

your global specialist

Detailed information

Seaworthy.

A selection of lubricants for maritime
and offshore applications



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Speciality lubricants for maritime applications

Huge challenges for your equipment

Ships and offshore equipment are subject to extreme conditions at sea: arctic cold or tropical heat, high mechanical stress, continuous vibrations, aggressive, salty air and seawater. With the right lubrication and proper maintenance, you can ensure the reliable operation of all moving components aboard. The failure of a crane, winch, driving motor or propeller can have fatal consequences, resulting in high costs for complex repair, expensive spare parts and transport delays. If worst comes to the worst, even the crew, ship, cargo or environment are at risk.

Increasing the reliability of parts and components with the right lubricant

The right lubricant has a vital role to play when it comes to improving reliability and the lifetime of parts and components; therefore, the investment in high-quality lubricants pays off as they decrease maintenance and operating costs in the long run.

In this brochure, you will find a selection of our speciality lubricants, grouped according to the components and parts they are intended for. These lubricants have proven their worth in ships and platforms, some of them even over decades. One particular highlight is that, in many cases, you can use one lubricant for several friction points, simplifying your logistics processes and saving you time, money and storage space. If there is a part or component that you don't find in this brochure, just contact one of our specialists for advice. We have the right solution for (almost) all applications.

We are where you are

It is our aim to provide you with high-quality speciality lubricants and service with consistent high quality around the globe at any time while keeping up our high technological competence. We're achieving this aim thanks to our global network of production and sales companies as well as competent distribution partners and thanks to our highly specialised experts who are at your service when it comes to dealing with your individual enquiries.

Thinking toward the future

Beside top-quality mineral oil-based lubricants for the marine industry, we offer a comprehensive range of synthetic high-performance speciality lubricants which contribute to increased efficiency of marine equipment. Our special lubricants help to extend maintenance intervals and decrease the lubricant quantities required. For eco-friendly operators we have non-toxic, rapidly biodegradable lubricants to offer, which contribute to the sustainable protection of the seas.

We generally recommend consulting our lubrication experts prior to selecting a lubricant.

Selected Klüber lubricants for ships and offshore platforms

Module	Component/lubrication point
Diesel engine	Screws on turbocharger
	Open gears on flywheels
Power transmission	Marine reduction gearboxes
	Enclosed gearboxes (general)
	Thruster
	Curved tooth gear couplings - oil lubrication
	Curved tooth gear couplings - grease lubrication
	Split roller bearings for propeller shafts
Azipod	Azipod - slewing bearing with gear teeth
	Azipod - sealing grease for slewing bearings
	Azipod - thrust bearing
	Azipod - propeller shaft bearing
Compact Azipod	Azipod X - propeller shaft seal
	Compact Azipod - slewing bearing
	Compact Azipod - gear teeth on slewing bearing
	Compact Azipod - thrust bearing
	Compact Azipod - propeller shaft bearing



Differentiation	Klüber speciality lubricant
Highly viscous adhesive lubricant	Klüberpaste HEL 46-450
Adhesive grease	Klüberfluid C-F 3 ULTRA
Standard mineral oil-based lubricant	Klüberplex AG 11-462
Synthetic high-performance gear oil offering longer service life than mineral oil	Klüberoil GEM 1-100 N/ 150 N
Standard mineral oil-based lubricant	Klübersynth GEM 4-100 N/ 150 N
Synthetic high-performance gear oil offering longer service life than mineral oil	Klüberoil GEM 1-100 N/ 150 N/220 N
Readily biodegradable synthetic oil for high requirements offering longer service life than mineral oil	Klübersynth GEM 4-100 N/ 150 N/220 N
	Klübersynth GEM 2-220/320
	Klüberbio EG 2-150
High base oil viscosity With solid lubricant	STRUCTOVIS BHD MF
Low base oil viscosity Without solid lubricant	Klüberoil GEM 1-460 N
Very soft fluid grease with solid lubricant	GRAFLOSCON C-SG 500 PLUS
Soft heavy-duty grease with solid lubricant	Klüberlub BE 41-1501
Very soft fluid grease without solid lubricant	Klüberplex GE 11-680
	Klüberplex BEM 41-132
Standard viscosity according to ABB Marine lubrication chart	Klübersynth GEM 4-320 N
Very high base oil viscosity to prevent lubricant leakage via the rotating shaft seals	Klüberfluid C-F 3 ULTRA
Mineral oil-based grease	STABURAGS NBU 30
Readily biodegradable grease based on synthetic oil	Klüberbio M 72-82
	Klübersynth GEM 4-320 N
	Klübersynth GEM 4-320 N
	Klüberbio RM 2-150
	MICROLUBE GL 262
	GRAFLOSCON C-SG 0 ULTRA
	Klübersynth GEM 4-320 N
	MICROLUBE GL 262

