

Klüberpaste HEL 46-450

High-temperature screw paste



Benefits for your application

- **Reliable screw connection ensured by constant and sufficient preload force**
- **Easy release also after long time at high temperature**
- **Approved in acc. with VW-TL 52112 and Ford tox. No. 138624**

Description

Klüberpaste HEL 46-450 is a black hot screw paste for high-alloy steels. It contains fully synthetic polyalkylene glycol and ester base oils and a combination of inorganic solid lubricants.

Klüberpaste HEL 46-450 is suitable for a temperature range between -40 °C and 1000 °C. In the normal temperature range (i.e. below 200 °C) it shows good anticorrosion behaviour and good water resistance. Above 200 °C it acts as a dry lubricant.

Application

Screw paste for conventional and high-alloy steels (Cr-Ni steels) up to 1000 °C.

Lubricating and assembly paste for connections in hot air ducts (e.g. automotive exhaust systems). For connecting elements in turbochargers and compressors.

**High-temperature screw test

The test was performed acc. to VW-TL 52112

- Bolt: DIN 931-2
- Material: 1.4989
- Nut, material: 1.4923

The nuts were preloaded with 70 Nm and stored at 750 °C for 100 hours. After this period a low release torque was measured.

Application notes

It is important to clean and degrease the contact surfaces thoroughly before applying Klüberpaste HEL 46-450.

A thin layer of paste is then applied by brush, leather cloth or plastic sponge.

Klüberpaste HEL 46-450 spreads easily over the entire surface and thus prevents excess lubrication.

Close container immediately after use in order to prevent contamination.

The friction values indicated on page 2 in the Section Product Data were determined with two different materials. Other materials/surfaces have to be checked accordingly.

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	Klüberpaste HEL 46-450
Tube 70 g	+
Cartridge 600 g	+
Can 750 g	+
Bucket 30 kg	+

Product data	Klüberpaste HEL 46-450
Article number	089032
Lower service temperature	-40 °C / -40 °F
Upper service temperature	1000 °C / 1832 °F

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Product data	Klüberpaste HEL 46-450
Colour space	black
Density at 20 °C	approx. 1.43 g/cm ³
Worked penetration, DIN ISO 2137, 25 °C, lower limit value	325 x 0.1 mm
Worked penetration, DIN ISO 2137, 25 °C, upper limit value	340 x 0.1 mm
Corrosion inhibiting properties of lubricating greases, DIN 51802, (SKF-EMCOR), test duration: 1 week, distilled water	<= 1 corrosion degree
Flow pressure of lubricating greases, DIN 51805, test temperature: -35 °C	<= 600 mbar
Drop point, DIN ISO 2176, IP 396	>= 250 °C
Four-ball tester, welding load, DIN 51350 pt. 04	>= 5 000 N
High-temperature screw test according to VW-TL 52112, breakaway torque*	<= 120 Nm
Friction coefficient screw test, measured with hexagon bolts M10x30-8.8, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, nut M10-8, plain and degreased, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 50 Nm, averaged bearing surface friction coefficient (initial tightening)	0.11
Friction coefficient screw test, measured with hexagon bolts M10x30-8.8, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, nut M10-8, plain and degreased, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 50 Nm, standard deviation (S) of averaged bearing surface friction coefficient (initial tightening)	0.015
Friction coefficients screw test, screw M 10x30-8.8, DIN EN ISO 4017, black and nut M 10-8, DIN EN ISO 4032, polished, averaged thread friction coefficient (first-time tightening)	0.09
Friction coefficient screw test, Measured with hexagon bolts M10x30-8.8, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, nut M10-8, plain and degreased, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 50 Nm, standard deviation (S) of averaged thread friction coefficient (initial tightening)	0.01
Friction coefficient screw test, measured with hexagon bolts M10x50-A2-70, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, material of the nut A2, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 40 Nm, averaged bearing surface friction coefficient (initial tightening)	0.09
Friction coefficient screw test, measured with hexagon bolts M10x50-A2-70, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, material of the nut A2, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 40 Nm, standard deviation (S) of averaged bearing surface friction coefficient (initial tightening)	0.006
Friction coefficient screw test, measured with hexagon bolts M10x50-A2-70, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, material of the nut A2, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 40 Nm, averaged thread friction coefficient (initial tightening)	0.11
Friction coefficient screw test, measured with hexagon bolts M10x50-A2-70, DIN EN ISO 4017, tightening speed n = 5 rpm, number of screws = 20, material of the nut A2, face material 42CrMo4 with roughness Ra 1.6, tightening torque MA = 40 Nm, standard deviation (S) of averaged thread friction coefficient (initial tightening)	0.03
Water resistance, DIN 51807 pt. 01, 3 h/90 °C, rating	<= 1 - 90
Minimum shelf life from the date of manufacture - in a dry, frost-free place and in the unopened original container, approx.	24 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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