

Wind Energy

Powered by TOTAL lubricants



TOTAL



High performance lubricants for greater productivity

Wind energy has the wind in its sails: experts predict that by 2020, more than 10% of the world's electricity will come from this renewable resource.

To meet this challenge, the industry is making the most of technological progress (lighter materials, electronics, etc.) and the energy of the men and women working to install wind farms.

To back this expertise and help you gain the most from your installations, you can also count on the lubrication solutions from TOTAL. In your quest for productivity, our lubricants and services will help you:

- **prevent** unscheduled shutdowns,
- **maximize** the energy efficiency of your wind turbines,
- **minimize** maintenance costs,
- **streamline** your lubricants purchases with a single, reliable partner.

■ Lubricants offering exceptional performance

- ease of cold starts
- greater mechanical efficiency of wind power installations
- excellent protection for lubricated parts in all weather conditions
- longer intervals between oil changes
- less shutdowns for maintenance
- environmentally-friendly products

■ Compliant with manufacturer specifications

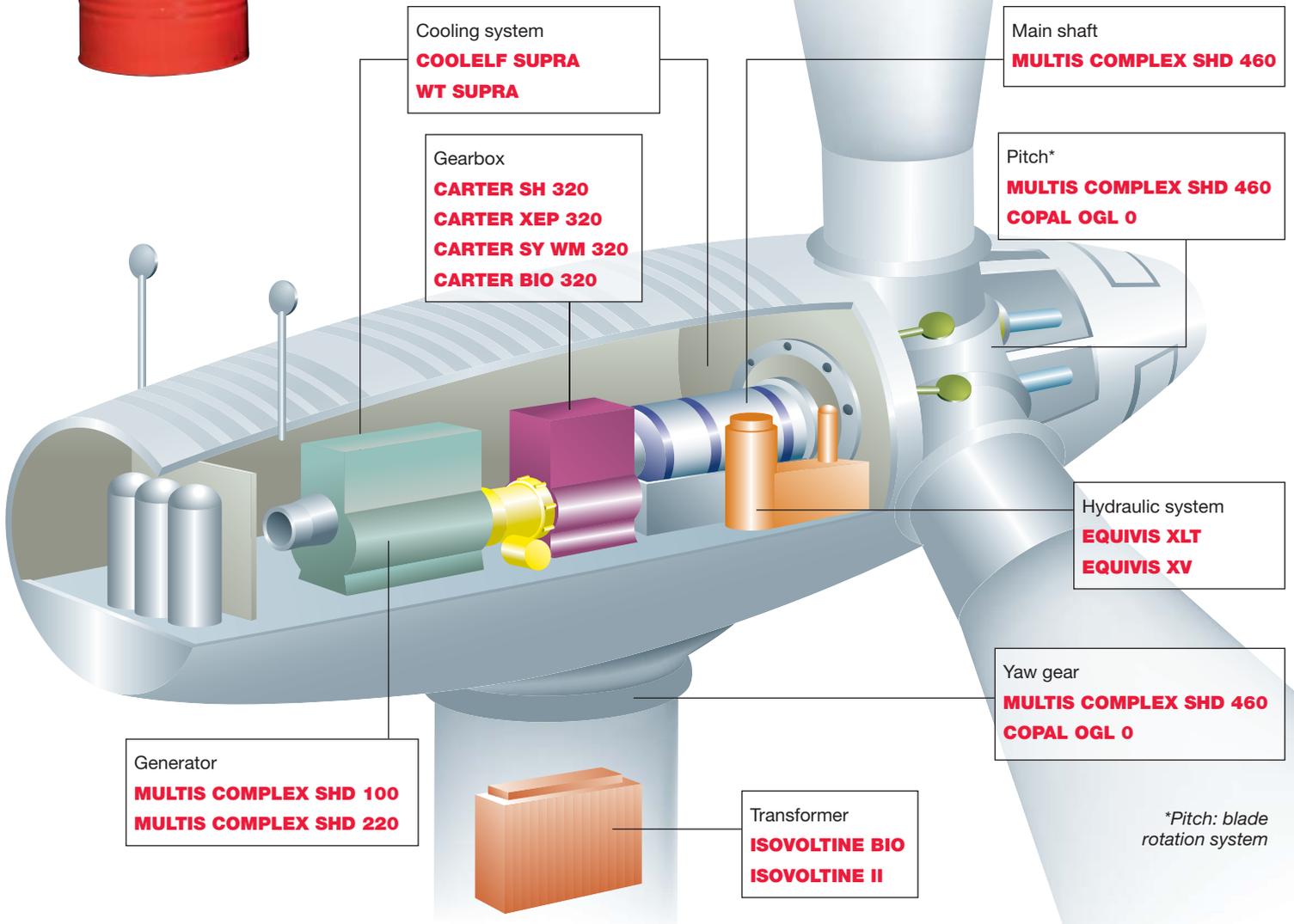
Our products meet optimal requirements for installation efficiency and protection, regardless of the location and local weather conditions.

