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BIO



Environmental  
Management  
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# Environmentally Acceptable (EAL) & Biodegradable Lubricants

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# Vickers Oils EALs: A Vision REALised

In 2002 Vickers Oils became the first company to make biodegradable lubricants commercially available to the global marine market.

The ground-breaking introduction of biodegradable lubricants marked the beginning of our commitment to help companies involved in waterborne transportation to meet the challenge of reducing their environmental footprint.

Research suggests that between 37 million and 61 million litres of “operational lubricant discharge” pass into ports and harbours around the world each year, the scale of the problem of ocean pollution is brought into even greater focus.

In addition to improving environmental credentials, the opportunity to reduce operating costs is just as important across a variety of industries including marine, heavy industrial, mining, forestry, agricultural or ports. The use of biodegradable lubricants, or EALs (Environmentally Acceptable Lubricants), is one way that operators can achieve real cost saving benefits through superior performance, whilst minimising the impact of lubricants that leak into the environment. The applications for our biodegradable lubricants include open gear boxes, wheel motors, bearings, mobile hydraulic equipment, wire rope etc.

Customers are choosing to use our biodegradable lubricants because:

- They can give better performance than conventional lubricants, resulting in longer fluid life and less machinery downtime.
- They can provide evidence of continuous improvement for ISO 14001 and other environmental management programmes.
- They provide a means of enhancing corporate reputation and demonstrating Corporate Social Responsibility.
- Their use has been regarded as a mitigating factor by enforcement authorities in some cases of accidental leakage, resulting in lower penalties.

We are justifiably proud of our global reputation for supplying innovative lubricants, continuing to lead the way in the development of biodegradable lubricants, or EALs and providing our customers with the high levels of service and solutions they need.



<b>1993</b>	<b>2002</b>	<b>2006</b>	<b>2008</b>	<b>2013</b>	<b>2016</b>	<b>2020</b>	<b>2021</b>
R&D into Marine EALs began	Launched HYDROX BIO the first EAL for sterntubes and stabilisers	ECOSURE HSE a range of EAL hydraulic fluids, launched	BIOGREASE EP2 and BIOGEAR XP range launched	Our range of EALs confirmed as VGP compliant	ECOSURE EAF launched expanding our range of EAL Hydraulic Fluids	Wire rope lubricants range added to our EAL range	Corrosion prevention lubricants added to our EAL range
MARINE EALs	HYDROX BIO	ECOSURE HSE	BIOGREASE EP2 & BIOGEAR XP	VGP COMPLIANT	ECOSURE EAF	VICKERLUBE BIO WRL and BIO LV WRL	VICKERLUBE BIO CPF

# Biodegradability and Environmental Specifications

A range of stringent environmental specifications and labelling schemes exist around the world, all designed to have a more sustainable, safer and to provide a cleaner future.



## The Vessel Incidental Discharge Act (VIDA)

The VIDA establishes a framework for the regulation of discharges incidental to the normal operation of a vessel under a new Clean Water Act (CWA)

The VIDA applies to:

- Commercial vessels greater than 79 feet in length;
- Other non-recreational, non-Armed Forces vessels, such as research and emergency rescue vessels; and
- Ballast water only from small vessels (vessels less than 79 feet in length) and fishing vessels of all sizes.

The VIDA requires EPA to develop national standards of performance for incidental discharges similar to the VGP that will eventually encompass the VGP

## Swedish Standard SS 15 54 34

The Swedish Institute for Standards (SIS) develops Swedish standards as well as contributing to the development of international standards. The Swedish Standard SS 15 54 34 includes environmental requirements for hydraulic oils and specifies the need for high biodegradability, low acute and chronic toxicity of the additives toward water organisms, and the finished lubricant must not be classified as hazardous to health and the environment.

## Biodegradation & Biodegradability Test OECD 301B

A lubricant is considered biodegradable if it achieves a biodegradability of greater than 60% in the 28-day OECD 301B tests.

OECD 301B is a test that involves treating a lubricant sample with micro-organisms in the presence of oxygen, and measuring the CO<sub>2</sub> produced by these micro-organisms over a minimum of 28 days in a liquid environment.

