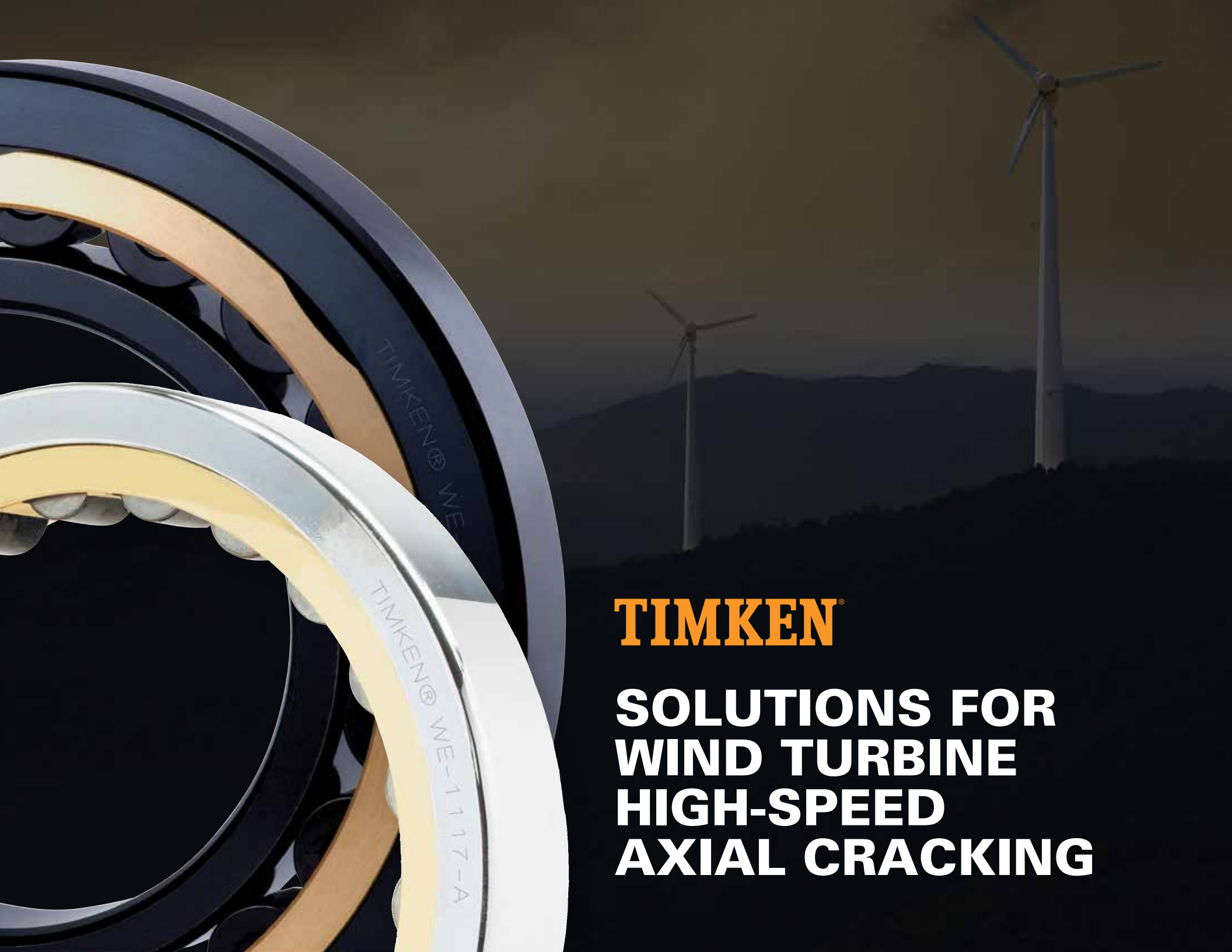

TIMKEN®

SOLUTIONS FOR WIND TURBINE HIGH-SPEED AXIAL CRACKING

TIMKEN® WEAR-RESISTANT BEARINGS

The wind energy market faces some of the toughest challenges for extending bearing life and reducing wear. Our engineers applied their extensive knowledge of friction management to address these challenges. Timken wear-resistant bearings are a premium choice for wind turbines. They significantly reduce wear, and are designed to resist white etch area cracking and resist damage from debris.

