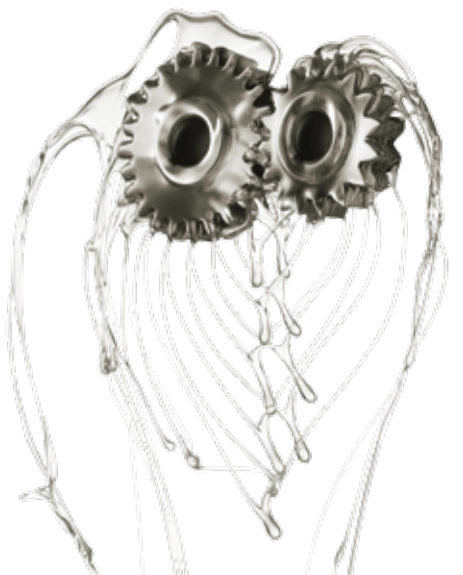




Mobilgear SHC XMP 320

High performance synthetic gear oil for wind turbines



Challenges in wind turbine gearbox lubrication.

Wind turbines are highly engineered, sophisticated pieces of machinery, invariably operating in harsh environments. The main gearbox is a particularly critical component of the wind turbine that needs careful consideration from a lubrication perspective:

- Weight and space restrictions result in a compact gearbox design. This factor coupled with high loads due to strong and gusty winds require a gear oil with excellent wear protection.
- Due to the difficulty and cost of changing oil up tower, extended oil drain intervals are highly desirable which means that lubricant property retention is important as well as long term protection against ageing. Fine filtration systems call for excellent oil filterability under wet and dry conditions.
- Increasing off-shore installations require a lubricant with outstanding rust and corrosion protection.

Lubrication excellence is the solution.

An ideal lubricant for wind turbine gearboxes, Mobil SHC branded synthetic gear oil Mobilgear SHC XMP 320 exceeds the performance of conventional, mineral oil based products by extending the interval between oil changes to three years or more. With its proprietary, balanced additive system, Mobilgear SHC XMP 320 delivers excellent gear and bearing protection against conventional wear modes, such as scuffing and micropitting. Furthermore, the high performance synthetic gearbox oil offers exceptional oxidation resistance, excellent low temperature fluidity and outstanding filterability and keep clean properties, which can help reduce unscheduled downtime and lower maintenance costs – even under the extreme weather and load conditions that wind turbines face every day. Mobilgear SHC XMP 320 is designed to help operators unleash the productivity of their wind turbines and thereby enhance their competitiveness.

Proof of performance.

With more than 30,000 wind turbine gearboxes around the world now protected by Mobilgear SHC XMP 320, Mobil Industrial Lubricants is setting the standard for lubrication excellence in the wind turbine marketplace. Analysis of several thousand used-oil samples in service confirm the superb long term wear protection and oxidation stability characteristics of Mobilgear SHC XMP 320, and makes it a compelling choice for wind turbine builders, operators and service companies.

Equipment Builder Experience

Mobilgear SHC XMP 320 meets the requirements and/or has significant proven performance in equipment of the following major wind turbine and component builders:

Wind Turbines

Acciona, Bard, Dongfang, Ecotecnia, Goldwind, MHI, Multibrid, Nordex, REpower, Suzlon, Vestas, WinWind

Gears

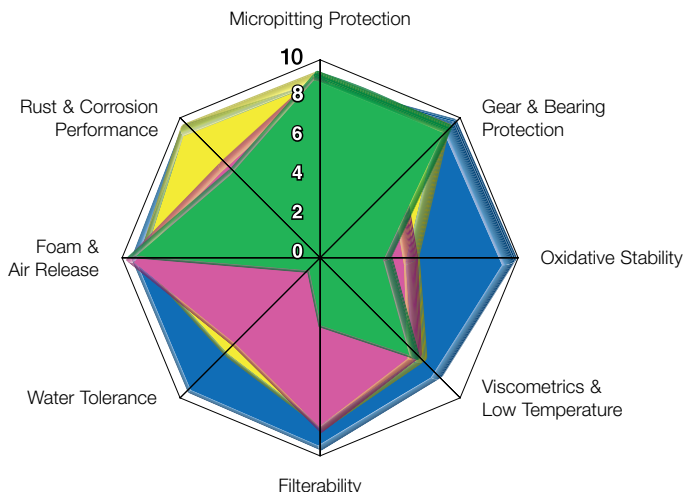
Bosch Rexroth, Chongqin, Hansen, Moventas, Nanjing, Renk, Winergy

Bearings

FAG, NSK, SKF, Timken

Mobilgear SHC XMP 320 – Performance

Mobilgear SHC XMP 320 performs well on multiple dimensions to meet the challenging demands of gearboxes in wind turbines. The product is characterized by outstanding antiwear and load carrying properties and provides long term protection against rust and corrosion. Alongside with superb filterability and excellent water tolerance it is the product of choice for the wind power industry.



Spider chart indicates relative performance for synthetic gear oils

■ MOBILGEAR SHC XMP 320 ■ COMPETITOR A ■ COMPETITOR B ■ COMPETITOR C

Source: ExxonMobil Research

Performance Dimension	Test Method	Mobilgear SHC XMP 320 Test Result	Benefit(s)
Wear Protection – Gear Micropitting – Gear Scuffing – Bearing	FVA 54 Micropitting Test FZG Scuffing Test (DIN 51534 Mod) FAG FE8, 4-Stage Bearing Test	=10 High FLS > 14 Consolidated rating 1.2	Excellent gear and bearing wear protection for extended equipment life
Oxidation Stability – US Steel Oxidation Test – Thermal Stability Test	ASTM D 2893 ASTM D 2070	2.3% Visc Increase – 0.01 Δ TAN	Extended oil life
Low Temperature Properties – Scanning Brookfield Viscosity – Pour Point	ASTM D 5133 ASTM D 97	31000 cP @ – 20°C – 39°C	Easier startup and better wear protection at low temperatures
Filterability – Sediment and Filterability Test – Wet Pall Filterability	Mobil Method Mobil Method	135 seconds, 0.1mg Pass	Less filter changes and reduced maintenance costs
Water Tolerance – Demulsibility – Demulsibility of industrial gear oils – Water Tolerance Test	ASTM D 1401 ASTM D 2711 Mobil Method	15 minutes 83 mL Visual	Good keep clean performance for long equipment life and reduced downtime
Foam and Air Release – Foam Test – Flender Foam Test – Air Release Test	ASTM D 892 - Seq 1,2,3 Flender Method GG-V 425 ASTM D 3427	0/0 for all three Seq. 9% @ 25°C <20 minutes	Excellent foam and air release behaviour for optimal gearbox operation
Rust and Corrosion Protection – ASTM Rust Tests – Bethlehem Rust Test – Thermal Stability – SKF Emcor Bearing Rust Test – Copper Corrosion	ASTM D 665A/B/Mod (syn. sea water) Mobil Method ASTM D 2070 Distilled water ASTM D 130	Pass/Pass/Pass Pass Fe 1, Cu 2 0,0 1B	Strong corrosion protection for extended equipment life

For more information on Mobilgear SHC XMP 320 and other Mobil Industrial Lubricants and services, please contact the Mobil Technical Helpdesk on TechDeskEurope@exxonmobil.com or visit our website at www.mobilindustrial.com