

# Klüber<sup>®</sup> TG 05-371

## Thermosetting bonded coating



### Description:

Klüber<sup>®</sup> TG 05-371 is a thermosetting, grey-black bonded coating based on graphite and an organic binding agent. It is a fluid, ready-to-use product containing a mixture of solvents classified into the VbF All group in accordance with the German regulations on flammable substances.

Once applied and hardened, the coating forms a dry lubricant layer which has a very wide service temperature range and a low friction coefficient, ensures that there is no stick slip at low speeds, has a long service life and is very resistant to wear. In addition, this product has an excellent resistance to oil, and a good resistance to chemicals. It also provides good corrosion protection on phosphated surfaces.

### Application:

Klüber<sup>®</sup> TG 05-371 reduces friction and wear in metal/metal and metal/plastic sliding components.

Owing to its structure, Klüber<sup>®</sup> TG 05-371 is particularly suitable for applications in humid environments. It can also be used in context with oil lubrication, e.g. on pistons and other engine components, and in similar fields of application.

As a dry lubricant it is suitable for a wide range of components used in bearings, electrical engineering, precision engineering and in textile machines, where contamination by oil or grease should be avoided.

Klüber<sup>®</sup> TG 05-371 has also proven effective, especially in terms of corrosion protection, when exposed to high temperatures, extreme environmental conditions (impact of dust, dirt, etc.), and oscillating movements.

### Application notes:

Stir or shake well before use.

Klüber<sup>®</sup> TG 05-371 can be applied by spraying or screen printing, or by means of a brush. Other types of application (e.g. for bulk processes) are indicated on request.

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

Roughening of the surface by means of a chemical (e.g. phosphating) or mechanical (e.g. sand blasting) process is recommended to increase adhesion and extend the component's usable life. Zinc-phosphatizing improves corrosion protection.

When applying Klüber<sup>®</sup> TG 05-371 by spraying, use a spray gun.

### Other application conditions:

Feed pressure: 2 bar  
Spraying distance: approx. 20 cm  
Nozzle diameter: 0.8 mm

Ensure that only pressurized air is used which is free from oil and water.

In the case of 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.

The recommended film thickness for tribological loads is between 7 and 15 µm.

Klüber<sup>®</sup> TG 05-371 is delivered as a ready to use product. Nevertheless, the component or application method may require viscosity adjustment. To this effect, and to clean the spray gun, use the SOLUTIN V 6 diluting and cleaning agent.

### Klüber<sup>®</sup> TG 05-371

- Bonded graphite coating for metal components
- Wide service temperature range
- Efficient lubricity in humid environments
- Suitable in context with oil lubrication
- Long service life, good wear resistance
- Good resistance to chemicals and oil
- Low friction coefficient

Klüber<sup>®</sup> TG 05-371 is ready to handle after approx. 5 min at 100 °C. The ideal thermosetting process requires a temperature of 250 °C for 15 min or, alternatively, 180 °C for 60 min. The indicated temperatures are component temperatures.

### Minimum shelf life:

The minimum shelf life is approx. 60 months if the product is stored in the original closed container in a dry place.

### Pack sizes:

1 l can  
20 l drum

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## Thermosetting bonded coating

### Product data:

Colour	grey-black
Service temperature range* [°C]	– 40 to 300
Service life in continuous operation (pin/disk, 20 °C, v = 10 m/min, F = 10 N) sliding distance [m], approx.	260
Elasticity after bending test, tested with a coating thickness of 7 µm, DIN 53 152 (ISO 1519) 2 mm mandrel (steel DIN 1544), a) 20 °C, b) – 40 °C	a) + b) passed
Cross-cut adhesion test, DIN 53 151	cross-cut 0
Stick slip in acc. with Tannert, 20 °C, V <sub>max</sub> = 0.243 mm/s, F = 300 N	none
Ready to handle at ... [°C]** / after ... [min]	100 / 5
Burning-in temperature [°C]** / hardening time [min]	250/15 (or 180/60)
Resistance to wear (in acc. with Reichert), 20 °C, v = 1.8 m/s, F = 100 N, sliding distance [m], approx.	11
Friction coefficient in acc. with Tannert, 20 °C, V <sub>max</sub> = 0.243 mm/s, F = 300 N, approx.	0,06
Friction coefficient measured with pin/disk, 20 °C, v = 10 m/min, F = 10 N, approx.	0.14
Resistance to distilled water, tested with a coating thickness of 15 µm, DIN EN 3026, [h] a) St 1303, DIN 1623, b) hot-galvanized steel, c) aluminium (DIN EN 2091)	a), b), c) > 500
Anti-corrosion, tested with a coating thickness of 15 µm, DIN 50 021, ISO 3768, test sheet, [h] a) bright steel, b) zinc-phosphated steel, c) sandblasted steel	a) < 50, b) < 96, c) < 50
Resistance to chemicals, tested with a coating thickness of 15 µm, DIN 53 168 B, test sheet of steel St 37, [h] a) bright steel, b) zinc-phosphated steel 0.1 n hydrochloric acid 0.1 n caustic soda blended mineral oil diester oil	a), < 140, b) < 200 a), b) < 140 a), b) > 500 a), b) > 500
Yield at 15 µm coating thickness, [m <sup>2</sup> /l], approx.	20

\* 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 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.

