

# Lagersmit information letter

*Heading towards VGP compliance*

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## Heading towards VGP compliance

On 19 December 2013, the revised [Vessel General Permit](#) (VGP) issued by the US Environmental Protection Agency (EPA) came into force. The VGP mandates the use of Environmentally Acceptable Lubricants (EAL) in all oil-to-water interfaces (e.g. stern tube seals, thruster seals) on all merchant vessels of 79 feet or longer that are sailing in US coastal and inland waters – unless technically infeasible.

“Environmentally Acceptable Lubricants” means lubricants that are biodegradable, non-bio accumulative, and minimally toxic. They must be approved by labelling programs like Blue Angel, European Ecolabel, Nordic Swan, Swedish Standards SS 155434 and 155470, OSPAR and the EPA’s DfE. Please note that not every bio-oil is an EAL. Always check with the oil supplier if the intended lubricant is in compliance with VGP requirements.

Technical infeasibility means:

- Not approved for use in a given application.
- Products that meet OEM specifications are not available within any port in which the vessel calls.
- Pre-lubricated machinery/equipment.
- Switch-over and use of EALs must wait until the next dry-docking.

Lagersmit has tested several EALs for compatibility with the Supreme® shaft seal system. Results can be found in the list below. As the number of EALs is still increasing, testing of compatibility with Supreme® shaft seals will continue, and the test result list will be updated regularly. Please visit our website for the latest test result list. If you want an oil to be tested, kindly ask your oil supplier to contact our service team to explore the possibilities.

Lagersmit's test result list:

Company name	Product name	Viscosity [cSt @ 40°C]	FKM-EAL compatible	VGP compliant *
<b>Castrol</b>	Biostat 68	70	✓ ***	✓
	Biostat 100	103	✓	✓
	Biostat 150	144	✓ ***	✓
	Biostat 220	207	✓ ***	✓
	Biobar 68	68	✓	✓
<b>Chevron</b>	Clarity synth. EA Gear Oil 100	100	✓	✓
	Clarity synth. EA Hydraulic Oil 46	46	✓	✓
	Clarity synth. EA Hydraulic Oil 68	68	✓	✓
<b>ExxonMobil</b>	SHC Aware ST 100	100	✓	✓
	SHC Aware ST 220	220	✓	✓
	SHC Aware Gear 68	68	✓	✓
	SHC Aware Gear 100	100	✓	✓
	SHC Aware Gear 150	150	✓	✓
<b>Fuchs</b>	Plantosyn 68 HVI	68	✓	✓
	Plantogear 100 S	100	✓	✓
	Plantogear 150 S	150	✓	✓
	Plantogear 220 S	220	✓	✓
<b>Gulf Oil Marine</b>	GulfSea BD Sterntube Oil 68	68	✓	✓
	GulfSea BD Sterntube Oil 100	100	✓	✓
	GulfSea BD Sterntube Oil 220	220	✓	✓
	Gulfsea BD Gear 68	68	✓	✓
	Gulfsea BD Gear 100	100	✓	✓
	Gulfsea BD Gear 150	150	✓	✓
<b>Kajo</b>	Kajo-Bio-Gear Oil 100	100	✓	✓
<b>Klüber</b>	Klüberbio RM2-100	100	✓	✓
	Klüberbio RM2-150	150	✓	✓
	Klüberbio RM8-100	100	✓	✓
	Klüberbio EG2-68	68	✓	✓
	Klüberbio EG2-100	100	✓	✓
	Klüberbio EG2-150	150	✓	✓

Company name	Product name	Viscosity [cSt @ 40°C]	FKM-EAL compatible	VGP compliant *
<b>Panolin</b>	Stella Maris 100	100	✓	✓
	Stella Maris 220	220	✓	✓
	Margear 68	68	✓	✓
	Margear 100	100	✓	✓
	Margear 150	150	✓	✓
	Margear 220	220	✓	✓
<b>Shell</b>	Naturelle S4 Gear Fluid 68	68	✓	✓
	Naturelle S4 Gear Fluid 100	100	✓	✓
	Naturelle S4 Gear Fluid 150	150	✓	✓
	Naturelle S4 Stern Tube Fluid 100	100	✓	✓
	Naturelle HF-E-46	46	✓	✓
	Naturelle HF-E-68	68	✓	✓
	Shell Panolin S4 Stern Tube EAL 100	100	✓	✓
	Shell Panolin S4 Gear EAL 68	68	✓	✓
	Shell Panolin S4 Gear EAL 100	100	✓	✓
	Shell Panolin S4 Gear EAL 150	150	✓	✓
<b>RSC Bio Solutions</b>	Envirologic GO 68	68	✓	✓
	Envirologic GO 100	100	✓	✓
	Envirologic GO 150	150	✓	✓
	Envirologic GO 220	220	✓	✓
	Envirologic HF 46 HP	46	✓	✓
	Envirologic HF 68 HP	68	✓	✓
	EnviroLogic HF 100 HP	100	✓	✓
	Futerra HF 46	46	✓	✓
	Futerra HF 68	68	✓	✓
	Futerra HF 100	100	✓	✓
<b>Royal Purple</b>	Biomax Stern Tube Oil 100	100	✓	✓
	Biomax Stern Tube Oil 150	150	✓	✓

