Klüber Tyreno Fluids 3-6V, 6-14V, 12-25V

High-performance vacuum pump oils for fine- and high-vacuum applications

Your benefits at a glance

- Reliable operation of vacuum pumps as well as installations and components using gaseous oxygen
  - due to low oil vapour pressure
  - due to very low tendency to thermal ageing
  - due to good chemical stability and resistance to aggressive media
  - due to high oxygen pressure surge resistance (see product data)
- Versatile sliding agent
  - for industrial handling of oxygen, air, carbon dioxide, inert and other gases as well as their condensates
  - for maintenance and care of breathing apparatus on the low pressure side
- Each production batch is checked for its reactivity with oxygen

Your requirements - our solution

Klüber Tyreno Fluids are fluids designed to meet the special requirements of modern vacuum pumps.

Klüber Tyreno Fluids 3/6 V, 6/14 V, 12/25V are perfluorinated polyether oils (PFPE) which are available in different viscosities and show particularly high chemical stability.

They are used whenever aggressive media must be pumped, e.g. oxygen, and / or high-vacuum conditions (e.g. multiple-stage pumps) prevail.

Klüber Tyreno Fluids show a high resistance to a wide range of chemicals. To ensure continuous adherence to this high quality standard, these fluids are manufactured in small series subject to strict hygiene requirements and each batch is inspected for resistance to gaseous oxygen (following to M 034-1 list of nonmetallic materials (213-075)).

Application

Klüber Tyreno Fluids are tried-and-tested as filling fluids in mechanical backing pumps, diffusion pumps and turbomolecular pumps by leading OEMs. They are also suitable for pumping gasous oxygen. Klüber Tyreno Fluids have been tested as filling fluids according to the Autogeneous Ignition Temperature (AIT) procedure. Klüber Tyreno Fluids can also be used as vapour-resistant, chemically inert transmission fluid in dry-running screw-type pumps.

Klüber Tyreno Fluids can also be used as sliding agent for the lubrication of valves, fittings and installations carrying gaseous oxygen or for chemical plants and apparatus requiring good resistance to various gases (conclusion by analogy based on chemical composition. For this purpose, we recommend users conduct their tests using the complete component under conditions similar to series application. Test results show the products' usability for an O2 content > 21 % by vol. under operating conditions specified in the product data section of this product information leaflet.

Behaviour towards metal, elastomers and plastics

Klüber Tyreno Fluid 3/6V, 6/14V, 12/25V are normally neutral towards metallic materials, plastics and elastomers within the envisaged temperature range. Nevertheless, we recommend checking the compatibility of the product with materials prior to the introduction of this product.

Application notes

All surfaces to be wetted must be thoroughly cleaned prior to product application. The friction and lubrication points of these surfaces/components must be clean and bright (i.e. free from oil, grease, dirt particles or perspiration, etc.). For optimum lubrication results, we recommend cleaning the friction points with clean white spirit and then Klüberalfa XZ 3-1, ensuring residue-free surfaces when dried. Application to equipment, valves and fittings carrying oxygen must also be "oxygen clean" to attain a "ready for oxygen service" condition.

For use at low temperatures, e.g. where components are in direct contact with liquid oxygen, experimental testing and approval by the component manufacturer is required since the design and power

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ratings, for example in actuator gears, may play a decisive role in this context.

For optimised service life, please contact our service engineers.

* Notes on the lower service temperature limit (see product data): The service temperature is defined on the basis of physical and mechanical-dynamic product characteristics. At very low temperature and pressure, however, where oxygen remains fluid, the product retains its stability in liquid oxygen tests. If the product is intended to be used below the lower service temperature limit, it has to be checked if reliable operation of the component is ensured under these conditions. In cases of doubt, application-specific tests would have to be performed.

** Notes on the upper service temperature limit (see product data): The service temperature is defined on the basis of physical and mechanical-dynamic product characteristics. When working in an atmosphere with added oxygen and/or under high oxygen partial pressure, the upper service temperature limit may be reduced due to a reaction with oxygen. To assess whether use in a particular application is safe, please refer to the product data section in this product information. In cases of doubt, application-specific tests would have to be performed.

Safety advice:

The resistance to oxygen was determined with the unused, contamination-free product. If the product is decomposed during use due to physical (temperature, electric discharge, pressure surges) or chemical influence or contaminated by foreign substances (e.g. easily oxidisable organic or inorganic materials, particularly iron metals, magnesium, aluminium, titanium or their alloys, e.g. rubbed-off particles, contamination from the environment), decomposition products or foreign substances can be generated which clearly reduce oxygen resistance.

Furthermore, operating conditions have a major impact on the lubricant's behaviour in the application.

For example, presence of mists, turbulence effects, foam formation and the intake of extracted substances can reduce the oxygen resistance compared to the fresh oil.

Therefore, it can be necessary or prescribed to conduct own safety-relevant examinations on the equipment or lubricated component.

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 Tyreno Fluid 3/6V	Klüber Tyreno Fluid 6/14V	Klüber Tyreno Fluid 12/25V
Canister 500 ml		+	+
Canister 1 l	+	+	+
Canister 5 l	+	+	+
Canister 10 l	+		+

Characteristics	Klüber Tyreno Fluid 3/6V	Klüber Tyreno Fluid 6/14V	Klüber Tyreno Fluid 12/25V
Article number	130021	130022	130023
Composition, type of oil	PFPE	PFPE	PFPE
Service temperature, lower limit	-50 °C	-45 °C	-40 °C
Service temperature, upper limit	120 °C	150 °C	180 °C
Density, DIN 51757, 20°C	approx. 1.88 g/cm³	approx. 1.89 g/cm³	approx. 1.9 g/cm³
Vapour pressure, 20°C	≤ 5.33 x 10^{-6} hPa	≤ 2.67 x 10^{-6} hPa	≤ 2.67 x 10^{-6} hPa
Kinematic viscosity, DIN EN ISO 3104 / DIN 51562-1 / ASTM D445 / ASTM D7042, 40°C	approx. 28 mm²/s	approx. 60 mm²/s	approx. 95 mm²/s

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Characteristics	Klüber Tyreno Fluid 3/6V	Klüber Tyreno Fluid 6/14V	Klüber Tyreno Fluid 12/25V
Upper oxygen pressure limit up to a maximum operating temperature, ISO 21010, 60°C, reactivity when exposed to oxygen pressure surges	100 bar	100 bar	100 bar
Upper temperature limit when product is used as filling liquid for vacuum pumps with a maximum working pressure of 2 bar, Auto Ignition Temperature (AIT) procedure	150 °C	150 °C	150 °C
Minimum shelf life from the date of manufacture - in a dry, frost-free place and in the unopened original container, approx.	60 months	60 months	60 months

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 90 years.

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