

Klüberbio LM 2-22, 2-32, 2-46

Eco-friendly hydraulic fluids



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).
- Fully biodegradable, non-toxic products reducing environmental impact in the event of leakage
- Facilitate start-up of hydraulic systems at very low temperatures due to very good viscosity-temperature behaviour and low pour point; can therefore be used in hydraulic systems with high temperature fluctuations.

Your requirements - our solution

Klüberbio LM 2 oils are fully biodegradable, eco-friendly hydraulic fluids based on synthetic ester oils.

The product series complies also with the U.S. Environmental Protection Agency's requirements for classification as an Environmentally Acceptable Lubricant (EAL) in terms of biodegradability, toxicity and bioaccumulation standards according to Appendix A of the EPA's Vessel General Permit (VGP). In addition, Klüberbio LM 2 oils meet or even exceed the minimum requirements of HEES oils according to DIN ISO 15380.

Application

Klüberbio LM 2 oils are intended for applications in mobile hydraulic systems, e.g. in the marine and offshore industries as well as for use in the building and water engineering sectors. They are also preferred in stationary hydraulic equipment operating in ecologically sensitive environments, e.g. in hydroelectric power plants and waterway locks

Application notes

Klüberbio LM 2 oils meet ISO 15380 requirements in terms of compatibility with standard reference elastomers. Nevertheless, due to the large variety of materials available, compatibility with seals and paint coatings should be verified. In general, Klüberbio LM 2 oils are miscible with mineral oil based hydraulic oils. However, a miscibility test should be performed in order to rule out the possibility of an incompatibility between different additives. Prior to changeover, we recommend flushing the hydraulic system with the Klüberbio LM 2 oil.

Material safety data sheets

Material safety data sheets can be requested via our website www.klueber.com. You may also obtain them through your contact person at Klüber Lubrication.

Pack sizes	Klüberbio LM 2-22	Klüberbio LM 2-32	Klüberbio LM 2-46
Drum 200 l	+	+	+

Characteristics	Klüberbio LM 2-22	Klüberbio LM 2-32	Klüberbio LM 2-46
Article number	009083	009084	009085
Composition, type of oil	ester oil	ester oil	ester oil
Appearance	clear	clear	clear
Colour space	green	green	green

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Characteristics	Klüberbio LM 2-22	Klüberbio LM 2-32	Klüberbio LM 2-46
Service temperature, lower limit	-45 °C	-45 °C	-45 °C
Service temperature, upper limit	110 °C	110 °C	110 °C
Classification HEES, DIN ISO 15380	HEES 22	HEES 32	HEES 46
Vessel General Permit	passed	passed	passed
Biodegradability, OECD 301 F, 28, within days	≥ 60 %	≥ 60 %	≥ 60 %
Density, DIN 51757, 20°C	approx. 0.908 g/cm³	approx. 0.915 g/cm³	approx. 0.918 g/cm³
Flash point, DIN EN ISO 2592, Cleveland open cup	≥ 180 °C	≥ 220 °C	≥ 200 °C
Foam test, ISO 6247 / ASTM D892, 24°C, sequence I	≤ 150/0 ml	≤ 150/0 ml	≤ 150/0 ml
Foam test, ISO 6247 / ASTM D892, 24°C, sequence III	≤ 150/0 ml	≤ 150/0 ml	≤ 150/0 ml
Foam test, ISO 6247 / ASTM D892, 93.5°C, sequence II	≤ 80/0 ml	≤ 80/0 ml	≤ 80/0 ml
Kinematic viscosity, DIN EN ISO 3104 / DIN 51562-1 / ASTM D445 / ASTM D7042, 100°C	approx. 5 mm²/s	approx. 6.3 mm²/s	approx. 7.8 mm²/s
Kinematic viscosity, DIN EN ISO 3104 / DIN 51562-1 / ASTM D445 / ASTM D7042, 40°C	approx. 22 mm²/s	approx. 32 mm²/s	approx. 46 mm²/s
Viscosity index, DIN ISO 2909	≥ 130	≥ 135	≥ 135
Copper corrosion, DIN EN ISO 2160, 3 h, 100°C	1 - 100 - 3 corrosion degree	1 - 100 - 3 corrosion degree	1 - 100 - 3 corrosion degree
Steel corrosion, DIN ISO 7120 / ASTM D665, method A, 24 h, 60°C	rust-free	rust-free	rust-free
Pour point, DIN ISO 3016	≤ -50 °C	≤ -50 °C	≤ -50 °C
Ageing resistance, DIN EN ISO 4263-4, TOST test, period until acid number increases by 2.0 mg KOH/g	≥ 2000 h	≥ 2000 h	≥ 2000 h
FZG scuffing test, DIN ISO 14635-1, A / 8.3 / 90, failure load stage		≥ 12	≥ 12
Minimum shelf life from the date of manufacture - in a dry, frost-free place and in the unopened original container, approx.	48 months	48 months	48 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 90 years.

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