

The Lofrix® Product Range

The Lofrix® product range lowers the cost and carbon footprint of industry through advanced friction reduction technology. In 2006 Envirolink recognised the ground-breaking benefits of Lofrix® with an award for Innovation and Excellence in Environmental Technologies and Services.

Lofrix® protects metal surfaces and enhances performance in arduous applications. Conventional hard metallic coatings are improved and their useful lives extended by this high technology surface protection. Lofrix® creates a new contact zone, less than 1 micron thick, reducing coefficients of friction and associated wear in industrial applications.

Range

The result of 20 years of research and development in the combined fields of tribology and metallurgy, the Lofrix® range includes:

- Oil dispersed additives
- Dry lubrication treatments
- Hydraulic system enhancers
- High performance greases

Benefits

Lofrix® is proven to reduce the impact of metal to metal contact under the intense conditions associated with heavy industry.

The Lofrix® range:

- Extends component life
- Reduces plant and machinery downtime
- Lowers operating temperatures
- Reduces energy consumption
- Reduces exposure to climate change levy

Sectors

Working across a large number of industrial sectors

Lofrix® is used by a blue-chip client base to reduce their operating costs.

Sectors already benefiting from this award winning technology include:

- Aerospace
- Brick, cement and aggregate manufacture
- Power stations
- Metal working
- Wind turbines
- Textiles
- Paper making
- Printing

Contact

For more information about how Lofrix® can help your business, contact Lofrix Associates Ltd. 1st Floor, Blackfriars House, Parsonage, Manchester M3 2JA. Telephone +44 (0)161 838 3890 or email info@lofrix.com



Reducing the carbon footprint of industry



Lofrix® Original

Lofrix® Original has proven to be effective in reducing temperature, friction, wear and energy consumption in industrial gearboxes, bearings and machine tooling, resulting in extended machine life and reduced maintenance.

Lofrix® Original is an oil dispersed additive, being carried by the host oil to coat metal surfaces with a barrier which is capable of withstanding extreme pressure and even temporary absence of lubricant. Lofrix® Original can be applied directly into gearboxes or used in automatic lubricating systems.

Lofrix® Original is especially effective in conditions of extreme wear, extended operating periods and high temperatures.

When added to automatic lubrication systems, Lofrix® Original lifts carbon deposits enabling them to be filtered from the system. Lubrication systems are then able to operate at lower pressures, reducing the amount of energy required to operate effectively and lowering oil temperatures.

Benefits

- Improves productivity
- Increases plant life
- Lowers energy consumption
- Lowers operating temperature
- Reduces vibration
- Reduces noise levels
- Reduces corrosion
- Reduces maintenance costs

Features

- Effective in all oils
- Simplifies lubricant stocks
- Bonds to most metals
- Cleans and lubricates
- Waterproof
- Low hazard in use
- Non flammable
- Contains no solid particles

Applications

- Gearboxes
- Compressors
- Bearings
- Chains

Industries using Lofrix® Original

- Power stations
- Cement and brick manufacturing
- Paper and board manufacturing
- Machine tooling
- Printing
- Textile manufacturing

Application

Using Lofrix® Original is a simple process. The recommended amount, which is between 1% and 2% of the bulk oil amount, is combined with a sample of the base oil. Heating to around 55°C will speed up the blending process. A clouding of the mix will develop and then clear with stirring. Once clear this mix is added to the bulk oil.

With gearboxes, Lofrix® Original can be added directly into the box while it is working. Mixing will occur automatically.



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Case Study

Gearboxes

Cemex, the largest producer of ready-mix concrete in the world, has conducted a series of tests on industrial processing plant gearboxes. The objective of the tests was to monitor the potential reduction in energy consumption with the use of Lofrix®.

Before conducting tests with Lofrix®, parameters were established with an average of on-load and off-load readings being taken over one week. Measurements were then taken after the addition of Lofrix® and an average established over the following week. The results are shown in the following tables.

Barrel Drive Gearbox

Make: David Brown Type: M10202Z Rating: 22kw 1440rpm Ratio: 21.57:1 Oil Capacity: 10 litres

	Off-Load (Amps)	On-Load (Amps)
Gearbox Normal	24.5	27.4
Gearbox with Lofrix®	22.5	25.0
Energy Consumption Reduction	8.1%	8.7%

Mixer Gearbox

Make: David Brown Radicon Type: Underdriven worm wheel Rating: 45kw 1440rpm Oil Capacity: 20 litres

	Off-Load (Amps)	On-Load (Amps)
Gearbox Normal	29	58
Gearbox with Lofrix®	26	55
Energy Consumption Reduction	10.3%	5.1%

Static gearboxes for a rotating drum situated within a mixing tower

No.1 motor is the lead motor and on-load readings were taken for both gearboxes.