Feature	Biodegradability 28 days OECD 301B
Mineral Oil	20–40%
Biodegradable Ester	60–95%

## The Vessel General Permit (VGP)

The VGP is a National Pollutant Release System (NPDES) Permit issued by the Environmental Protection Agency (EPA) in the United States of America.

The VGP mandates the use of Environmentally Acceptable Lubricants (EALs) in all oil-to-water interfaces (e.g. stern tube seals, thruster seals) on all merchant vessels of 79 feet or longer (excluding recreational vessels) entering US coastal and inland waters, unless technically infeasible.

“Environmentally Acceptable Lubricants” (EAL) are lubricants that are “biodegradable” and “minimally toxic” and are “not bio accumulative” as defined in Appendix A [of the VGP].

## The European Ecolabel (EEL)

The European Ecolabel (EEL) aims to highlight products that have reduced impact on the environment. These products contribute to the environmental protection and sustainability as compared to conventional products.



The European Ecolabel for Lubricants is “The official EU mark for Greener Products”.

All Ecolabel awarded lubricants are independently tested and are of good quality, environmentally friendly lubricants leaving lesser impact on air, water, ground, and human health as compared to conventional mineral-oil based lubricants on the market.

## Objectives of EU Ecolabel

EU Ecolabel aims to guarantee

- Reduced impact on the aquatic environment and the soil during use
- Reduced CO<sub>2</sub> emissions
- High percentage of renewable raw materials
- Limited use of hazardous substances
- High technical performance

Therefore, products with the EEL can be more cost-effective than comparable mineral-oil based counterparts and added value can often be achieved during use.

EEL can be awarded to the following categories of products :

**Total Loss Lubricants (TLL):** Chainsaw oils, wire rope lubricants, concrete release agents

**Partial Loss Lubricants (PLL):** Gear oils for open gears, stern tube oils, two-stroke oils, oils for temporary protection against corrosion

**Accidental Loss Lubricants (ALL):** Hydraulic fluids, metalworking fluids, gear oils for closed gears.

# Explore our range of Environmentally Acceptable Lubricants (EALs)



Application	Product name	Product code	Page
<b>Gear Oils</b>	BIOGEAR XP 220	15280	<b>7</b>
	BIOGEAR XP 320	15392	
	BIOGEAR XP 460	15564	
<b>Hydraulic Fluids</b>	ECOSURE EAF 32	20824	<b>9</b>
	ECOSURE EAF 46	20763	
	ECOSURE EAF 68	20347	
	ECOSURE HSE 32	20232	
	ECOSURE HSE 46	20346	
<b>Grease</b>	ECOSURE HSE 68	20368	<b>11</b>
	BIOGREASE EP0	25560	
<b>Wire Rope</b>	BIOGREASE EP2	25892	<b>13</b>
	VICKERLUBE BIO WRL	25765	
<b>Corrosion Prevention</b>	VICKERLUBE BIO CPF	35283	<b>14</b>

# BIOGEAR XP: REAL Protection



The Environmentally Acceptable Gear Lubricant delivering superior anti-wear, Extreme Pressure (EP) and oxidation protection even under severe conditions

- Achieves a biodegradability of greater than 60% in the 28 day OECD 301B test
- Exceeds the requirements of DIN 51517 part 3
- Excellent equipment protection
- Superior thermal stability
- Non-toxic in the marine environment
- ISO 220, 320 and 460



### Applications

BIOGEAR XP is designed for use in sensitive environments where there is a potential for fluid loss to occur, while demanding superior performance

- Enclosed gearboxes
- Bearings
- Circulating Oil Systems

### Features and benefits

Feature	Benefit
<b>Extended fluid life</b>	Fewer fluid changes, less equipment downtime and lower overall cost of ownership
<b>Excellent resistance to micropitting</b>	Protects the gear teeth against fatigue wear resulting in less down time
<b>High EP protection</b>	Ability to withstand shock and high loads
<b>Excellent water separation</b>	Enables easy removal of free water
<b>Good hydrolytic stability</b>	Resists breakdown of the lubricant by water in high temperature situations
<b>Wider operating temperatures</b>	Protects equipment from -25°C to over +100°C
<b>Superior oxidative stability</b>	Less sludge and system failures, longer fluid life and less fluid thickening
<b>Good elastomer compatibility</b>	Compatible with most sealing materials including Nitrile and Viton
<b>Biodegradable and non-toxic</b>	Lower environmental risk