■ Available quickly, anywhere in the world

Thanks to Total's international logistics and its retail presence in over 160 countries, you're sure to have access to the lubricants you need for your wind turbines, wherever and when needed.



A COMPLETE RANGE OF LUBRICANTS FOR WIND TURBINES



GEAR OILS

Product	Type	Specific advantages
CARTER SH 320	Synthetic PAO	<ul style="list-style-type: none"> • Longer intervals between oil changes: up to 5 years • Excellent performances at very low temperatures • Optimal protection of teeth against micropitting • Miscibility with mineral oil
CARTER XEP 320	New-generation mineral	<ul style="list-style-type: none"> • Longer intervals between oil changes: up to 3 years • Excellent protection against corrosion, even in the presence of seawater and acidic water • Optimal protection of teeth against micropitting
CARTER SY WM 320	Synthetic PAG	<ul style="list-style-type: none"> • Specially developed for gearbox lubrication • Very high resistance to micropitting • Exceptional oxidation stability
CARTER BIO 320	Biodegradable, synthetic base	<ul style="list-style-type: none"> • Biodegradability > 75% after 28 days (OECD 301B test), ultimately biodegradable product • Excellent protection against corrosion, even in seawater

Total Lubrificants reserves the right to modify the formulation of its products without prior notice in order to improve their performance or comply with changing regulations.

HYDRAULIC FLUIDS

Product	Type	Specific advantages	Specifications
EQUIVIS XLT	Ashless mineral fluid with very high viscosity index	Operating temperatures to -40 °C	<ul style="list-style-type: none"> • ISO 11158 HV • DIN 51524-3 HVLP
EQUIVIS XV	Fluid with very high viscosity index and high shear resistance	Operating temperatures to -30 °C	<ul style="list-style-type: none"> • ISO 11158 HV • DIN 51524-3 HVLP

BEARING GREASES

Product	Applications	Thickener	Specific advantages	Specifications
MULTIS COMPLEX SHD 100	Generator bearing	Complex lithium	<ul style="list-style-type: none"> • For high rotation speeds • Range of use: from -50 °C to +160 °C 	<ul style="list-style-type: none"> • ISO 6743-9: L-XEEHB 00 • DIN 51502: KP00P-50
MULTIS COMPLEX SHD 220	Generator bearing	Complex lithium	<ul style="list-style-type: none"> • For moderate rotation speeds • Range of use: from -50 °C to +160 °C 	<ul style="list-style-type: none"> • ISO 6743-9: L-XDEHB 2 • DIN 51502: KP2P-50
MULTIS COMPLEX SHD 460	Bearing: <ul style="list-style-type: none"> • main shaft • pitch • yaw gear 	Complex lithium	<ul style="list-style-type: none"> • For slow to moderate rotation speeds • Range of use: from -40 °C to +160 °C • 1 grease for 3 applications 	<ul style="list-style-type: none"> • ISO 6743-9: L-XDEHB 1/2 • DIN 51502: KP1/2P- 40
COPAL OGL 0	Open gear: <ul style="list-style-type: none"> • pitch bearing • yaw bearing 	Complex aluminium	The presence of solid lubricants helps to reduce friction coefficients and fully protects parts from wear, so as to drive the blades more effectively.	<ul style="list-style-type: none"> • ISO 6743-9: L-XBDHB 0 • DIN 51 502: OGPFO-N-20

