



BioStat

Environmentally responsible stern tube/gear lubricant

Description

Castrol BioStat environmentally acceptable lubricants are specifically designed to replace conventional lubricants in the stern tube bearings and thruster gearboxes of ships. Small quantities of lubricant can be discharged into the marine environment in the course of normal operation of vessels, but the cumulative amount for all vessels is very large. Larger quantities of oil may be released under fault conditions.

Castrol BioStat lubricants are formulated from synthetic ester base oils which are selected to give a wide operating temperature range and long service life.

Castrol BioStat lubricants have been tested and registered according to OSPAR (Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic) requirements and therefore meet the definition of an Environmentally Acceptable Lubricant (EAL) under the US Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP) 2013.

Application

The Castrol BioStat range of lubricants has been developed to replace conventional mineral oil based lubricants in the stern tube bearings and thruster gearboxes of all vessels operating in the marine environment. Castrol BioStat can also replace conventional gear oils in the gearboxes of deck machinery, where there is a risk of spills or leaks during operation or maintenance activities.

Castrol BioStat has been approved by all the major stern tube seal manufacturers for use in their equipment. In many cases, it is necessary to specify a particular type of sealing ring whenever an EAL is used. Conversion to an EAL is therefore most easily carried out during a dry-docking. The inspection interval for the stern tube seal may also be reduced for some lubricant/sealing ring combinations.

Castrol BioStat provides extremely high gear and bearing protection and can replace conventional gear oils in thruster gearboxes. Propeller shaft seals for thrusters are similar to those of stern tubes and the same reservations about sealing ring types apply.

Advantages

Reduced environmental impact when compared to conventional mineral oil based lubricants – demonstrable benefits in the following key environmental performance criteria:

- Superior marine biodegradation
- Significantly reduced levels of potentially bioaccumulative* components
- Enhanced renewability

*Using OSPAR criteria.

High levels of protection given to bearing and gear components, particularly at high loads and low speeds, which can contribute to extended component life and increased reliability:

- Load carrying performance to failure load stage 13 (or better) in the FZG gear test.
- Minimal wear in FZG low speed gear wear test.
- Minimal wear in FAG FE8 bearing test, at both standard (80 kN) and increased (100kN) radial load.

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Additional Information

Typical Characteristics

Name	Method	Units	BioStat 68	BioStat 100	BioStat 150	BioStat 220
Kinematic Viscosity @ 40C	ASTM D445	cSt	68	100	150	220
Kinematic Viscosity @ 100C	ASTM D445	cSt	13.3	16.9	21.7	28.4
Viscosity Index	ASTM D2270		178	178	178	178
Relative Density @ 15C	ASTM D4052		0.93	0.93	0.93	0.93
Pour Point	ASTM D97	Degrees Celsius	-39	-27	-27	-27
Closed Flash Point	ASTM D92	Degrees Celsius	>220	>220	>220	>220
Steel Corrosion, Sea Water	ASTM D665B	Rating	Pass	Pass	Pass	Pass
Corrosion Protection, 0.5% NaCl (SKF Emcor)	ISO 11007	Rating	2-2	2-2	2-2	2-2
Copper Corrosion, 3 hrs @ 100C	ASTM D130	Rating	1A	1A	1A	1A
Demulsification Time @ 54C	ASTM D1401	ml/ml/ml	0/23/57 (30)			
Demulsification Time @ 82C	ASTM D1401	ml/ml/ml		0/23/57 (30)	0/23/57 (30)	0/23/57 (30)
FZG Step Load A/8.3/90	ISO 14635-2	Failure Load Stage	13	>13	>13	>13
FZG Micropitting @ 60C	FVA 54/7	Failure Load Stage	>10	>10	>10	>10

The above figures are typical of those obtained with normal production tolerance and do not constitute a specification.

User Advice

Specific seal materials are specified by most equipment manufacturers for use with EALs. These must be used to ensure reliable operation between dry-dockings and to meet the expected service life/inspection intervals. To ensure that the correct sealing materials are used:

- For new-build vessels, the shipyard must be aware of the intention to use environmental lubricants at an early stage, so that the required sealing rings can be specified and supplied in good time.
- For existing vessels, EALs can generally only be adopted when the vessel is dry-docked, as it will be necessary to replace the sealing rings with the approved seal materials. The shipyard must be aware of the intention to use environmental lubricants at an early stage, so that the required sealing rings can be specified.

It is generally accepted that elastomers become “conditioned” by the first lubricant which they are in contact with. Therefore, most manufacturers recommend that new sealing rings are installed when changing to an EAL, even if the sealing rings are of a type which is approved for use with EALs.

Compatibility between Castrol BioStat and conventional mineral oils has been confirmed by laboratory stability tests which were carried out using a selection of representative conventional lubricants and at a range of different concentrations. Castrol BioStat and conventional mineral oils are expected to be compatible when mixed in any

proportions. Residues of mineral oil should be minimised in order to protect the environmental properties of Castrol BioStat and to ensure compliance with Vessel General Permit requirements, with a target of 5% mineral oil content after change-over.

Castrol cannot confirm the compatibility of BioStat with other non-Castrol EALs. Castrol BioStat is expected to be miscible with other ester-based EALs, but we cannot confirm if a mixture will display the same performance as either individual oil. As a general rule Castrol does not recommend mixing different types of EALs due to the number of different base oils and additive system combinations which are possible. There are exceptions but compatibility testing is required before confirmation can be given. Castrol BioStat is not miscible or compatible with EALs based upon poly-alkylene glycols (PAG).

Castrol BioStat does not require any additional maintenance in service over and above that which is considered good practice for stern tubes or gearboxes in general service. The lubricant – whatever type is in use – is a key component without which the system will not operate. Water removal equipment and additional filtration will prolong the life of system components and of the lubricant and is recommended, particularly when BioStat is used by dynamically positioned vessels. Some Class Societies may insist on the installation of water removal equipment whenever EALs are used. Measurement of water content on a regular basis is a necessary part of the maintenance process.

Storage

All packages should be stored under cover. Where outside storage is unavoidable drums should be laid horizontally to avoid the possible ingress of water and the obliteration of drum markings. Products should not be stored above 60°C, exposed to hot sun or freezing conditions.

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Australia Level 8 (QV1 Building), 250 St. Georges Terrace, Perth WA 6000, Australia. Customer Service Number +61 (0)8 9420 1825

Dubai City Tower 2, 6th Floor PO BOX 1699, Sheikh Zayed Road, Dubai, U.A.E. Customer Service Number +971 4 3079304

Norway Drammensveien 167, Box 153 Skoyen, 0212 Oslo, Norway. Customer Service Number +47 22 51 12 43 501

Singapore Keppel Bay Towers, 1 Harbourfront Avenue 02-01, Singapore 098632, Singapore. Customer Service Number +65 6371 8478

United Kingdom BlueSky Business Space, Westpoint House, Pavilion 2 Prospect Park, Prospect Road, Arnhall Business Park, Westhill. AB32 6FJ, UK. Customer Service Number +44 (0)1224 270365

USA 501 Westlake Park Boulevard, Houston, Texas 77079, USA. Customer Service Number +1 800 339-7157., Brazil Avenida Itaoca, 2.400, Inhauma, Rio de Janeiro, Zip code 21061-020, customer service +55 11 4133 7835

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