

Klüber TP 46-111

Water-miscible, thermo-setting PTFE-based bonded coating for low to medium loads



Benefits for your application

- **Clean and dry surface with lubricating effect**
 - lifetime resistance to wear when subjected to low to medium loads, lubricant firmly incorporated
 - no contamination by fluid lubricant
 - no "sticking" during automated assembly
- **Lower costs and less space needed for processing**
 - Klüber TP 46-111 is water-miscible, no VOC filter systems needed
 - cost-efficient mass coating and coating of small parts possible owing to the thermosetting system
- **Higher component performance**
 - low friction coefficient
 - prevents stick-slip
 - delayed tribocorrosion
 - excellent corrosion protection on phosphated substrate
 - good chemical resistance

Description

Klüber TP 46-111 is a thermosetting, black bonded coating based on polytetrafluoroethylene (PTFE) and an organic, water-dilutable binder.

Klüber TP 46-111 is a ready-to-use fluid containing water as a solvent.

Once applied, this bonded coating dries rapidly, once hardened it ensures good resistance to wear and chemicals, a low friction coefficient, no stick-slip at low speeds and excellent corrosion protection on phosphated surfaces. Its resistance to oils and greases is good.

Adhesion to metals and various plastics is good.

Application

Klüber TP 46-111 reduces friction and wear in metal/metal or metal/plastic sliding contacts.

Klüber TP 46-111 is also suitable for the cost-effective coating of small mass-produced parts such as straight pins, studs, safety belt components and similarly shaped items. It can also be applied in components used in electrical engineering, precision engineering and textile machinery such as slideways, springs, etc. which are subject to low or medium mechanical loads, and where contamination by oil or grease should be avoided.

Owing to its very good resistance to oil and chemicals, Klüber TP 46-111 can be used in the presence of aggressive ambient media.

Application notes

Stir or shake well before use. The product should be filtered after stirring, e.g. using a nylon filter with a pore size of 125-150 µm.

Klüber TP 46-111 can be applied by immersion, dip/spin coating, spraying or by brush. Information on other types of application are provided upon request.

The surfaces to be coated must be cleaned and degreased and be completely free from oil, grease, water, corrosion and scale.

Roughening of the surface by means of sand blasting is recommended to increase adhesion. Chemical pretreatment such as phosphating (zinc or manganese) may also lead to very good adhesion, which is especially important in cases where increased anticorrosive properties are called for.

When applying Klüber TP 46-111 by spraying, use a spray gun.

Other application conditions

Feed pressure: 2 bar

Spraying distance: approx. 20 cm

Spray nozzle diameter: 0.8 mm

Make sure that only compressed air is used which is free from oil and water. When spraying by hand, it is recommended to apply the product in a zig-zag pattern. When spraying systems are used, an agitator should be installed in the container to prevent the solid particles from settling. When applying the

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product by immersion, use plastic or stainless steel containers. The recommended film thickness for tribological applications is between 7 and 20 µm.

While Klüber TP 46-111 is supplied as a ready-to-use product, its viscosity may have to be adjusted to suit the particular component or application.

For this purpose as well as for cleaning tools, deionized water or tap water may be used.

Klüber TP 46-111 is ready to handle after approx. 30 minutes at approx. 25°C. The hardening time is 15 minutes at a component temperature of 180°C.

Protect product from frost and direct heat; do not store above 30 °C .

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	Klüber TP 46-111
Can 1 l	+
Bucket 15 l	+

Product data	Klüber TP 46-111
Article number	099173
Lower service temperature	-40 °C / -40 °F
Upper service temperature	180 °C / 356 °F
Colour space	black
Density, DIN EN ISO 2811, at 20 °C	approx. 1.18 g/cm ³
Cross-cut adhesion (test plate), PA-063 based on DIN EN ISO 2409, value	0 Gt
Klüber pin-disc rig for testing the service life of bonded coatings, temperature: 25 °C, load: 20 N, speed: 10 m/min, sliding contact: point, sliding distance	approx. 1 152 m
Klüber pin-disc rig for testing the service life of bonded coatings, temperature: 25 °C, load: 20 N, speed: 10 m/min, sliding contact: point, friction coefficient (µ)	approx. 0.10
Friction coefficient, Tannert sliding indicator, room temperature, v _{max} = 0.243 mm/s, F = 300 N	approx. 0.06
Stick-slip, Tannert sliding indicator, room temperature, v _{max} = 0.243 mm/s, F = 300 N, evaluation	no stick slip
Media resistance of coatings, based on DIN EN ISO 2812-1, tested at room temperature, layer thickness approx. 15 µm, substrate steel, medium soda lye, result: film resistant, tested up to	400 h
Media resistance of coatings, DIN EN ISO 2812-1, tested at room temperature, layer thickness approx. 15 µm, material steel ST 1303, medium diester oil, result: film resistant, tested up to	500 h
Media resistance of coatings, based on DIN EN ISO 2812-1, tested at room temperature, layer thickness approx. 15 µm, material steel ST 1303, medium doped mineral oil, result: film resistant, tested up to	500 h
Media resistance of coatings, based on DIN EN ISO 2812-1, tested at room temperature, layer thickness approx. 15 µm, substrate steel, medium 0.1n hydrochloric acid, result: film resistant, tested up to	400 h

