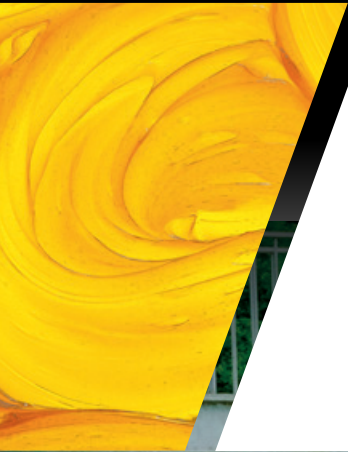


your global specialist

Make hydropower more efficient.

With Klüberoil EE 1-46, the new turbine oil
for hydropower plants



High system and energy efficiency for uninterrupted operation



Energy-efficient high-performance lubricating oil

Cost pressures, the fulfilment of sustainability targets, renaturalisation measures and market influences are constantly confronting hydropower plant operators with new challenges.

Together with a leading European manufacturer of electric systems for hydropower plants, Klüber Lubrication has developed a solution that enables hydropower plants to increase their efficiency without any design modifications and so improve the sustainability and profitability of the plant.

Efficient within the DIN 51515-2 standard

The turbine oil is characterized by a particularly low foaming tendency and high oxidation stability. Efficiency optimisation is achieved by reducing losses in the plain bearing.

Klüberoil EE 1-46 complies with the requirements for turbine oils laid down in DIN 51515-2.

	Requirements DIN 51515-2	Klüberoil EE 1-46
Kinematic viscosity at 40 °C	41.4 – 50.6 mm ² /s	approx. 46 mm ² /s
at 100 °C	–	approx. 7 mm ² /s
Viscosity index, DIN ISO 2909	≥ 90	≥ 100
ISO viscosity grade, ISO VG	46	46
Flash point, DIN EN ISO 2592	≥ 185 °C	≥ 215 °C
Pourpoint, DIN ISO 3016	≤ –6 °C	≤ –15 °C
Foam test, ASTM D 892, ISO 6247, sequence I/24 °C	≤ 450/0	≤ 50/0 ml
sequence II/93,5 °C	≤ 50/0	≤ 50/0 ml
sequence III/24 °C	≤ 450/0	≤ 50/0 ml
Anticorrosive properties on steel, DIN ISO 7120, method A, 24 h/60 °C	pass	No rust corrosion degree
Copper corrosion, 3h/125 °C	2	1 – 100
Air release property, 50 °C	≤ 5 min	≤ 3 min
Water content (mg/kg)	≤ 150	≤ 150
Ageing characteristics RPVOT	≥ 750	≥ 750

Perfect compatibility

Klüberoil EE 1-46 is a semi-synthetic plain bearing oil which is compatible with oils based on mineral oil, synthetic hydrocarbon and ester. A change to Klüberoil EE 1-46 is therefore easily possible.

The additives used were selected to ensure compatibility with plain bearing materials.

Product details Klüberoil EE 1-46	
Chemical composition	Mineral oil Polyalphaolefin oil
Lower service temperature	–15 °C
Upper service temperature	80 °C
Colour space	yellow
Density at 20 °C	approx. 0,86 g/cm ³

A sustainable solution

With an efficiency of more than 90 percent, hydropower is the most efficient technology for generating energy. With Klüberoil EE 1-46, operators and manufacturers of hydropower plants can still further increase this efficiency without having to reconstruct their plants. This contributes to achieving sustainability goals such as an improved energy balance.

Your benefits at a glance

- Meets DIN 51515-2 requirements for turbine oils
- High system and energy efficiency over a wide temperature range due to lower losses in plain bearings
- Process optimisation
 - Uninterrupted operation due to low foaming tendency
 - Good compatibility with plain bearing materials due to a carefully designed additive system

Global presence

We are where you are. Our aim is to offer you high-quality speciality lubricants and services around the globe along with the outstanding consulting competence for which Klüber Lubrication is known. We meet this aim through our worldwide network of development, production and sales companies, competent dealers, and last but not least, through our highly specialised experts who are ready to respond to your individual requirements.



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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 85 years.