



# SKF Energy Efficient bearings

Reduced friction, for reduced energy use



For more information, contact your SKF representative or Authorized Distributor.



With the contribution of the LIFE financial instrument of the European Community

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The Power of Knowledge Engineering

# Energy savers



Every once in a while, a product innovation comes along that holds the potential for huge benefits, when used on a global scale.

You already know about the longer lasting, energy efficient compact fluorescent lamp (CFL). Now discover the energy saving potential of new SKF Energy Efficient (E2) bearings. SKF E2 bearings are a family of performance class bearings that have been specially engineered and manufactured to reduce frictional moment by 30% or more beyond the already efficient SKF standard bearings. This means that when compared to other manufacturers' bearings, the reduction can be even more dramatic.

Like the new generation of light bulbs that are saving energy around the world, SKF Energy Efficient bearings also reduce energy consumption. They exhibit ultra low friction that enable equipment manufacturers to build greater energy efficiency into their equipment, reducing total cost of ownership for end users, and helping to preserve the world's resources for us all.

With potential application in many millions of machines – electric motors, pumps, conveyors and other low-to-normal load applications – SKF E2 bearings have the potential to make a significant contribution to global sustainability.

How significant? Here's just one example: If SKF Energy Efficient deep groove ball bearings were used on every industrial motor in the US and EU, (and assuming a minimum of 30% less friction moment), potential energy savings would equal 2,46 billion kWh/year. And this estimate does not take into account millions of motors and other applicable machines in use elsewhere throughout the world.

But the benefits go beyond energy savings. In most cases, SKF E2 bearings run cooler compared to SKF standard bearings at equivalent loads and speeds. They also reduce lubricant use and potentially extend the life of components and the machine itself. The result is a reduced negative environmental impact.



*The SKF Energy Efficient symbol indicates that the product or solution inside has met quantifiable SKF standards for increased energy efficiency.*



# SKF Explorer bearings for high capacity

In the 1990's, SKF set out to increase bearing performance beyond conventional ISO standards. This resulted in SKF Explorer performance class rolling bearings, which substantially improved key operational parameters. Dynamic load carrying capacity, noise and vibration levels, friction and heat generation, wear resistance, and service life were all substantially improved. Friction was also reduced. Since their introduction, SKF Explorer bearings have been proven around the world to extend bearing service life by a factor of 3 in the most demanding industrial applications.

Our next challenge was to develop a new performance class of bearings with ultra low friction characteristics that would maximize energy efficiency and reduce environmental impact. An international team of scientists and engineers at the SKF Engineering & Research Centre in the Netherlands – representing bearing design, tribology, metallurgy, lubrication, sealing and manufacturing – pooled their research and expertise for the solution. They redesigned bearing geometries and cages, refined manufacturing techniques, and developed new lubrication formulas.

The result is the new family of SKF Energy Efficient (E2) bearings that are designed to reduce frictional moment by 30% or more beyond the already efficient SKF standard bearings.

Dimensionally interchangeable with ISO standard bearings, SKF E2 bearings will be available, off-the-shelf, in common sizes, for a variety of bearing types, starting with SKF E2 single row deep groove ball bearings. SKF Energy Efficient tapered roller bearings have also been developed that achieve the SKF friction reduction criteria. The SKF E2 tapered roller bearings are currently tailored for specific automotive applications.

In working to meet the targets of the SKF E2 performance class, the development team was limited by the lubricants currently available on the market today. The solution was the development of new grease formulas that adequately lubricate SKF E2 bearings and extend lubrication intervals. Results have shown that the new low friction SKF E2 grease, when applied to a shielded deep groove ball bearing, will last at least two times longer than conventional greases used in similar standard bearings.

## SKF Explorer performance class

Bearings that fall within this performance class are designed to run smoother, cooler and longer than standard ISO bearings under heavy load conditions. With SKF Explorer bearings, design engineers and end users can opt to increase the power density, increase the service life of an existing application, or downsize a new design.

