



## Klüberbio EG 2-68, 2-100, 2-150

High-performance, readily biodegradable, non-toxic gear 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)**
- **Readily biodegradable and not toxic to marine organisms reducing environmental impact in the event of leakage**
- **Klüberbio EG 2 oils have a high scuffing resistance, protecting gear teeth reliably against fretting damage even at high peak loads**
- **Standard NBR and FKM elastomers of the leading propeller shaft seal manufacturers are resistant to and approved for use with Klüberbio EG 2 oils, preventing leakages and impurities**

### Your requirements - our solution

Klüberbio EG 2 oils are a readily biodegradable gear oils based on synthetic ester oil.

Their biodegradability acc. to OECD 301 F is  $\geq 60\%$  after 28 days. Klüberbio EG 2 oils contain  $>90\%$  of renewable raw materials and comply with 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 (Vessel General Permit).

Klüberbio EG 2 oils have a high scuffing resistance, protecting gear teeth reliably against fretting damage even at high peak loads. The oils successfully passed the standard FAG FE 8 test for gear oils, proving their good wear protection for rolling bearings.

### Application

Klüberbio EG 2 oils were developed for the lubrication of ships' gearboxes, particularly for thrusters and rudder propellers. They comply with the oil specifications of leading thruster manufacturers.

Klüberbio EG 2-150 and Klüberbio 2-150 can be used in gears with wet-running multiple disc clutches made by Ortlinghaus-Werke GmbH after confirmation by the thruster OEM.

Klüberbio EG 2 oils are tested and approved by propeller shaft seal manufacturers like SKF Blohm + Voss Industries GmbH, Cedervall & Söner AB, Freudenberg Simmerringe GmbH & Co. KG, IHC Sealing Solutions, James Walker & Co Ltd., Wartsilä Japan Ltd. Please contact Klüber Lubrication or the seal manufacturer for technical consultation on your specific seal-lubricant combination.

### Application notes

In general, our biodegradable high-performance gear oils are miscible with mineral oils and synthetic hydrocarbons. 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 cleaning the lube points or flushing the gear with the Klüberbio EG 2 oil to be used.

The Klüberbio EG 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 (e.g. maximum admissible water content in the oil) with the component under conditions similar to practice.

### Material safety data sheets

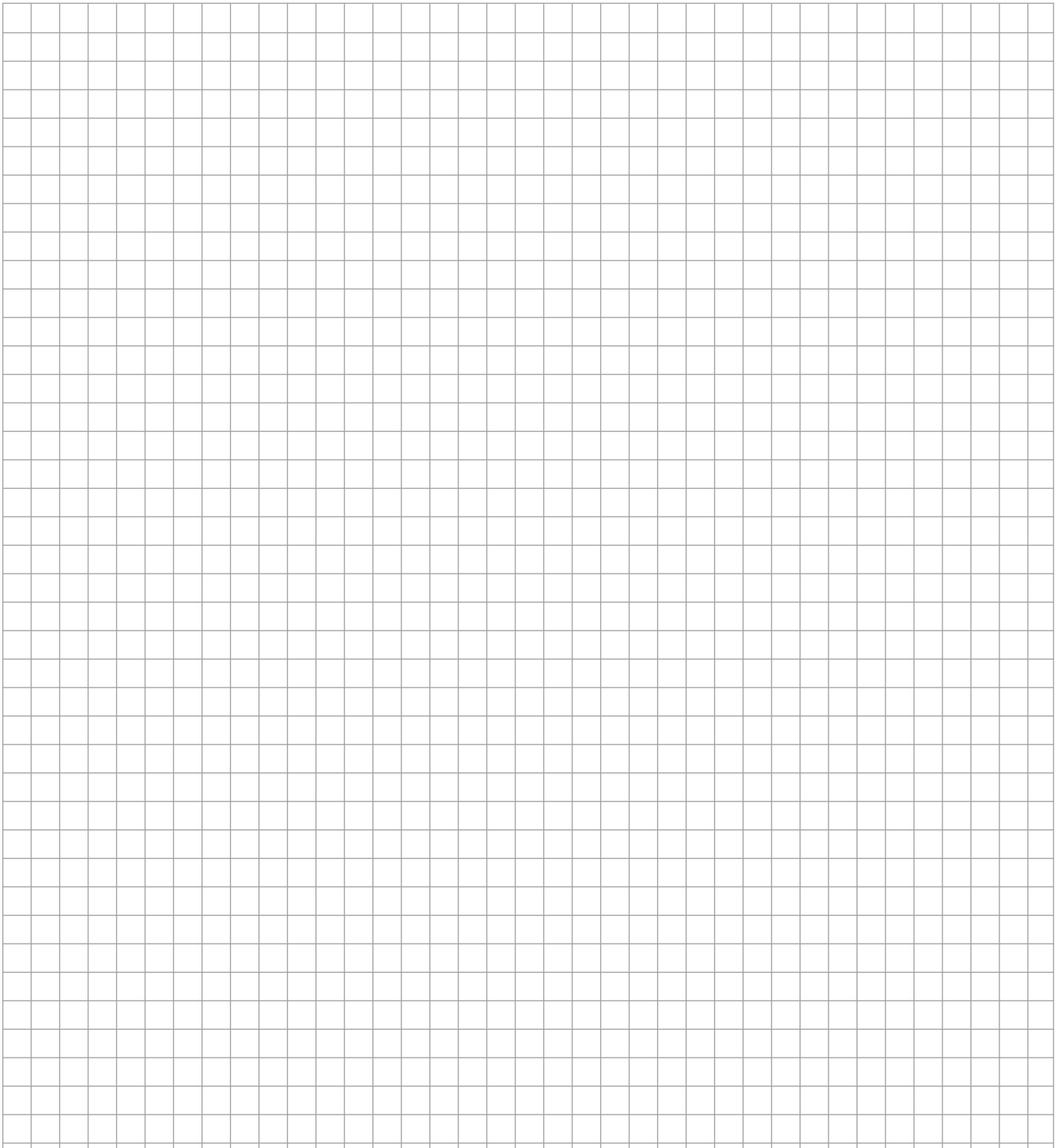
Material safety data sheets can be requested via our website [www.klueber.com](http://www.klueber.com). You may also obtain them through your contact person at Klüber Lubrication.

