

Boost gearbox reliability with SKF Black oxide bearings

SKF's surface treatment helps reduce the risk of white etching cracks and axial cracks

When a gearbox manufacturer began seeing early bearing failures in the field, it raised concerns about potential technical and financial consequences. After just two years in operation, cracks were forming in the bearing steel. These included white etching and axial cracks. Even with correct installation and maintenance, the operating conditions were pushing conventional bearings beyond their limits. Out of a sample of 1000 standard cylindrical roller bearings, failure rates had reached up to 70% in two years.

SKF was brought in to help address the issue. The manufacturer introduced SKF Black oxide coated bearings and the results marked a turning point. In a follow-up sample of 1150 black oxide coated bearings from SKF, the failure rate dropped to just 0.1% over the same period.

SKF Black oxide high-capacity cylindrical roller bearings



Protection tailored to real-world demands

This improvement is made possible by a precisely engineered surface treatment. SKF Black oxide coated bearings have a thin, durable black oxide layer that can be applied to the rings, the rollers, or both, depending on specific requirements. This layer provides extra protection against WECs and axial cracks, as well as other damage mechanisms common in wind applications.

The treatment improves the adhesion of lubricants and reduces the risk of smearing, fretting, micropitting and corrosion. It also limits the effects of aggressive oil additives and reduces hydrogen permeation into the bearing steel.



Bearing types used in wind turbine gearboxes

- Tapered roller bearings
- Cylindrical roller bearings
- Ball bearings

Proven performance, cost-efficient upgrade

SKF Black oxide bearings offer an accessible and reliable way to improve wind gearbox performance. They are suitable for both new designs and retrofits and can help extend bearing service life while lowering unplanned maintenance costs.

Several hundred thousands of SKF Black oxide bearings are in operation globally, often applied on the most critical position in the wind gearbox, such as the high speed shaft and first planetary stage.

Advanced engineering behind the surface

SKF began developing and fine-tuning black oxidation treatments in 2006. Today, each process is tailored to the specific bearing type, size and application. The treatment is applied through a controlled chemical process involving up to 15 immersion steps in an alkaline aqueous salt solution at defined temperatures. The result is a black surface layer 1–2 µm thick that delivers a measurable improvement in bearing performance.

This treatment is available for a wide range of bearing sizes used in wind turbines, including components up to 2.2 m in diameter and 1000 kg in weight.

How to specify

To order SKF Black oxide bearings, add the suffix **L4B** to the part number. Example: NU 2326 ECML/L4BC3

skf.com

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Benefits

-  Helps reduce premature crack failures (WEC)
-  Enhances resistance against corrosion and aggressive oil additives
-  Offers better performance in poor lubrication conditions
-  Resistance against smearing damage

Features

-  Improves adhesion of oil and grease
-  Reduces hydrogen permeation into bearing steel
-  Improves running-in behaviour
-  Lowers the risk of fretting corrosion in the fits



Explore SKF solutions for the wind energy sector at www.skf.com/wind or get in touch with your local SKF representative.