Selected Klüber lubricants for ships and offshore platforms

Module	Component/lubrication point
Fixed and controllable pitch propeller	Stern tubes
Anchor winch/Mooring winch	Open gears Running-in lubricant
	Open gears Operational lubricant for usage in central lubrication systems
	Open gears Operational lubricant for usage in central lubrication systems or manual lubrication
	Enclosed gearboxes
	Bearings - rolling bearings
	Bearings - plain bearings
	Anchor winch spooling devices
	Hydraulic motors



Differentiation	Klüber speciality lubricant
For all purpose operation	Klüberbio RM 2-100
For continuous operation in the tropics	Klüberbio RM 2-150
	GRAFLOSCON B-SG 00 ULTRA
Highly viscous adhesive lubricating oil for ambient temperatures of -10 to 5 °C (14 to 41 °F)	Klüberfluid C-F 4 ULTRA
Highly viscous adhesive lubricant for ambient temperatures of 5 to 30 °C (41 to 86 °F)	Klüberfluid C-F 3 ULTRA
Highly viscous adhesive lubricant for ambient temperatures above 30 °C (86 °F)	Klüberfluid C-F 3 M ULTRA
Very soft adhesive grease Applicable through central lubrication systems at ambient temperatures down to approx. -10 °C (14 °F)	Klüberplex AG 11-461
Soft adhesive grease Applicable through central lubrication systems at ambient temperatures down to approx. 0 °C (32 °F)	Klüberplex AG 11-462
	Klübersynth GEM 4-220 N/320 N
Readily biodegradable	Klübersynth GEM 2-220/320
For low-speed, highly loaded rolling bearings	Klüberplex AG 11-462
For low-speed rolling bearings at low temperature	Klüberplex EM 91-102
Readily biodegradable grease for medium-speed rolling bearings and at low temperatures	Klüberbio M 72-82
For highly loaded, low-speed plain bearings	Klüberplex AG 11-462
For low and high-speed plain bearings Also at low temperatures	Klüberplex BEM 41-132
Readily biodegradable grease For low and high-speed plain bearings Also at low temperatures	Klüberbio M 72-82
	Klüberplex AG 11-462
	LAMORA HLP 32/46/68

Selected Klüber lubricants for ships and offshore platforms

Module	Component/lubrication point
Fairleads	Bearings - plain bearings
Deck and offshore cranes	Open gears at slewing bearings and drive pinions
	Open gears on hoisting winches
	Bearings - rolling bearings
	Bearings - plain bearings
	Enclosed gears
	Hydraulic motors
Towing pins and shark jaws	Bronze plain bearings/bushings
Container lashing supplies	Twistlock
	Turnbuckle threads (container lashing)



Differentiation	Klüber speciality lubricant
For highly loaded, low-speed plain bearings	Klüberplex AG 11-462
For low and high-speed plain bearings Also at low temperatures	Klüberplex BEM 41-132
Readily biodegradable grease For low and high-speed plain bearings Also at low temperatures	Klüberbio M 72-82
	Klüberplex AG 11-462
Very soft adhesive grease Applicable through central lubrication systems at ambient temperatures down to approx. -10 °C (14 °F)	Klüberplex AG 11-461
Soft adhesive grease Applicable through central lubrication systems at ambient temperatures down to approx. 0 °C (32 °F)	Klüberplex AG 11-462
For low-speed, highly loaded rolling bearings	Klüberplex AG 11-462
For low-speed rolling bearings and low temperatures	Klüberplex EM 91-102
Readily biodegradable grease For medium-speed rolling bearings and low temperatures	Klüberbio M 72-82
For highly loaded, low-speed plain bearings	Klüberplex AG 11-462
For low and high-speed plain bearings Also at low temperatures	Klüberplex BEM 41-132
Readily biodegradable grease For low and high-speed plain bearings Also at low temperatures	Klüberbio M 72-82
	Klübersynth GEM 4-150 N
	LAMORA HLP 32/46/68
	Klüberplex AG 11-462
	Klüberplex BE 11-462
	Klüberplex AG 11-462