BIOGEAR XP is a range of biodegradable, high performance, extreme pressure (EP) gear lubricants with excellent anti-wear and micropitting performance, available in ISO 220, 320 and 460 viscosities. These lubricants are based on fully saturated synthetic esters with a high degree of renewability and use state-of-the art technology.

BIOGEAR XP is designed for use in bearings, enclosed gearboxes and, planetary or circulating oil systems operating in sensitive environments where there is a potential for fluid loss to occur, while demanding superior performance.

BIOGEAR XP is miscible with common mineral based gear oils, but in line with good practice, old lubricants should be drained completely to avoid any risk of additive incompatibility and ensure that the full benefits and performance are achieved. Water content should not exceed 0.1% and any free water must be separated off on a regular basis. These lubricants do not emulsify in water.

BIOGEAR XP achieves a biodegradability of greater than 60% in the 28 day OECD 301B test.

Attribute	Test	Results
<b>Wear Protection</b>	FZG	> Load stage 14
	Micropitting	Passes all 5 endurance stages
	FE8	Pass
<b>Corrosion Protection</b>	ASTM D130 Copper Corrosion	Pass
	ASTM D665 Rust (Fresh and Sea Water)	Pass
<b>Elastomer Compatibility</b>	NBR, HNBR, FKM, PTFE, PU80, PU90	Pass
	DIN 51517 part 3 (2018)	Pass
<b>Gear Standards</b>	ISO 12925-1	Pass
	ANSI/AGMA 9005-F16	Pass



Environmentally Acceptable Hydraulic Fluids delivering superior fluid life and oxidation resistance

- Exceeds the requirements of ISO 15380
- Achieves biodegradability of greater than 60% in the 28 day OECD 301B test
- Extended fluid life
- Superior extreme temperature performance
- ISO 32, 46 & 68
- Use state-of-the-art ashless, zinc-free additive technology.

**Applications**

ECOSURE EAF/HSE hydraulic fluids, based on synthetic esters, are designed for use in applications where there is potential for fluid loss to occur to the environment.

- All mobile and stationary hydraulic systems

**Features and benefits**

Feature	Benefit
<b>Extended fluid life</b>	Fewer fluid changes, less equipment downtime and lower overall cost of ownership
<b>Improved lubricity</b>	Less wear and longer pump life
<b>Wider operating temperatures</b>	Protects equipment from -35°C to over +100°C
<b>Good hydrolytic stability</b>	Resists breakdown of the lubricant by water in high temperature situations
<b>Good oxidative stability</b>	Less sludge and system failures, longer fluid life and less fluid thickening
<b>Good thermal stability</b>	Less fluid thickening and system failures due to lower levels of corrosive decomposition products
<b>Superior demulsification</b>	Excellent water separation allowing easy removal of water and reduced pump wear
<b>Good VI</b>	Fluid remains within the desired viscosity over a broader temperature range
<b>Good shear stability</b>	Less viscosity loss, fewer fluid changes and prolonged pump life
<b>Good seal compatibility</b>	Less leakage and less equipment downtime
<b>Good long term filterability</b>	Less filter blockage and less equipment downtime
<b>Biodegradable and non-toxic</b>	Lower environmental risk

ECOSURE EAF 68 achieves over 330 minutes in the ASTM D-2272 RPVOT oxidation test, demonstrating greater performance and longer fluid life than many competing mineral and biodegradable hydraulic fluids.

ECOSURE EAF exhibits excellent low temperature performance with a pour point of < -48°C, making it particularly suitable for use in equipment exposed to very cold climates.

ECOSURE HSE is a high performance hydraulic fluid intended for heavy duty use where there is potential for fluid loss to occur to the environment.

