

<h1>Instruction Manual</h1>	Revision: 1
Product Name: KEMEL BIO ST-100	Issue Date: 01/07/2019

KEMEL BIO ST-100 is a biodegradable lubricant based on poly glycol and it meets the EAL (Environmentally Acceptable Lubricant) specification in 2013 VGP of US EPA. It is designed specially for sterntube application, and provides adequate lubrication and corrosion prevention even when the lubricant contains more than 5% seawater.

The following points should be noticed for the application of BIO ST-100:

- Water contained cannot be separated from BIO ST-100 by centrifugal purifier, because BIO ST-100 is water-soluble.
- BIO ST-100 should be applied with KEMEL special seal of advanced fluorocarbon-rubber. It should not be used with conventional KEMEL Compact Seal (regular VITON) nor the other seals.

1. Physical and Chemical Properties

Appearance	Yellow or brown liquid
Viscosity at 40°C	106 mm ² /s
Viscosity Index	126
Density at 15 °C	1.15 g/cm ³
Pour point	-38 °C
Flash point	280 °C

2. Application to Vessel

1) Piping

Piping design should be consulted with KEMEL. BIO ST-100 should not be applied in the mixture of system oil. The line for sterntube lubricant should be separated from the line for system oil.

2) Tank

Epoxy paint should not be used for tank inside paint. Zinc-rich primer or non-coating should be recommended.

3) Flushing

① Change over from ST-83A

No chemical reaction occurs even if KEMEL BIO ST-100 is mixed with ST-83A. However, to conduct used lubricant analysis properly, please drain out ST-83A fully before filling the stern tube with Bio ST-100. No special flushing is necessary.

② Change over from other LO

In case of cleaning the inside of stern tube, pipes and tanks by flushing, BIO ST-100 (or ST-83A) or turbine oil should be used as flushing oil.

4) Replenishing ST-83A with ST-100

As mentioned above, no chemical reactions will occur even if the two KEMEL lubricants are mixed and ST-100 can be applied to ships using ST-83A for replenishment. Yet, there are two notes as below:

① Regular Lubricant Analysis

Regular analysis on the mixed lubricants can be conducted properly.

If we are informed of the proportion of the total lubricant quantity and added ST-100 quantity when we are asked for an analysis, we will be able to evaluate the lubricant conditions.

Even if the proportion is unclear, if we are informed whether or not ST-100 has been added since the last lubricant analysis, we will still be able to determine the conditions with the transitions of analytical values.

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②Water Content Meter

The mixture of the two lubricants will deteriorate its measurement accuracy.

If water content increases, as necessary, send KEMEL an oil sample, then we will conduct an analysis in addition to the regular lubricant analysis.

3. Maintenance

1) AFT and FWD Seal Tank

BIO ST-100 in the tank should be replaced to new one every 6 months. It is very difficult to find out seawater ingress into sterntube and oil leakage to sea. Daily oil level check is the most important and effective.

Seawater contained in the tank cannot be drained off because BIO ST-100 is water-soluble.

2) Sterntube

It is very difficult to find out seawater ingress into sterntube and oil leakage to sea. Daily oil level check or checking of water content by using potable water content meter is effective.

Seawater contained in the sterntube cannot be drained off because BIO ST-100 is water-soluble. BIO ST-100 in the sterntube should be replaced to new one when its condition becomes unacceptable or its service time is over 5 years.

Criteria for water content in stern tube	Normal level	: 4% or less
	Cautious level	: 4 to 8%
	Alert level	: more than 8%

4. Lubricant analysis

The oil samples are taken under service conditions and are to be representative of the oil within the sterntube for lubricant analysis at interval of 6 months.

Send the sample of 100 cc together with the information, oil name (BIO ST-100), ship name, sampling point, date sampled, and lubricant service time.

The attention is:

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We are pleased to supply the potable water content meter if requested.

5. Disposal

BIO ST-100 should be disposed as same as conventional system oil.

Refer the SDS (Safety Data Sheet).

6. Storage

Keep container tightly closed and store in a well-ventilated place. Refer the SDS (Safety Data Sheet).

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