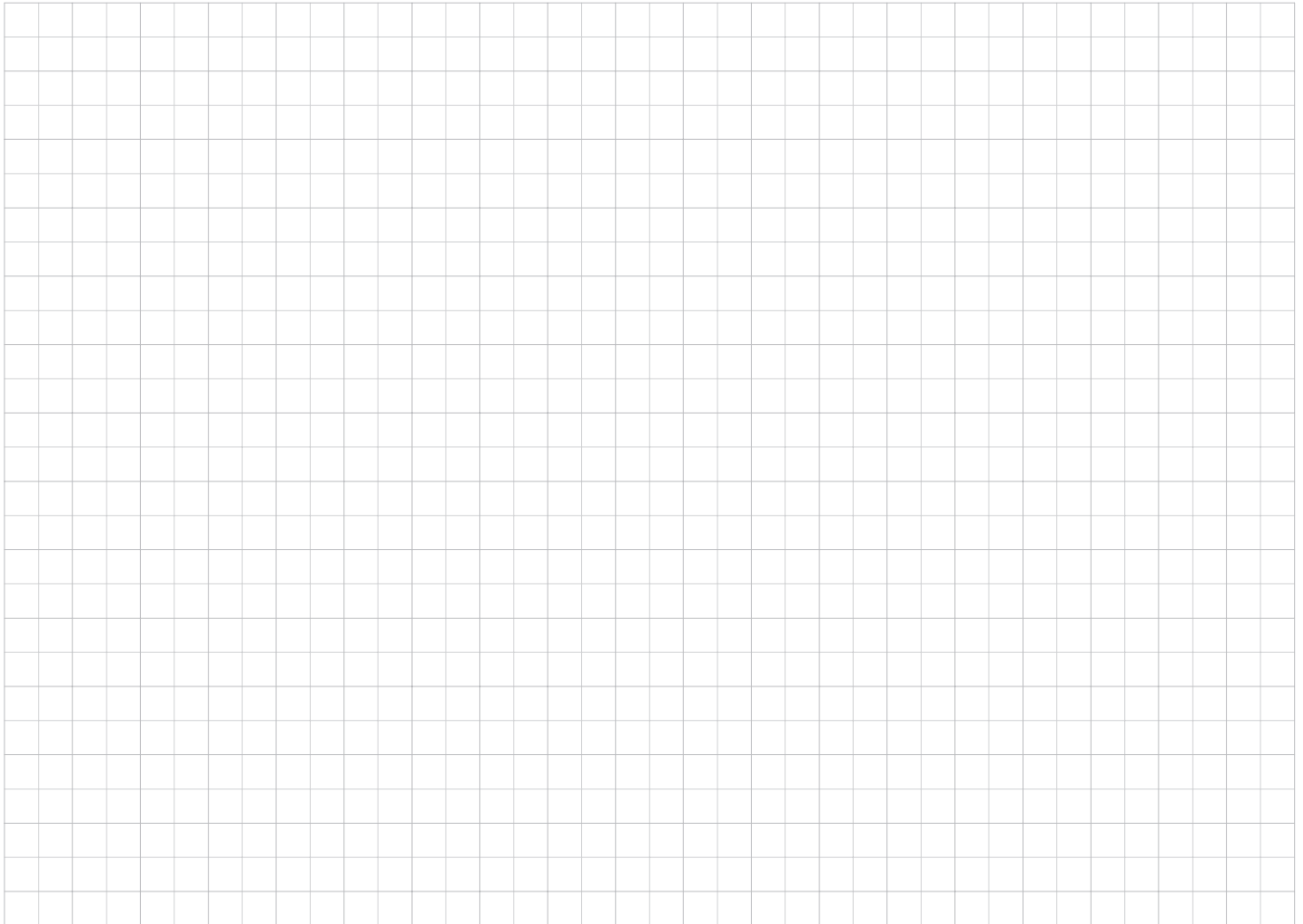


Product data	Klüber TP 46-111
Salt spray test, DIN EN ISO 9227, linked with DIN EN ISO 7253, 5% NaCl, temperature 35°C, material steel zinc-phosphatized, layer thickness 15 µm, corrosion after	> 400 h
Yield with a tribo-film thickness of 10 micrometer	approx. 31 m ² /l
Minimum shelf life from the date of manufacture - in a dry, frost-free place and in the unopened original container, approx.	12 months



Klüber top TP 46-111

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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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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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