ECOSURE HSE fluids are based on fully saturated synthetic esters and demonstrate exceptional fluid life. In oxidation tests they achieve up to 12,000 hours in the ASTM D-943 DRY TOST test and over 800 minutes in the ASTM D-2272 RPVOT test, demonstrating performance far superior to most competing biodegradable hydraulic fluids. Deposit formation in critical hydraulic control valves will be minimised leading to extended, smoother, more reliable operations.

ECOSURE HSE has been strongly recommended by several OEMs for its superior performance properties in critical applications and meets the environmental requirements of the Swedish Standard 15 54 34.

ECOSURE EAF meets the Swedish Standard SS 15 54 34 and is also listed on the USDA Bio Preferred Program.

Attribute	Test	Results
<b>Pump lubrication</b>	Eaton 104C & 35VQ	Pass
	Parker Hannifin Denison T6H20C	Pass
<b>Wear Protection</b>	FZG	> Load Stage 12
	ASTM D130 Copper Corrosion	Pass
<b>Corrosion Protection</b>	ASTM D665 Rust (Fresh and Sea Water)	Pass
	Elastomer Compatibility	Nitrile, Viton, Teflon, Nylon, PTFE
<b>Demulsification</b>	ASTM D1401 (Fresh & Sea water)	Pass

# BIOGREASE EP: REAL Resistance



The Environmentally Acceptable Grease combining corrosion protection with excellent resistance to wash off from rain and seawater

- Excellent resistance to water wash off
- Achieves biodegradability of greater than 60% in the 28 days OECD 301B test
- Long lasting corrosion protection
- Good load carrying properties
- NLGI 0 & 2

### Applications

BIOGREASE EP2 is designed for exposed equipment in sensitive environments where there is a potential for fluid loss to occur

- Bearings
- Wire ropes
- Multipurpose applications

### Features and benefits

Feature	Benefit
<b>Wider operating temperature</b>	Protects equipment from -25°C to +130°C
<b>Good adhesion</b>	Resists the washing action of rain and seawater
<b>Good corrosion protection</b>	Provides rust resistance to steel and copper
<b>Reduces wear and friction</b>	Protects and extends equipment life
<b>Good elastomer compatibility</b>	Compatible with most sealing materials including Nitrile and Viton
<b>Biodegradable and non-toxic</b>	Lower environmental risk

BIOGREASE EP offers improved operation and lower environmental risk leading to overall cost savings.

BIOGREASE EP is a Lithium/Calcium thickened lubricating grease based on fully saturated synthetic esters. It is available in NLGI 0 and NLGI 2 grades.

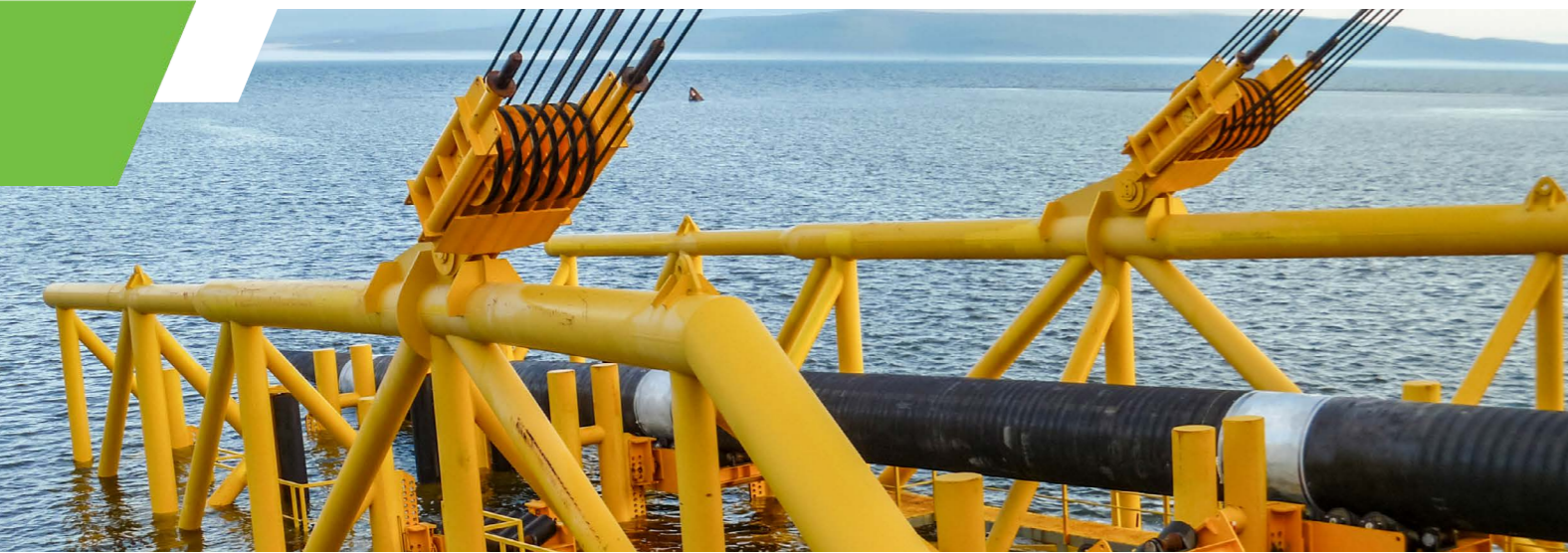
BIOGREASE EP2 is designed for the lubrication of bearings and as a protective coating for exposed equipment in sensitive environments where there is a potential for loss to occur, for example from multipurpose applications including antifriction and plain bearings, bushings and pins.