Company name	Product name	Viscosity [cSt @ 40°C]	FKM-EAL compatible	VGP compliant *
<b>Total</b>	Biohydran TMP 100	100	✓	✓
	Bioneptan 100	100	✓	✓
	Bioneptan 150	150	✓	✓
	Bioneptan 220	220	✓	✓
<b>Vickers</b>	HYDROX BIO 68	68	✓	✓
	HYDROX BIO 100	100	✓	✓
	HYDROX BIO 150	150	✓	✓
	HYDROX BIO 220	220	✓	✓
	BIOGEAR XP 68	68	✓	✓
	BIOGEAR XP 100	100	✓	✓
	BIOGEAR XP 150	150	✓	✓

Notes:

1. EALs can chemically affect the sealing rings by hydrolysis. Especially when emulsions are built up in the oil chamber of the sealing system or in the stern tube, these bio-oils interact with the water present and tend to break down. The lifetime of most NBR or FKM lip-type sealing systems will decrease due to this aggressive mixture. In general, FKM seals are chemically more resistant than NBR seals.

**Lagersmit has a special developed lip seal compound for use with EALs named FKM-EAL\*\* that is resistant to hydrolysed EAL.**

2. Please check the advised operating temperature range of the EAL with the oil supplier. In general, a maximum oil bulk temperature of 60 °C is applicable.
3. Please note that the quality and the surface roughness of the liner effects the wear rate of the lip seal. Therefor it is strongly advised to use Supreme liners of Lagersmit and comply to the general roughness values as indicated in the Supreme installation and maintenance manual. In particular, ceramic coated liners develop an abrasive character over time. Therefor it is advised to replace ceramic coated liners with a non-ceramic alternative when installing FKM(-EAL) lip seals

\* As per issue date of this document.

\*\* FKM-EAL compatibility is tested with a 5% water – EAL mixture at 80 °C. Approval can be granted after physical property changes and wear patterns are analysed from static and dynamic tests.

\*\*\* Data based on testing of old formulation.

### Switch over process

Mixing different synthetic lubricants can compromise the product integrity resulting in unpredictable and potential equipment damage. Furthermore, synthetic esters and mineral oils are not compatible in all cases. Please consult your oil supplier for guidance.

It is strongly recommended to drain the stern tube and sealing system completely when switching over to an EAL. Proper draining of stern tube and sealing system is essential to ensure VGP compliance and optimal efficiency. To avoid potential damage to the lip seals, lip seals should be replaced by new clean lip seals when switching over. As a result, it is technical infeasible to switch over to an EAL without dry docking the vessel.

### Summary

- As of 19 December 2013 it is mandatory to use Environmentally Acceptable Lubricants in all vessels entering US waters. VGP applies to all non-recreational vessels over 79 feet unless technically infeasible.
- Lip seal compatibility is a crucial consideration when switching over to EALs.
- It is technically infeasible to switch over to EALs without dry-docking the vessel.
- When switching over to EALs lip seals should be replaced as well.
- Supreme® FKM-EAL lip seals are specially developed to use with EAL.
- EAL condition should be monitored at regular intervals to determine if hydrolysis is occurring.

### Assistance

We kindly ask you to inform us about the usage of EALs on your vessels equipped with a Supreme® sealing system. If an EAL is not in our test result list, please contact us for further information or guidance.

Our service and support team can be reached at:

[service@lagersmit.com](mailto:service@lagersmit.com)

Tel. +31 (0)88 0216 300

Kind Regards,

**Lagersmit**

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The latest version of this letter and test result list can be found on our website: [www.lagersmit.com/eal](http://www.lagersmit.com/eal)

Disclaimer:

The EALs were tested in Lagersmits own test laboratory and in cooperation with the oil-suppliers as an added service to our customers. The test results as shown in this document do not constitute a warranty of any kind with regards to the performance of the EALs or the Supreme® seal system itself in combination with the use of EALs in a different environment.

EALs can chemically affect sealing rings by hydrolysis. Especially when emulsions are built up in the oil chambers of the sealing system or in the stern tube, these bio-oils interact with the water present and tend to break down. The lifetime of most NBR or FKM lip-type sealing systems will decrease due to this aggressive mixture. When using EAL, the use of Supreme® FKM-EAL lip seals is strongly recommended by Lagersmit. Lagersmit is not always notified of oil formula changes that could have a negative effect on physical property changes or wear of the Supreme® lip seal. Lagersmit will therefore not accept any liability of any kind for the information contained in this message and the effect of the use of EALs on its Supreme® shaft seal system.