\*\* The indicated temperature refers to the component temperature.

# Klüber<sup>®</sup> TG 05-371

## Safety Data Sheet

<div>1.1</div> <div><div>Product name: Klüber<sup>®</sup> TG 05-371</div><div>Code-No.: 099 151</div><div>27.06.2001</div></div>	<div>9.</div> <div><div>Physical and chemical properties</div><div>Form liquid</div><div>Colour greyblack</div><div>Odour amine-like</div><div>Boiling point &gt; 135 °C</div><div>Flash point approx. 45 °C, DIN ISO 1516</div><div>Flammability flammable</div><div>Ignition temperature approx. 270 °C, DIN 51 794</div><div>Autoflammability no data available</div><div>Lower explosion limit approx. 1.0 Vol. %</div><div>Upper explosion limit approx. 9.5 Vol. %</div><div>Vapour pressure-first approx. 8 mbar</div><div>Density approx. 1.07 g/cm<sup>3</sup>, 20 °C, DIN 51 757</div><div>Water solubility partly miscible</div><div>pH value no data available</div><div>Outdoor time approx. 95 s, DIN EN ISO 2431</div><div>Further information Run-out time (DIN-cup) determined with nozzle: 4 mm</div></div>															
<div>1.2</div> <div><div>Klüber Lubrication München KG</div><div>Geisenhausenerstraße 7</div><div>D-81379 München</div><div>Tel. ++49 - 89 78 76 - 0 telephone exchange</div><div>Fax: ++49 - 89 78 76 - 333</div><div>Emergency telephone no.: ++49 - 89 7876 - 0</div></div>																
<div>2.</div> <div><div>Composition / information on ingredients</div><div>Chemical characterization (preparation): Solid lubricants (graphite), organic binding agent, solvent (N-methylpyrrolidone, xylene)</div><div>Hazardous ingredients</div><table><tr><th>CAS-No.</th><th>Components</th><th>Value</th><th>Symbols</th><th>R-phrases</th></tr><tr><td>1330-20-7</td><td>Xylene</td><td>~ 15%</td><td>Xn</td><td>10-20/21-38</td></tr><tr><td>872-50-4</td><td>N-methylpyrrolidone</td><td>~ 60%</td><td>Xi</td><td>36/38</td></tr></table></div>	CAS-No.	Components	Value	Symbols	R-phrases	1330-20-7	Xylene	~ 15%	Xn	10-20/21-38	872-50-4	N-methylpyrrolidone	~ 60%	Xi	36/38	
CAS-No.	Components	Value	Symbols	R-phrases												
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<div>3.</div> <div><div>Hazards identification</div><div>Xn – Harmful</div><div>R phrases: 10-20/21-36/38. Flammable. Harmful by inhalation and in contact with skin. Irritating to eyes and skin. Vapours may form explosive mixture with air</div></div>																
<div>4.</div> <div><div>First aid measures</div><div>After inhalation: Move to fresh air. If symptoms persist, call a physician</div><div>After contact with skin: Wash off with plenty of water</div><div>After contact with eyes: Rinse with plenty of water</div><div>After ingestion: Do not induce vomiting. Obtain medical attention</div><div>Advice to doctor: Treat symptomatically. If swallowed or in the event of vomiting, risk of product entering the lungs</div></div>																
<div>5.</div> <div><div>Fire-fighting measures</div><div>Suitable extinguishing media: Water spray, foam, dry powder, carbon dioxide (CO<sub>2</sub>)</div><div>Unsuitable extinguishing media: High volume water jet</div><div>Special Hazards: In case of fire the following can be released: Carbon monoxide, hydrocarbons</div><div>Special protective equipment for firefighters: Standard procedure for chemical fires</div><div>Additional information: Water mist may be used to cool closed containers. In the event of fire and/or explosion do not breathe fumes</div></div>																
<div>6.</div> <div><div>Accidental release measures</div><div>Personal precautions: Risk of slipping due to leakage/spillage of product. Ensure adequate ventilation. Remove all sources of ignition</div><div>Environmental precautions: Do not flush into surface water or sanitary sewer system</div><div>Methods for cleaning up / taking up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Dispose of absorbed material in accordance with the regulations</div><div>Additional information: None</div></div>																
<div>7.</div> <div><div>Handling and storage</div><div>Advice on safe handling: Use only in well-ventilated areas</div><div>Advice on protection against fire and explosion: Keep away from sources of ignition – No smoking. Take precautionary measures against static discharges. Vapours may form explosive mixture with air</div><div>Requirements on storage rooms and vessels: Unsuitable materials: Light metals</div><div>Incompatible materials: Incompatible with oxidising agents. Do not store together with food</div><div>Further information on storage conditions: Keep in a well-ventilated place. Keep away from heat</div></div>																