BIOGREASE EP0 has been specifically formulated for use in centralised lubrication systems to improve pumpability or where low temperature performance is required or as recommended by certain OEMs.

BIOGREASE EP has a biodegradability of greater than 60% in the 28 days OECD 301B test.

Attribute	Test	Results
<b>Water Wash Out</b>	ASTM D1264	Excellent
<b>EP Performance</b>	ASTM D2596	Excellent
<b>Wear Protection</b>	ASTM D2266	Good
<b>Corrosion Protection</b>	ASTM D4048 Copper Corrosion	Good (1 max)
	ASTM D6138 Rust (Fresh and Salt Water)	No corrosion
<b>Elastomer Compatibility</b>	ASTM D4289 Nitrile, Viton	Compatible

# VICKERLUBE BIO WRL



**VICKERLUBE BIO WRL** is a biodegradable wire rope lubricant formulated using readily renewable and biodegradable base oils and is suitable for applications where lubricant contamination and environmental issues are a concern.

**VICKERLUBE BIO WRL** is a solvent free lubricant that penetrates slightly sealing the outside of the cable. The tacky formulation prevents fling-off and water-resistant characteristics displaces moisture to protect against corrosion.

**VICKERLUBE BIO WRL** is also a lubricant intended for spray application and to assist with penetration into the rope core.

## Applications

**VICKERLUBE BIO WRL** can be used on wire ropes to protect them while in storage against corrosion.

They can also be used to effectively lubricate operational wire ropes that are static or moving, against wear and corrosion.