	Motor 1 On-Load (Amps)	Motor 2 On-Load (Amps)
Gearbox Normal	100	97
Gearbox with Lofrix®	78	73
Energy Consumption Reduction	22%	24.7%

Lofrix® Dry Lubricant

Lofrix® Dry is specially formulated for use in areas prone to running dry and where normal lubrication methods suffer from severe wash-out. Its high water repellence makes it ideal for use wherever wet conditions may be found. The durable finish protects against atmospheric humidity and corrosive environments.

Lofrix® Dry is the only product of its type to be approved by BAE Systems for use on the Typhoon Eurofighter. After five years of testing, Lofrix® Dry was selected for use in the extreme conditions encountered in this technologically advanced aircraft.

Treated surfaces have a very low friction coefficient making Lofrix® Dry the appropriate product for moving parts in mould tools, locks and machine slides.

The simple application and bonding process also makes it ideal for difficult tooling and engineering components.

Benefits

- Improves productivity
- Increases plant life
- Lowers energy consumption
- Lowers operating temperature
- Reduces vibration
- Reduces noise levels
- Reduces corrosion
- Reduces maintenance costs

Features

- Highly water repellent
- Low viscosity provides excellent penetrative qualities
- Cleans and lubricates
- Simplifies lubricant stocks
- Bonds to most metals
- Low hazard in use
- Contains no solid particles

Applications

- Locks
- Machine slides
- Mechanisms prone to running dry
- Releasing agent in plastic extrusion moulding
- Metal pressing

Industries using Lofrix® Dry

- Aerospace
- Plastic mouldings
- Metal pressing

Application

The surface temperature of the part needs to be heated above 55°C either in hot water or a suitable oven.

The part is then immersed in Lofrix® Dry, or it can be applied with a brush or cloth. If immersed, the part is removed from the fluid and the carrier is allowed to evaporate. The part cools and is coated with the lubricant.



Reducing the carbon footprint of industry



Lofrix® Hydraulic

Lofrix® Hydraulic has been specially formulated to reduce friction in the particular conditions encountered in hydraulic systems.

High temperatures within hydraulic systems can cause seals to harden and crack, resulting in leaks and loss of oil. Hydraulic fluid temperatures above 180°F (82°C) damage most seal compounds and accelerate degradation of the oil, leading to inefficiencies through contamination.

The advanced friction reduction properties of Lofrix® Hydraulic stabilise operating temperatures, increasing efficiency and reliability and dramatically reducing failure rates and downtime.

Benefits

- Improves productivity
- Increases plant life
- Lowers operating temperature
- Lowers energy consumption
- Reduces vibration
- Reduces noise levels
- Reduces corrosion
- Reduces maintenance costs

Features

- Effective in all oils
- Simplifies lubricant stocks
- Bonds to most metals
- Cleans and lubricates
- Waterproof
- Low hazard in use
- Non flammable
- Contains no solid particles

Industries using Lofrix® Hydraulic

- Aggregate processing
- Cement and brick manufacturing
- Machine tooling
- Plastics manufacturing

Application

Using Lofrix® Hydraulic is a simple process. The recommended amount, which is between 1% and 2% of the bulk oil amount, is combined with a sample of the base oil. Heating to around 55°C will speed up the blending process. A clouding of the mix will develop and then clear with stirring. Once clear this mix is added to the bulk oil.



Reducing the carbon footprint of industry



Lofrix® Windpower

Lofrix® Windpower has all the features of Lofrix® Original but has been specially formulated to cope with the extreme conditions encountered in wind turbines.

The differences in operating speeds, temperatures and pressures within the single gearbox of a wind turbine are a particularly harsh environment for lubricating oils. Wind turbine gearboxes are subject to highly complex loads and throughout the gearbox, bearing performance criteria differs widely. In some operating conditions bearings carry medium-sized loads at low speeds, while elsewhere bearings need to carry much lower loads but at far higher speeds.

Rapid changes in operating speeds can cause high shock loads, while the high-load/low-speed conditions that arise when winds are light can lead to the breakdown of essential lubricating film.

