

# Boost wind turbine gearbox reliability and safety

## Benefits

- Improve gearbox reliability
- Increase load carrying capacity
- Minimize smearing and wear
- Reduce bearing failures
- Mount/dismount quickly and easily
- Reduce maintenance
- Increase operational safety

## Typical applications

Initial designs or replacement upgrades for wind turbine gearbox shafts:

- High-speed shafts
- High-speed intermediate shafts



Featuring an optimized internal design, SKF Separable High-capacity Cylindrical Roller Bearings help reduce wind turbine gearbox shaft failures.

## SKF Separable High-capacity Cylindrical Roller Bearings offer big performance benefits

During the last decade, wind power generation has increased dramatically. Unfortunately for wind farm owners and operators, so has turbine maintenance and repair demands. For equipment manufacturers, market demand for greater reliability has grown accordingly.

With offshore farms and larger turbines on the horizon, that demand will only increase, as will calls for increased safety, improved availability and reduced operating costs. SKF Separable High-capacity Cylindrical Roller Bearings can help.

## Compact design and high load carrying capacity help meet several operating challenges

Combining the advantages of conventional and SKF High-capacity Cylindrical Roller Bearings, the SKF separable version can help bring gearbox reliability and safety to the next level.

Their unique bearing design reduces the risk of smearing, adhesive wear and bearing failures on high-speed shafts, while allowing high-speed intermediate shafts to withstand higher loads. When maintenance is required, especially top-of-turbine, it can be accomplished quickly and easily, helping to reduce operating, maintenance and lifetime costs per kW hour.



## Why SKF?

As a major supplier to the wind power industry, SKF has been working with original equipment manufacturers and operators since the earliest wind turbine designs.

Supported by our extensive manufacturing capabilities and worldwide logistics network, SKF wind power solutions include design optimization and engineering consultancy services, bearing and sealing solutions, condition monitoring tools and diagnostics services, automated lubrication systems, grease, seals, bearing housings, couplings, bolt tensioners, mechanical refurbishments and maintenance services and tools.



## SKF Separable High-capacity Cylindrical Roller Bearings

### Delivering better wind turbine gearbox performance by design

In lightly loaded high-speed applications in wind turbine gearboxes, roller sliding is a frequent cause of premature bearing failures.

The recently developed SKF High-capacity Cylindrical Roller Bearings go a long way toward solving this wind turbine gearbox challenge. These bearings feature inner ring shoulder-guided caged bearings, black-oxidized rollers, or even black-oxidized bearings, all to improve sliding resistance and promote the lubricant film formation on all contact surfaces.

SKF's separable version of the high-capacity cylindrical roller bearing picks up where the non-separable high-capacity cylindrical roller bearing leaves off. The rollers in SKF Separable High-capacity Cylindrical Roller Bearings are held in place by the cage, essentially eliminating the prospect of rollers falling off during mounting and dismounting operations, and the optimized roller drop facilitates mounting – both innovative improvements in top-of-turbine repairs.

In combination with other SKF Explorer bearings, such as four-point contact ball bearings and taper roller bearings, SKF offers a range of solutions to meet the challenges of high-speed shafts in wind turbine gearboxes.



SKF Separable High-capacity Cylindrical Roller Bearings for wind turbine gearboxes

| Features   | Conventional CRBs | SKF High-capacity CRBs | SKF Separable High-capacity CRBs | Benefits  |
|--|-------------------|------------------------|----------------------------------|---|
| Cage guidance on inner ring (shoulder)                     |                   | ✓                      | ✓                                | Inner ring (shoulder) guidance leads to reduced roller slip and reduced risk of smearing and higher reliability |
| Optimized cage design                                      |                   | ✓                      | ✓                                | Better lubricant flow and stable oil film build-up  |
| Low cage weight and low inertia                            |                   | ✓                      | ✓                                | Lower mass inertia reduces risk of smearing for higher reliability  |
| Optimized play between rollers and cage bars               | ✓                 |                        | ✓                                | Cage bars are less loaded, enabling greater safety and reliability  |
| Higher load carrying capacity                              |                   | ✓                      | ✓                                | More rollers → higher C, improved L10, increased safety   |
| Optimized roller drop                                      | ✓                 |                        | ✓                                | Facilitates mounting; inner and outer rings can be mounted/dismounted separately; rollers will not fall off     |
| Black-oxidized rollers or complete black-oxidized bearings |                   | ✓                      | ✓                                | Enables better running-in behavior and helps maintain proper lubrication  |

**Note: CRBs is an acronym for cylindrical roller bearings.**

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