COOLANTS

Product	Type	Specific advantages	Specifications
COOLELF SUPRA	Very long life, ready-to-use coolant	<ul style="list-style-type: none"> • Antifreeze protection: -26 °C and -37 °C • Eco-friendly product 	<ul style="list-style-type: none"> • ASTM D 3306, D 4656, D 4985 • BS 6580 • SAE J 1034 • AFNOR NF R 15-601
WT SUPRA	Aqueous concentrate of specific organic corrosion and cavitation inhibitors	<ul style="list-style-type: none"> • Recommended when antifreeze protection is not required • Eco-friendly product 	

TRANSFORMER FLUIDS

Product	Type	Specific advantages	Specifications
ISOVOLTINE BIO	Synthetic esters	<ul style="list-style-type: none"> • Biodegradable (OECD 301B standard) • Very high fire resistance • No danger to the aquatic environment 	<ul style="list-style-type: none"> • IEC 61099 • IEC 61100 - K3 • NWG
ISOVOLTINE II	Naphthenic mineral	<ul style="list-style-type: none"> • High insulating power • Very high resistance to oxidation to provide a long service life • Excellent cooling properties 	<ul style="list-style-type: none"> • IEC 60296:2003

We recommend that you contact us to choose the product best suited to your operating conditions.

Services

We provide you support

Oil analyses

We offer the **ANAC INDUSTRIE** oil analysis service to help **reduce your operating costs**. With this service, especially recommended for gear and hydraulic system oils, you can:

- **monitor** the mechanical condition of your installations without shutdown or disassembly,
- **reduce** the number of breakdowns and halts in production,
- **extend** the service life of your lubricants,
- **increase** time intervals between oil changes.

Scheduling of analyses

Our application engineers will support you to establish a timetable for oil analyses of your installations. This schedule reflects the manufacturer's recommendations and your operating conditions, to ensure optimal wind turbine operation.

Maintenance management

The **TIG XP 5** maintenance software, designed by Total Lubrificants, will help you **be more efficient** in coordinating maintenance for your wind farm and reducing your costs:

- **schedule** preventive, predictive and corrective maintenance operations,
- **manage** oil analyses,
- **monitor** lubricant and spare parts inventories,
- **analyse** total maintenance costs.

And other services connected with TOTAL lubricants

- **recommendation** of products with the aim of rationalizing your inventories,
- **technical** support for lubrication operations,
- **training** in the use of our products for your staff.



4 good reasons to choose TOTAL

A major company

Total Lubrificants is a subsidiary of Total. The Group is the world's fifth largest integrated oil and gas company* and employs nearly 97,000 people on five continents. Total Lubrificants produces and sells its products under the TOTAL brand in more than 160 countries.

Safe and eco-friendly products

Elements designed to reduce the risk of toxicity and VOC emissions and encourage recycling and elimination from the environment are incorporated into the design of every new product. Total Lubrificants renews its ISO 9001 certification every three years, as a guarantee of its long-term commitment.

Material safety data sheets available at www.quickfds.com

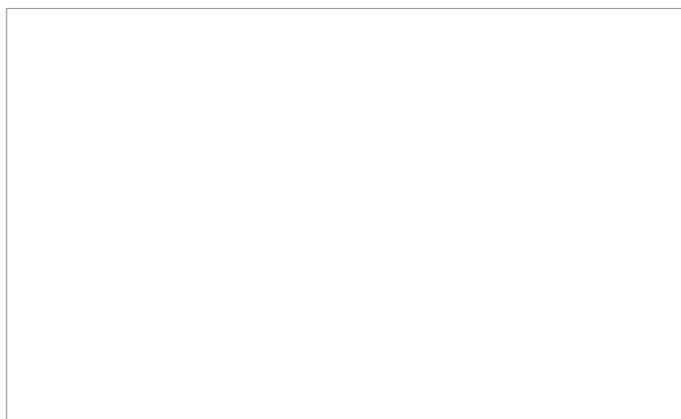
Innovation

Thanks to a major investment in R&D and close cooperation with equipment manufacturers, Total Lubrificants creates high-technology products with substantial added value, for optimal performance and protection of your machinery.

Partnership

The wide range of TOTAL products means that you can find the maintenance lubricants or specialized products to meet your every need. By choosing TOTAL, you can be fully confident that our team will work with you to enhance your productivity and reduce your maintenance costs.

** Based on market capitalization in dollars at 31 December 2008.*



www.lubricants.total.com



You know where to turn

TOTAL