Lofrix® Windpower is extremely tolerant of shock loads and stresses and is able to withstand temporary absence of lubricant. These properties help to smooth out the environmental extremes, enabling the lubricating oil to operate effectively within its tolerances.

Benefits

- Improves productivity
- Increases plant life
- Reduces shock and stress
- Lowers operating temperature
- Reduces vibration
- Reduces noise levels
- Reduces corrosion
- Reduces maintenance costs

Features

- Effective in all oils
- Simplifies lubricant stocks
- Bonds to most metals
- Cleans and lubricates
- Waterproof
- Low hazard in use
- Non flammable
- Contains no solid particles

Applications

- Wind turbine gearboxes

Application

The recommended amount of Lofrix® Windpower, which is between 1% and 2% of the bulk oil amount, can be added directly into the gearbox while it is working, or as part of routine maintenance. Mixing will occur automatically.



Reducing the carbon footprint of industry



Case Study

A major wind power operator conducted tests of Lofrix® Windpower to see if it would reduce the high failure rate which is common in turbine gearboxes.

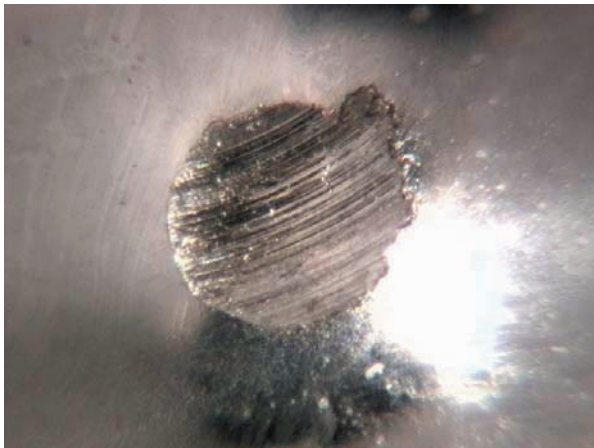
Five turbines were identified by the company's monitoring procedures as being in danger of failure, with an estimated remaining life span of two to three weeks. On adding Lofrix® Windpower the operating temperature of the gearboxes dropped by an average of 12%. The turbines continued to operate satisfactorily, well beyond the predicted failure dates prompting further successful trials in more turbines.

Following these initial positive results, the company commissioned the National Centre of Tribology to assess the long and short term effects of Lofrix® Windpower in wind turbine gearboxes.

These tests showed:

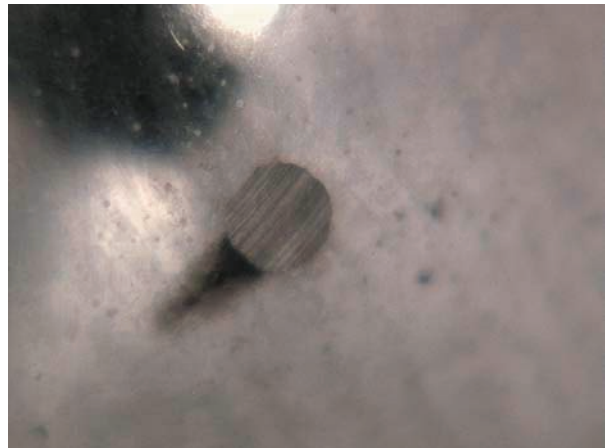
- A reduction in wear scar width in 4-ball tests under 980N load of 40% - 51%, as shown below
- A reduction in friction forces generated in Falex pin-in-vee block tests of 14% - 22%
- A reduction in the cold start up friction coefficient of 50%, to the same levels as normal operating temperatures in dowel-on-plate tests

Without Lofrix® Windpower



4-ball wear scar from Q8 El Greco 320 @ 980N.

With Lofrix® Windpower



4-ball wear scar from Q8 El Greco 320 @ 980N with 1% Lofrix® added.

The Lofrix® Grease Range

The greases in the Lofrix® range all create an environment that is tolerant to shock loads and sustained extreme contact pressure. The ultra-low coefficient of friction helps to reduce thermal loading and cuts the restrictions to movement, providing tenacious protection for the most arduous applications.