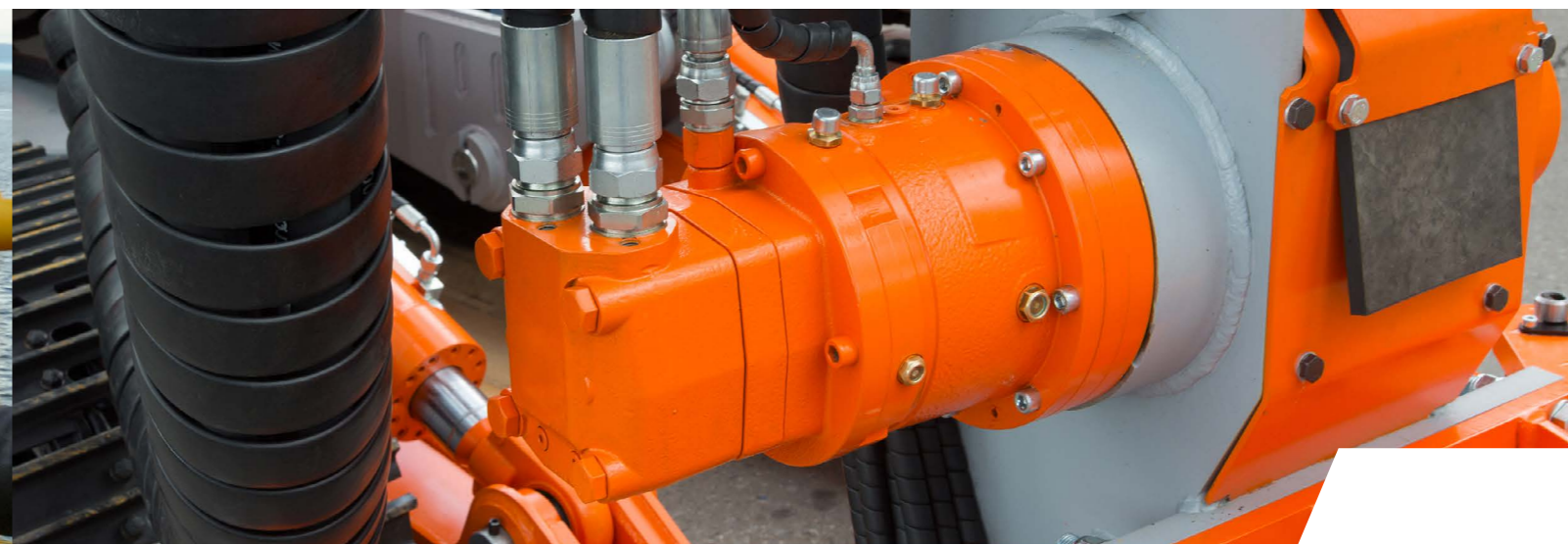
### Applications include:

- Quayside ship to shore cranes
- Container handling equipment including straddle carriers and reach stackers
- Marine Deck and Winch ropes
- All lifting and hoist ropes in mining and construction industries
- All static and guy rope applications typically found on bridge and waterway applications
- Lift and drag ropes used in logging and forestry applications

## Features & Benefits

FEATURE	BENEFIT	VICKERLUBE BIO WRL
<b>Biodegradable and renewable</b>	Lowers environmental impact, responsibility	✓
<b>Low viscosity</b>	Lubricates between rope strands	✓
<b>De-watering characteristics</b>	Displaces water, leaving a thin lubricant film	✓
<b>Corrosion protection</b>	Increases rope and cable life even in salt water	✓
<b>Wear resistant</b>	Protects ropes and cables against wear, increases life	✓
<b>Extreme pressure resistance</b>	Maximises component life in all load conditions	✓

# VICKERLUBE BIO CPF



## Biodegradable, High-performance multipurpose Corrosion Prevention Fluid

- Made from bio-based, sustainable ingredients.
- Creates a thin, colourless soft coating.
- Designed to penetrate, lubricate, displace moisture.
- Designed to clean and protect metal parts against corrosion.
- Quickly loosens and releases metal parts and mechanical equipment that are stuck, seized, or rusted together.

## Applications

Corrosion Protection for Short-Term Storage of metal surfaces.

For use on pins, bushes, screws, valves, chains, bearings, couplings, levers, locks, hinges, cables, pulleys, winches, pedal crank arms, derailleur assemblies, gear mechanisms, and many more.

