

# Klüberbio RM 2-100, 2-150

Biodegradable, non-toxic stern tube oils



## Your benefits at a glance

- **Comply with the requirements for Environmentally Acceptable Lubricants as defined in Appendix A of the EPA 2013 VGP (Vessel General Permit)**
- **Biodegradable and not toxic to marine organisms reducing environmental impact in the event of leakage**
- **FKM elastomers available from leading propeller shaft seal manufacturers are compatible and approved for use with Klüberbio RM 2 oils to prevent leakage and contamination**

## Your requirements - our solution

Klüberbio RM 2 oils are readily biodegradable oils for stern tubes based on synthetic ester oil showing good ageing and oxidation stability.

Their biodegradability acc. to OECD 301 F is  $\geq 60\%$  after 28 days. The oils are rated as non-toxic according to the tests OECD 201 (EC50), OECD 202 (EC50) and OECD 203 (LC50). In all three tests, EC50/LC50 is  $> 1,000$  mg/l.

As the lubricants are readily biodegradable and contain carefully selected raw materials, oil loss or leakage are less dangerous to the environment.

Klüberbio RM 2 oils contain  $> 90\%$  of renewable raw materials and bear the European Ecolabel.



The EU Ecolabel is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their life-cycle: from raw material extraction, to production, distribution and disposal.

Attaining EU Ecolabel certification provides ship owners and/or operators with independent assurance that the product achieves the U.S. EPA's requirements for classification as an Environmentally Acceptable Lubricant (EAL). Therefore, these high-performance lubricants meet the biodegradability, minimally toxic, and non-bioaccumulating standards set in Appendix A of the U.S. EPA's VGP.

## Application

Klüberbio RM 2 oils were developed for the lubrication of propeller bushes made of white metal and propeller shaft seals.

Klüberbio RM 2 oils are tested and approved by leading propeller shaft seal manufacturers like Blohm + Voss Industries GmbH, Cedervall & Söner AB, IHC Sealing Solutions, James Walker & Co Ltd., Wartsilä Japan Ltd. and KEMEL Company.

Please contact Klüber Lubrication or the seal manufacturer for technical consultation on your specific seal-lubricant combination.

## Application notes

In general, Klüberbio RM 2 oils are miscible with mineral oil based stern tube lubricants. However, a miscibility test should be performed in order to totally rule out the possibility of an incompatibility between different additives. Prior to changeover, we recommend flushing the stern tube with the Klüberbio RM 2 oil.

Klüberbio RM 2 oils need to be approved by the OEMs of the equipment. In case the oil has not yet been approved or the equipment's specification has been changed - e.g. type, design or material of the sealing - we recommend consulting the OEM prior to the oil change.

Owing to the many different elastomer compositions of seals we recommend - prior to series application - checking the compatibility and other influencing factors that are relevant for the application with the component under conditions similar to practice.

## Material safety data sheets

Material safety data sheets can be requested via our website [www.klueber.com](http://www.klueber.com). You may also obtain them through your contact person at Klüber Lubrication.



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Biodegradable, non-toxic stern tube oils

Pack sizes	Klüberbio RM 2-100	Klüberbio RM 2-150
Canister 20 l	+	+
Drum 200 l	+	+

Product data	Klüberbio RM 2-100	Klüberbio RM 2-150
Article number	009031	009025
EU Ecolabel registration number	DE/027/110	DE/027/111
Lower service temperature	-10 °C / 14 °F	-10 °C / 14 °F
Upper service temperature	100 °C / 212 °F	100 °C / 212 °F
Density, DIN 51757, 20 °C	approx. 0.94 g/cm <sup>3</sup>	approx. 0.92 g/cm <sup>3</sup>
Flash point, DIN EN ISO 2592, Cleveland, open-cup apparatus	>= 230 °C	>= 250 °C
Biodegradability according to OECD 301 F, (within 28 days)	>= 60 %	>= 60 %
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 40 °C	approx. 100 mm <sup>2</sup> /s	approx. 150 mm <sup>2</sup> /s
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 100 °C	approx. 14 mm <sup>2</sup> /s	approx. 18 mm <sup>2</sup> /s
ISO viscosity grade, DIN ISO 3448	100	150
Viscosity index, DIN ISO 2909	approx. 137	approx. 135
Anticorrosive properties on steel, DIN ISO 7120, method A, steel, 24 h/60 °C	no rust	no rust
Copper corrosion, DIN EN ISO 2160, 24 h/100 °C	1 - 100 corrosion degree	1 - 100 corrosion degree
Pour point, DIN ISO 3016	<= -30 °C	<= -30 °C
Minimum shelf life from the date of manufacture - in a dry, frost-free place and in the unopened original container, approx.	36 months	36 months

## Klüber Lubrication – your global specialist

Innovative tribological solutions are our passion. Through personal contact and consultation, we help our customers to be successful worldwide, in all industries and markets. With our ambitious technical concepts and experienced, competent staff we have been fulfilling increasingly demanding requirements by manufacturing efficient high-performance lubricants for more than 80 years.

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