

Klübersynth GEM 2 oils

Synthetic high-performance gear oils



Benefits for your application

- **Synthetic high-performance gear oils**
 - **High scuffing load capacity**
 - **Very good wear protection**
 - **High micropitting resistance**
 - **Excellent rolling bearing test results**
 - **Rapidly biodegradable**
 - **Good viscosity-temperature behaviour**
 - **Wide operating temperature range**
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Description

The Klübersynth GEM 2 oils are high-performance gear oils with a synthetic ester oil as base oil. They achieve a scuffing load capacity ≥ 14 in the FZG test acc. to DIN 51 354, pt. 2 (A/16,6/90), which is better than the CLP requirements. A micropitting test was performed acc. to FVA No. 54, which yielded a micropitting resistance > 10 .

The most comprehensive tests for rolling bearing lubrication were made with Klübersynth GEM 2-320. Tests with the rolling bearing lubricant tester FE 8 resulted in a rolling element wear $mW_{50} < 2$ mg and a cage wear $mK_{50} < 20$ mg (test acc. to DIN 51819-03-D-7,5/80-80, two test runs, no failure).

The oil also passed the SKF roller test (120 °C / 8 weeks). Klübersynth GEM 2 oils have a good viscosity-temperature behaviour and a wide operating temperature range. They offer good wear and corrosion protection as well as ageing and oxidation stability. Biodegradability as shown in the CEC-L-33-A-93 test is $> 70\%$ after 21 days.

Application

Klübersynth GEM 2 oils may be used for the lubrication of spur, bevel and worm gears as well as the associated machine elements such as sliding and rolling bearings. Furthermore, they are particularly suited for applications where leaking or dripping lubricant might pose a hazard to the environment.

Application notes

Klübersynth GEM 2 oils can be applied by immersion, immersion circulation or injection. Drip-feed lubrication and application by brush or oil feeder is also possible, as well as use in automatic lubricating systems.

Basically, Klübersynth GEM 2 oils are miscible with conventional mineral oils and polyalphaolefin oils. It should be noted, however, that the oils may no longer be rapidly biodegradable when mixed with mineral or polyalphaolefin oil. For this reason careful cleaning of the gear or the oil circulation system is advisable before switching to Klübersynth GEM 2 oils.

Ester-based synthetic lubricants may affect the functional characteristics of rubber seals, depending on the temperature and time of exposure. For permanent oil sump temperatures of max. 80 °C, NBR seals (acrylonitrile-butadiene rubber) can be used. For higher temperatures, FKM (fluoropolymers) are suggested. It should be noted that elastomers from one or several manufacturers can behave differently. A compatibility test should always be carried out with the elastomers which are actually used.

When using Klübersynth GEM 2 oils, we recommend two-component paints (catalysed lacquers) for the coating. We further recommend testing the suitability of design materials and paints in contact with the selected lubricants, especially for series application.

Viscosity selection for rolling bearings and gears

To select the correct oil viscosity, observe the bearing manufacturer's instructions or refer to worksheet 3 from the Society of Tribology (GfT). For determining the correct viscosity for gears, the manufacturer's instructions take priority in all cases. Only in cases where there are no gear manufacturer's instructions, the viscosity can be selected in accordance with the enclosed worksheet "Klübersynth GEM 2 oils – selection of oil viscosity for gears".

Service temperature range

Service temperatures are guide values which depend on the lubricant's composition, the intended use and the application method. Lubricants change their consistency, apparent dynamic

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viscosity or viscosity depending on the mechano-dynamical loads, time, pressure and temperature. These changes in product characteristics may affect the function of a component.

For immersion lubrication of gears and chains

Klübersynth GEM 2-220/320 approx. -30 °C to approx. 130 °C.

When using automatic systems, observe the manufacturer's instructions regarding the maximum viscosity that can be pumped.

Minimum shelf life

The minimum shelf life is approx. 36 months if the product is stored in its unopened original container in a dry, frost-free place.