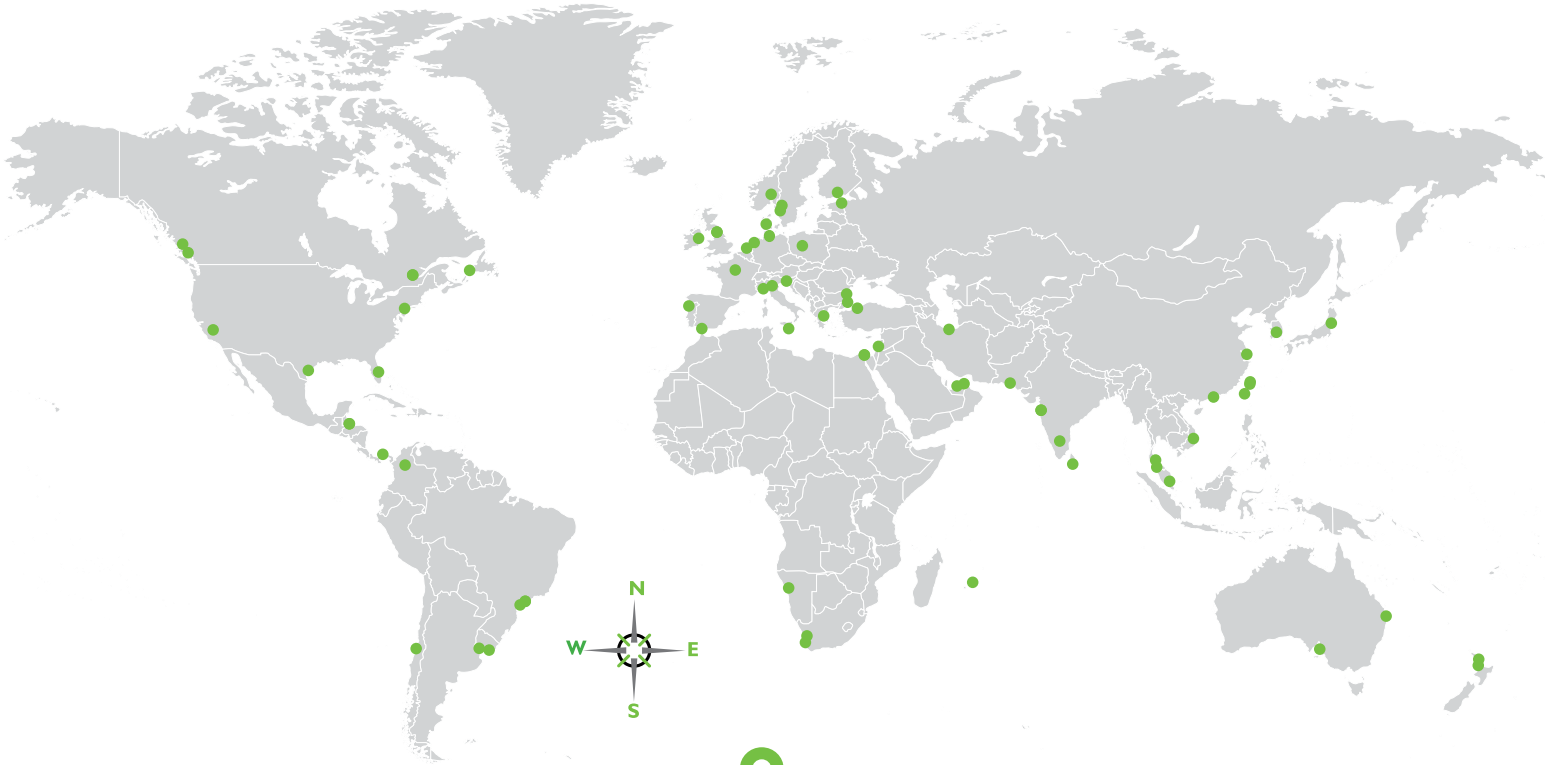
## Typical characteristics and properties

VICKERLUBE BIO CPF	RESULT
<b>Appearance</b>	Green solution
<b>Viscosity @ 25°C (cSt)</b>	11.2
<b>Water Solubility (g/l)</b>	<1
<b>Flash Point</b>	176°C
<b>Dry Film Thickness (µm)</b>	<1
<b>Coverage (m2/l)</b>	330
<b>Specific Gravity (g/cm3)</b>	0.89
<b>Shelf Life</b>	3 years in original sealed containers whilst stored out of direct sunlight





Trusted for Generations



An award-winning range of EALs (Environmentally Acceptable Lubricants)



Regional stock points in over 40 locations



Ability and infrastructure to respond quickly to urgent requirements

# Service & Support

30% of our workforce are employed in the technical team, focusing on Quality Control, R&D, OEM liaison and Technical Service allowing us to provide one-on-one dedicated customer support by our team of highly qualified experts.



Field Support



Lubrication Surveys and Recommendations



Equipment Reports and Analysis



Lubricant Analysis



Training

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V29/04/22

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