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Pack sizes	Klüberbio EG 2-68	Klüberbio EG 2-100	Klüberbio EG 2-150
Canister 20 l	+	+	+
Drum 200 l	+	+	+

Product data	Klüberbio EG 2-68	Klüberbio EG 2-100	Klüberbio EG 2-150
Article number	009043	009039	009030
Classification acc. to CLP -DIN 51517-3	corresponds to	corresponds to	corresponds to
Marking acc. to DIN 51502	CLP E 68	CLP E 100	CLP E 150
EU Ecolabel registration number	DE/027/133	DE/027/098	DE/027/099
Lower service temperature	-25 °C / -13 °F	-25 °C / -13 °F	-25 °C / -13 °F
Upper service temperature	100 °C / 212 °F	100 °C / 212 °F	100 °C / 212 °F
Density, based on DIN 51757) at 15 °C	approx. 909 kg/m <sup>3</sup>	approx. 919 kg/m <sup>3</sup>	approx. 927 kg/m <sup>3</sup>
Foam test, ASTM-D 892, ISO 6247, sequence I/24 °C	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
Foam test, ASTM-D 892, ISO 6247, sequence II/ 93.5 °C	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
Foam test, ASTM D 892, ISO 6247, sequence III/24°C	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
Flash point, DIN EN ISO 2592, Cleveland, open-cup apparatus	>= 260 °C	>= 280 °C	>= 280 °C
Biodegradability according to OECD 301 F, (within 28 days)	>= 60 %	>= 60 %	>= 60 %
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 40 °C	approx. 68 mm <sup>2</sup> /s	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. 11 mm <sup>2</sup> /s	approx. 14 mm <sup>2</sup> /s	approx. 18 mm <sup>2</sup> /s
ISO viscosity grade, DIN ISO 3448	68	100	150
Viscosity index, DIN ISO 2909	approx. 140	approx. 140	approx. 135
Anticorrosive properties on steel, DIN ISO 7120, method A, steel, 24 h/60 °C	no rust corrosion degree	no rust corrosion degree	no rust corrosion degree
Copper corrosion, DIN EN ISO 2160, 24 h/100°C	1 - 100 corrosion degree	1 - 100 corrosion degree	1 - 100 corrosion degree
Pour point, DIN ISO 3016	<= -25 °C	<= -25 °C	<= -25 °C
FZG scuffing test, DIN ISO 14635-1, A/8.3/90, scuffing load stage	> 13	> 13	> 13
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	36 months





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### 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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