Timken wear-resistant bearings start with a proprietary blend of clean steel. They are case carburized for extra hardness to stand up to the toughest conditions and resist cracking. We finish with our special wear-resistant engineered coating that solves many of the issues commonly seen in standard bearings for wind applications.

The Wear-Resistant Bearing Advantage:

- Reduces smearing, micropitting and fretting.
- Enhances debris resistance.
- Improves scoring resistance from poor lubrication.
- Enhances low Λ (lambda) fatigue life.
- Increases energy efficiency.



TIMKEN® HIGH-SPEED WIND TURBINE BEARINGS

Wind energy operators need bearings that can manage a wide range of operating parameters in advanced wind applications. At Timken, we collaborate with wind turbine and gear drive designers and manufacturers to develop solutions that can keep equipment running longer and help control total cost of ownership.

Among the best-performing, best-engineered, longest-lasting bearings in the industry are Timken wind bearings. Now, you have the option to select our high-speed case-carburized bearings finished with wear-resistant coating, or a black oxide process.

Take advantage of all the strength and efficiency a Timken bearing has to offer. See which bearing meets your wind turbine needs.

IT STARTS WITH CLEAN STEEL

Strong bearings start with clean steel. We simply do not compromise our requirements. Using proprietary grades we develop, premium steels are the foundation of our offering for the wind market.

HIGH-SPEED AND INTERMEDIATE BEARING ENHANCEMENTS

- STEEL CLEANLINESS
- CASE CARBURIZED
- BLACK OXIDE
- WEAR-RESISTANT COATING

THE SUPERIOR PROCESS OF CASE CARBURIZING

Case-carburized bearings have a tough, ductile core combined with a hard, resistant outer surface. The core enhances the ability to endure heavy shock loads without damage or cracking. It also improves the ability to operate under misalignment and where dirt and debris are present.

Material composition and microstructure play a significant role in enhancing bearing life. Case carburizing is a three-step process, where all other steel hardening processes are two steps. The steel used in Timken bearings is brought to a higher temperature and held longer than other hardening processes.

LONGER LIFE

Timken formulated the case-carburizing process for alloy steel in 1924 and has enhanced it over the years to produce a hard, fatigue-resistant surface and a tough, crack-resistant core. Case-carburized material yields up to three times longer L10 life than traditional through-hardened bearings in high-stress applications.



TIMKEN® BLACK OXIDE BEARINGS

Timken has expanded its cylindrical roller bearing product line for wind energy applications, giving operators an alternative solution to meet standard operating needs. Like the wear-resistant bearing, it also starts with our proprietary blend of clean steel and is case carburized. Instead of the Timken wear-resistant coating, this bearing is finished with a black oxide conversion process. This helps prevent mild adhesive wear damage.

	WHITE ETCH	INCLUSIONS	SMEARING
GOOD	★	★★★	
BETTER	★★★	★★	
BEST	★		★★
	★		★★★

PROTECTION
(compared to standard bearings)

Operators cite white etch, inclusions and smearing as the three most common bearing-wear issues found. Timken wear-resistant bearings provide the strongest features to cover these concerns.

See your Timken sales engineer for gearbox model part numbers, and request an interchange guide for ordering specifications.

To learn more about our wind energy products and services, visit www.timken.com/windenergy.

TIMKEN

The Timken team applies their know-how to improve the reliability and performance of machinery in diverse markets worldwide. The company designs, makes and markets high-performance mechanical components, including bearings, belts, chain, gears and related mechanical power transmission products and services.

Stronger. **Commitment.** Stronger. **Value.** Stronger. **Worldwide.** Stronger. **Together.** | **Stronger.** By Design.

www.timken.com

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