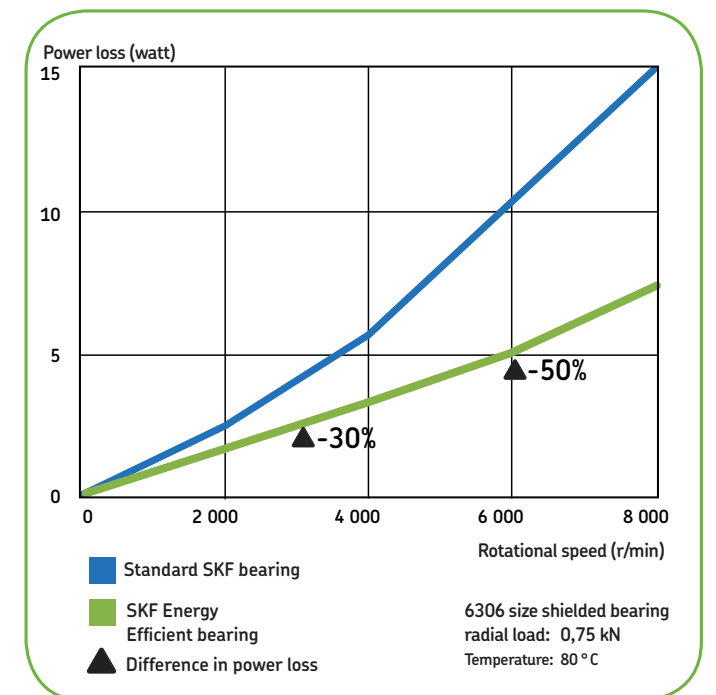


# SKF E2 bearings for high efficiency

## Match the performance class to the application

Total cost of ownership is the best, most accurate way to match a performance class to an application. In heavily loaded applications, where heat and wear contribute to bearing metal fatigue, premature bearing failure, costly maintenance and expensive downtime, SKF Explorer performance class bearings are a clear choice. In light-to-normal load applications, where these factors are typically not an issue, the answer is the SKF Energy Efficient performance class. In these applications, ultra low friction E2 bearings will reduce total cost of ownership by reducing energy and lubricant consumption when compared to ISO or SKF Explorer performance class bearings.

For extended service life in applications with higher than normal loads, SKF Explorer is still the best choice. But for light-to-normal loaded applications, ultra low friction SKF Energy Efficient bearings offer an excellent way to reduce mechanical friction, and possibly extend component and equipment life. Ultimately, these benefits can help end users advance sustainability goals.



Power loss simulation results showing energy savings of SKF Energy Efficient deep groove ball bearings compared to standard SKF bearings. Energy savings compared to other manufacturers' bearings can be even more dramatic.

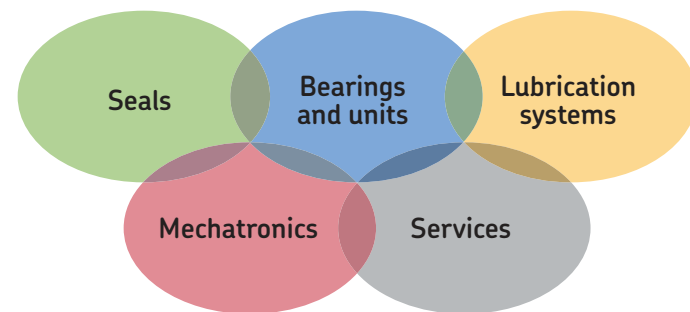
## SKF E2 performance class

SKF Energy Efficient (E2) bearings represent our ultra low friction performance class, which mandates a minimum of a 30% friction moment reduction when compared to SKF standard bearings. Design enhancements include improved surface finish, specialized cages, customized lubrication and optimized internal geometries. Designed for light-to-normal loaded applications, SKF E2 bearings typically generate less heat and can operate at higher speeds than ISO or SKF Explorer bearings.



# A systems approach to sustainability

In light of the global drive for sustainability, design engineers and industrial managers need to be concerned not only with a machine's performance today, but with its environmental impact over the total life cycle. For 100 years we have been applying our engineering expertise to the challenge of reducing friction to make machinery run more efficiently. Though many solutions are now possible because of a new generation of energy efficient SKF bearings, our contribution to energy efficiency extends well beyond the bearing. Drawing on five areas of technical expertise – bearings/units, seals, lubrication systems, mechatronics and services – SKF Knowledge Engineering is helping to make our energy go further, and our resources last longer.



Listed here are just a few of the energy efficiency solutions that SKF provides to design engineers and industrial managers:

- SKF Client Needs Analysis/Energy and Sustainability, a comprehensive facility-wide evaluation, helps customers identify areas impacting efficiency and sustainability
- Sophisticated condition monitoring systems with integrated hardware and software that improve machine performance
- Maintenance technologies, such as thermography, vibration analysis and laser shaft alignment tools, which extend equipment life and reduce energy consumption
- Mechatronic solutions that reduce energy consumption and improve product quality, including electrical actuation units that eliminate pneumatics or hydraulics
- Compact bearing units that reduce the number and weight of components and sealed-for-life bearing units that require no additional lubrication
- Environmentally friendly lubricants and lubrication systems that optimize and minimize the use of lubricants and cutting oils
- Sensorized bearing units that enable machinery to function more efficiently
- Bearing remanufacturing services that return worn large-bore bearings to like-new condition, saving 90% of the energy used to manufacture new ones
- Fly-by-wire actuation systems and lightweight components that reduce fuel consumption in aircraft
- Locomotive wheel rail lubrication systems and component bearing units that reduce friction to save fuel



See inserts for more details about SKF Energy Efficient bearings.

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