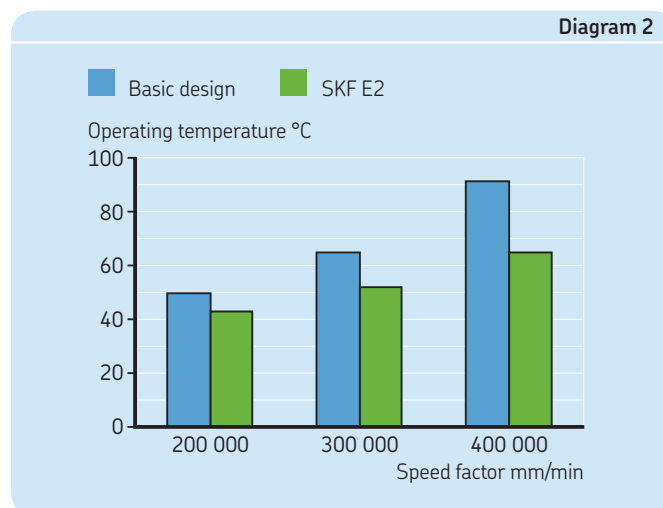
The tests showed that when compared to an SKF basic design bearing, the SKF E2 bearings run anywhere from 5 to 30 °C (40 to 85 °F) cooler, depending on speed.

Grease service life

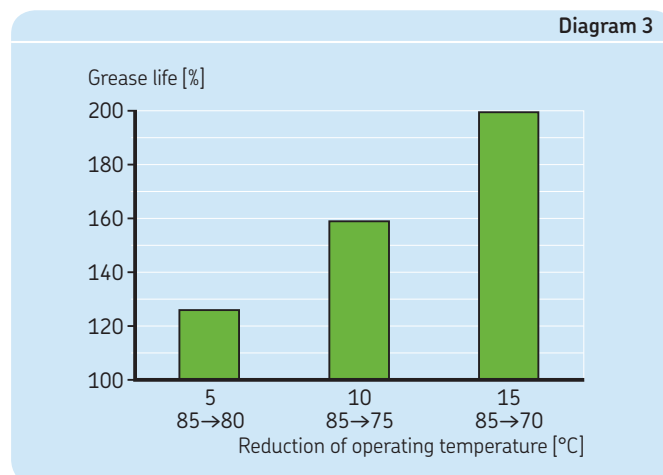
Reducing the heat generated by a bearing has a significant impact on grease service life. As a rule of thumb, reducing the operating temperature by 15 °C (59 °F) doubles the service life of the grease.

However, other factors that increase or decrease service life must be taken into consideration and include ambient and actual operating temperature, load, speed and misalignment.

Diagram 3 shows the influence of temperature on grease service life.



Comparison of the operating temperature at different speeds for SKF basic design and SKF E2 angular contact ball bearings



Influence of operating temperature on grease service life

Application recommendations

General information

SKF Energy Efficient double row angular contact ball bearings are fully interchangeable with the following basic design features of SKF bearings:

- Main dimensions
- Load ratings
- Limiting speeds

SKF E2 bearings can be used for most common applications, such as pumps, motors, transmissions and material handling equipment.

For certain operating conditions, however, low friction grease may not be suitable. See the section *Product data*.

For additional information, contact the SKF application engineering service.

Savings potential

The following example shows the potential energy savings that SKF E2 bearings could provide. The application is a pump equipped with an E2.3209 A-2Z double row angular contact ball bearing and an E2.6209-C3 deep groove ball bearing. The calculation, which is based on test results, shows the energy savings of SKF Energy Efficient bearings compared to same-size SKF basic design bearings.

Based on the results shown in **table 1**, a pump operating 5 000 hours per year would save 235 kWh annually. Actual savings can be calculated using local rates.

Table 1

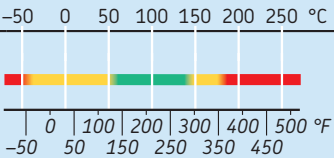
	SKF basic design bearing		SKF Energy Efficient bearings	
	Double row angular contact ball bearing	Deep groove ball bearing	E2 Double row angular contact ball bearing	E2 Deep groove ball bearing
Rotational speed	3 000 r/min	3 000 r/min	3 000 r/min	3 000 r/min
Radial load	2 500 N	2 000 N	2 500 N	2 000 N
Axial load	1 000 N	–	1 000 N	–
Temperature	80 °C	80 °C	80 °C	80 °C
Power loss	72 W	22 W	34 W	13 W
Total power loss	94 W / 100%		47 W / 50%	
Energy savings	–		50%	

Example of energy savings

Product data

Table 2

Technical specifications of SKF GE2 grease for capped double row angular contact ball bearings

Grease	Temperature range ¹⁾	Thickener	Base oil type	NLGI consistency class	Base oil viscosity [mm ² /s]	
					at 40 °C (105 °F)	at 100 °C (210 °F)
GE2		Lithium soap	Synthetic	3	25	4,9

¹⁾ Refer to the SKF traffic light concept → www.skf.com/bearings

SKF Energy Efficient (E2) double row angular contact ball bearings are available in the 32 A and 33 A series. Bore sizes range from 20 to 60 mm. Additions to the assortment will be based on customer demand. For the most up-to-date information, contact your local SKF representative or visit www.skf.com/bearings.

Designs

Shields and grease fill

SKF Energy Efficient double row angular contact ball bearings are fitted on both sides with a shield made of sheet steel, as standard. The bearings are supplied filled with a special low-noise, low-friction SKF grease (→ table 2). The grease is not identified in the bearing designation.

Cages

SKF E2 double row angular contact ball bearings are fitted with a ball centred, snap-type cage made of a temperature-resistant fibre reinforced polyamide. Steel cages are available on request.

Bearing data

Dimensions and tolerances

SKF Energy Efficient double row angular contact ball bearings are dimensionally interchangeable with same-size basic design

SKF double row angular contact ball bearings in the same dimension series.

Like SKF Explorer bearings, SKF E2 bearings are manufactured to P6 tolerances regarding dimensional and running accuracy.

Load carrying capacity

SKF Energy Efficient double row angular contact ball bearings have the same basic dynamic and static load ratings as SKF Explorer double row angular contact ball bearings.

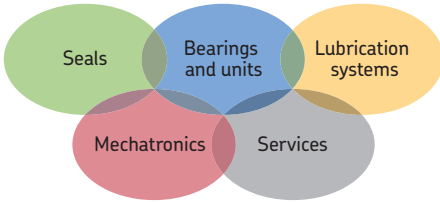
Internal clearance

SKF Energy Efficient double row angular contact ball bearings are manufactured with C3 internal clearance as standard. Bearings with radial internal clearance other than C3 can be supplied on request.

Designations and package identification

The designations for SKF Energy Efficient double row angular contact ball bearings follow the basic SKF designation system. However, the prefix "E2" has been added to avoid confusion. SKF E2 bearings are supplied in a new box marked SKF Energy Efficient bearing.





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 world-wide. 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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