The Lofrix® grease range is designed to operate in particularly challenging conditions and includes:

- Waterproof Grease
- Extreme Pressure Grease
- High Temperature Grease
- Synthetic High Temperature Grease
- Synthetic Low Temperature Grease

Benefits

- Improves productivity
- Increases plant life
- Lowers energy consumption
- Lowers operating temperature
- Reduces vibration
- Reduces noise levels
- Reduces corrosion
- Reduces maintenance costs

Lofrix® Waterproof Grease

This semi-synthetic grease is designed specifically for slow to medium speed plain and anti-friction bearings in marine and other hostile conditions.

Lofrix® Extreme Pressure Grease

This grease is designed to withstand extreme pressures over extended periods without leaving the dry residues associated with conventional types of thickeners used in extreme pressure greases.

Lofrix® High Temperature Grease

Designed for use in applications where a higher tolerance to temperature is required, this grease is effective at temperatures up to 160°C.

Lofrix® Synthetic High Temperature Grease

With an operating range of -50°C to + 220°C this grease provides excellent lubrication at sub-zero and ambient temperatures, making this lubricant extremely versatile in its applications.

Lofrix® Synthetic Low Temperature Grease

This grease will provide long term lubrication at temperatures down to -60°C without the difficulties of excessive drag usually associated with most lubricants operating at such low temperatures.



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The Lofrix® Grease Range - Physical Characteristics

Lofrix® Waterproof Grease

Appearance	Smooth adhesive grease
Colour	Green
NLGI classification	2
Thickener	Lithium soap
Base oil	Semi-synthetic
Base oil viscosity @ 40°C (IP71) cSt	1000
Worked penetration (IP50)	265 to 295
Dropping point (IP132) °C	185 min.
Oil separation (IP121) %	5 max.
Copper corrosion (IP112)	Pass
Resistance to corrosion Emcor (IP 220)	0:0
Water washout (ASTM D1264) @ 39°C %	2.5
Four Ball Weld Load (IP 239) kgs	260
Timken OK load (IP 326) kgs (lbs)	20 (45)
Operating temperature range	-7°C to +140°C

Lofrix® High Temperature Grease

Appearance	Smooth grease
Colour	Brown
NLGI Classification	2
Thickener	Bentone
Base oil	Solvent refined mineral oil
Base oil viscosity @ 40°C (IP71) cSt	110
Oil separation (IP121) %	2
Oxidation stability 100 hours @ 99°C pressure drop psi	3
Worked Penetration (IP50)	265 to 295
Dropping point (IP132) °C	>260
Copper corrosion (IP112)	Pass
Water Washout (ASTM D1264) @ 38°C %	5
Operating temperature range	-20°C to +160°C

Lofrix® Extreme Pressure Grease

Appearance	Smooth grease
Colour	Dark brown
NLGI classification	2
Thickener	Lithium soap
Base oil	Blend of solvent refined mineral oil
Base oil viscosity @ 40°C (IP71) cSt	180
Worked penetration (IP50)	265 to 295
Dropping point (IP132) °C	185 min.
Oil separation (IP121) %	5 max.
Copper corrosion (IP112)	Pass
Resistance to corrosion Emcor (IP 220)	0:0
Water washout (ASTM D1264) @ 39°C %	3
Four Ball Weld Load (IP 239) kgs	315
Timken OK load (IP 326) lbs	50
Oxidation stability @ 100°C (IP142)	
Pressure drop after 100 hrs psi	4
400 hrs psi	14
Operating temperature range	-20°C to +140°C

Lofrix® Synthetic Low Temperature Grease

Appearance	Brown soft grease
NLGI Classification	2
Thickener	Lithium complex
Base fluid	Blend of synthetic oils
Base fluid viscosity @ 100 °C	4 cSt
@ 40 °C	11 cSt
Water washout (IP 215)	2% max.
Dynamic corrosion resistance (IP 220)	0:0
Copper corrosion (IP 112)	1a
Shell Four Ball (IP 239) Weld load kgs	200
Operating temperature range	-60°C to +130°C

Lofrix® Synthetic High Temperature Grease

Appearance	Smooth brown grease
Thickener	Lithium complex
NLGI classification	2
Base oil	A Blend Synthetic Oils
Solid lubricant	PTFE
Dropping point (ASTM D2265)	>250°C
Dynamic corrosion resistance (EMCOR) (IP 220)	0:0
Shell 4 Ball (IP 239) (ASTM D2596)	
Weld Load kgs	355
Load Wear Index kgs	68
Corrosion (ASTM D130)	1b
dN factor	750,000
Operating temperature range	-50°C to +220°C

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