Material safety data sheets

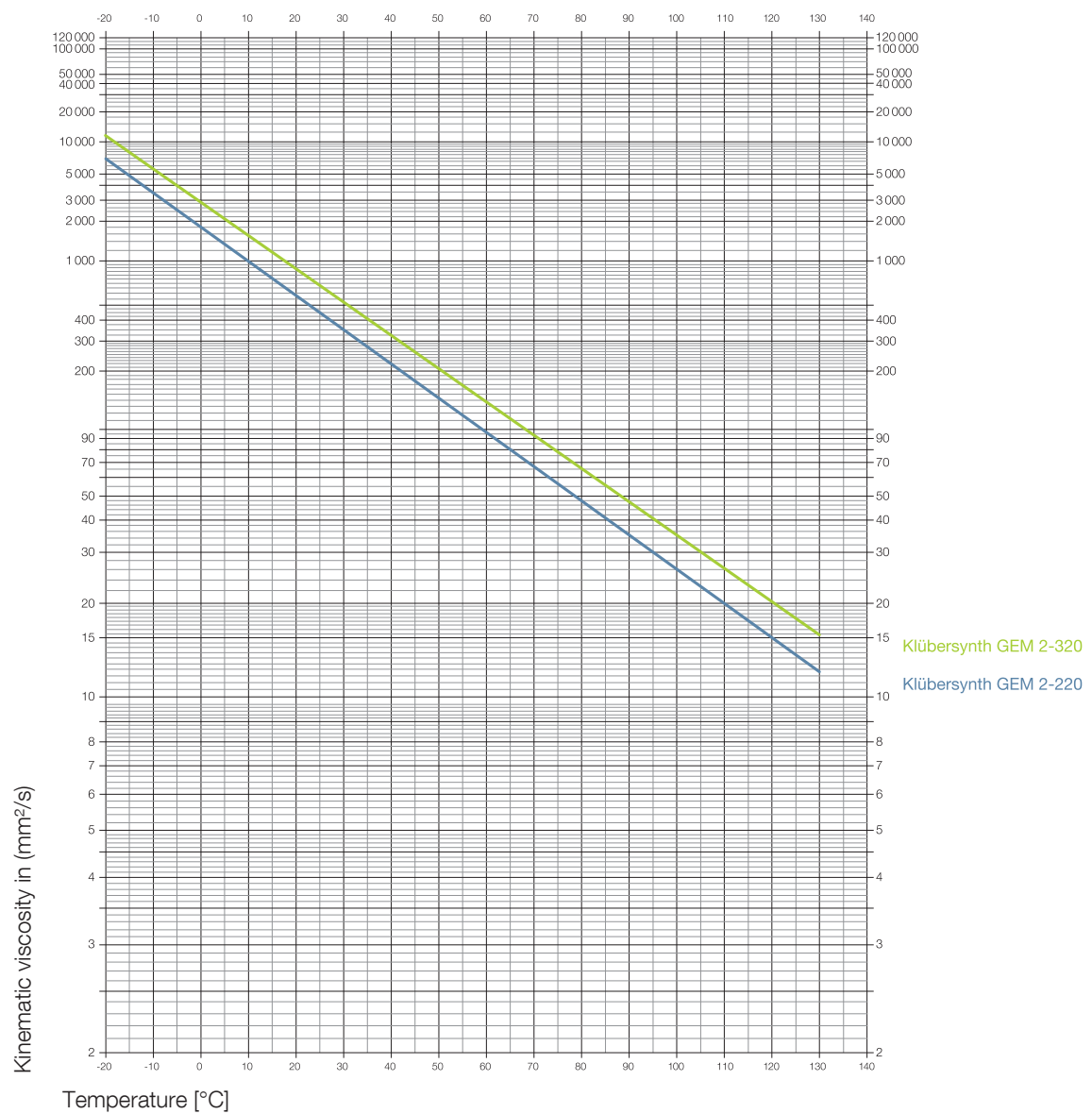
Material safety data sheets can be downloaded or requested via our website www.klueber.com. You may also obtain them through your contact person at Klüber Lubrication.

Pack sizes	Klübersynth GEM 2-220	Klübersynth GEM 2-320
Canister 20 l	+	+
Drum 200 l	+	+

Product data	Klübersynth GEM 2-220	Klübersynth GEM 2-320
Article number	012110	012111
ISO viscosity grade, DIN ISO 3448	220	320
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 100 °C	approx. 25 mm ² /s	approx. 35 mm ² /s
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 40 °C	approx. 220 mm ² /s	approx. 320 mm ² /s
Viscosity index, DIN ISO 2909	>= 150	>= 150
Density, DIN 51757, 20 °C	approx. 0.95 g/cm ³	approx. 0.95 g/cm ³
Flash point, DIN EN ISO 2592, Cleveland, open-cup apparatus	>= 200 °C	>= 200 °C
Anticorrosive properties on steel, DIN ISO 7120, method A, steel, 24 h/60 °C	no rust	no rust
Pour point, DIN ISO 3016	<= -30 °C	<= -30 °C



Viscosity-temperature diagram





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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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The data in this document is based on our general experience and knowledge at the time of publication and is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary field tests with the product selected for a specific application. All data are guide values which depend on the lubricant's composition, the intended use and the application method. The technical values of lubricants change depending on the mechanical, dynamical, chemical and thermal loads, time and pressure. These changes may affect the function of a component. We recommend contacting us to discuss your specific application. If possible we will be pleased to provide a sample for testing on request. Klüber products are continually improved. Therefore, Klüber Lubrication reserves the right to change all the technical data in this document at any time without notice.

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