<div>8.</div> <div><div>Exposure controls / personal protection</div><div>Additional advice on system design: Provide appropriate exhaust ventilation at machinery</div><div>Ingredients and specific control parameters:</div><div>TLV value of N-methylpyrrolidone: 20 ml/m<sup>3</sup> (Germany)</div><div>TLV value of xylene: 100 ml/m<sup>3</sup> (Germany)</div><div>Respiratory protection: No special protective equipment required</div><div>Hand protection: Protective gloves</div><div>Eye protection: Safety glasses</div><div>Body protection: No special protective equipment required</div><div>Other protection measures: No special protective equipment required</div><div>General protection and hygiene measures: Avoid prolonged and/or repeated contact with skin. Clean skin thoroughly after work; apply skin cream. Remove soiled or soaked clothing immediately. Do not breathe vapours or spray mist</div></div>																
	<div>10.</div> <div><div>Stability and reactivity</div><div>Conditions to avoid: Do no heat above flash point</div><div>Materials to avoid: Strong acids and oxidising agents</div><div>Hazardous decomposition products: None under normal use</div><div>Additional information: None</div></div>															
	<div>11.</div> <div><div>Toxicological information</div><div>The toxicological data has been taken form products of similar composition</div><div>Acute toxicity: LD50/oral/rat = &gt; 2 g/kg (literature data)</div><div>Chronic toxicity: None</div><div>Human experience: Prolonged skin contact may cause skin irritation and/or dermatitis. Solvents may degrease the skin</div></div>															
	<div>12.</div> <div><div>Ecological information</div><div>Information on elimination (persistence and degradability): The product has not been tested</div><div>Behaviour in environmental compartments: Ecological injuries are not known or expected under normal use</div><div>Ecotoxic effects: The product has not been tested</div><div>Additional information: Should not be released into the environment</div></div>															
	<div>13.</div> <div><div>Advice on Disposal</div><div>Code of waste: 070 604. Wastes from organic chemical processes; waste from the MFSU of fats, grease, soaps, detergents disinfectants and cosmetics; other organic solvents, washing liquids and mother liquors</div><div>Disposal: Can be incinerated when in compliance with local, state and federal regulations</div><div>Dispose of contaminated packaging and recommended cleaning: Offer rinsed packaging material to local recycling facilities</div></div>															
	<div>14.</div> <div><div>Transport information</div><div>GGVS / GGVE: Cl. 3, no. 31 c</div><div>Name: Xylenes solution</div><div>ADN / ADN: not classified</div><div>IMDG-Code: Class 3.3 UN number: 1307 UN packaging group: III</div><div>EMS: 3-07 MFAG: 310. No Marine-pollutant</div><div>Name: Xylenes solution</div><div>ICAO / IATA-DGR: Class 3 UN/ID number: 1307 ICAO-packaging group: III</div><div>Name: Xylenes solution</div><div>Further information: None</div></div>															
	<div>15.</div> <div><div>Regulatory information</div><div>Labelling according to EU-guidelines: The product is classified and labelled in accordance with EC-directives/German regulations on dangerous substances</div><div>Hazards: Xn – Harmful</div><div>Hazardous component(s) to be indicated on label: Xylene, N-methylpyrrolidone</div><div>R phrases: 10-20/21-36/38. Flammable. Harmful by inhalation and in contact with skin. Irritating to eyes and skin</div><div>S phrases: 41. In case of fire and/or explosion do not breathe fumes</div><div>National regulations</div></div>															
	<div>16.</div> <div><div>Other information</div><div>Issue-department of Safety Data Sheet: Chemical Documentation, Tel.: ++49 - 89 7876 - 564</div></div>															

The data in this product information is based on our general experience and knowledge at the time of printing 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 tests with the selected product. We recommend contacting our Technical Consulting Staff to discuss your specific application. If required and possible we will be pleased to provide a sample for testing. Klüber products are continually improved. Therefore, Klüber Lubrication reserves the right to change all the technical data in this product information at any time without notice.



Klüber Lubrication München KG, a member of the Freudenberg group