Selected Klüber lubricants for ships and offshore platforms

Module	Component/lubrication point
Compressors	Gas screw compressor
	Gas piston compressor
	Screw and piston compressors for refrigeration
	Compressed air screw compressor
	Compressed air piston compressor
Electric motors/Alternators	Electric motor bearings Alternator bearings
Chains	Chains - grease lubrication
	Chains - oil lubrication
Steel cables	Steel cables
Assembly lubricants for all types of modules	Assembly paste for screws
	Assembly paste for steel screws



Differentiation	Klüber speciality lubricant
	Klüber Summit PGS 68/100/150/220
For sour process gases Applicable in both piston and screw compressors	Klüber Summit PGS 68/100/150/220
Optimised for oil-injected high-pressure piston compressors	Klüber Summit NGL 444/888
For refrigeration compressors using CO ₂ or ammonia as refrigerant	Klüber Summit R 100/200/300
For refrigeration compressors using hydrocarbon-based refrigerants, e.g. propane, butane, propylene	Klüber Summit PGI 68/100/150
	Klüber Summit SH 32/46/68
	Klüber Summit DSL 68/100/125
	Klüberplex BEM 41-132
	GRAFLOSCON CA 901 ULTRA SPRAY
With solid lubricant	STRUCTOVIS BHD MF
Without solid lubricant With hydrocapillary effect (displaces humidity/water)	STRUCTOVIS BHD 75 S
	Klüberplex AG 11-462
Readily biodegradable grease	Klüberbio M 72-82
	Klüberpaste 46 MR 401
	Klüberpaste HEL 46-450

Details on the lubricants (products in alphabetical order)

Klüber speciality lubricant	Application notes and product description
GRAFLOSCON B-SG 00 ULTRA	<p>Running-in lubricant for open gears. Tooth flanks are levelled by means of controlled micro wear under load during operation. An increased contact ratio of the load-carrying tooth flanks of approx. 80 % can be obtained, largely avoiding overloads and gear damage. Once running-in is completed, change over to operational lubrication. The changeover can be undertaken without prior cleaning. Please use GRAFLOSCON B-SG 00 ULTRA as running-in lubricant only!</p>
GRAFLOSCON CA 901 ULTRA SPRAY	<p>Graphite-containing adhesive lubricant for external lubrication of chains and wire ropes. The product is very adhesive, high-pressure resistant and provides good corrosion protection. It has good emergency lubricating properties owing to solid lubricants. The handy spray can makes its application easy and comfortable.</p>
GRAFLOSCON C-SG 0 ULTRA	<p>Tried-and-tested operational lubricant for highly loaded gear teeth ensuring long drive lifetime at low lubricant consumption, hence contributing to operating cost savings. The lubricant has been approved by ABB Marine for the lubrication of the Compact Azipod slewing bearings.</p>
GRAFLOSCON C-SG 500 PLUS	<p>Very soft fluid grease providing good adhesion and pressure-absorption capacity. High operational reliability through solid lubricant with emergency lubricating properties.</p>
Klüber Summit DSL 68/100/125	<p>Synthetic air compressor oil. Significantly longer lifetime of valves and piston rings compared to mineral oil and hydrocarbon-based oils due to lower residue formation, reducing costs for maintenance and failures. Its low friction coefficient leads to higher energy efficiency.</p>
Klüber Summit NGL 444/888	<p>Synthetic compressor oil for the lubrication of cylinders in oil-injected high-pressure piston compressors. Cost reduction due to longer service life of valves and piston rings. Compared to mineral oils, the product is very resistant to dilution and absorption by hydrocarbon-containing gases.</p>
Klüber Summit PGI 68/100/150	<p>Synthetic compressor oil for oil-injected process gas compressors operated with refrigerants based on hydrocarbon (propane, butane, propylene, etc.). Very resistant to dilution and absorption by hydrocarbon-containing gases compared to mineral oils. Its longer oil lifetime reduces costs.</p>
Klüber Summit PGS 68/100/150/220	<p>Synthetic compressor oil for oil-injected process gas compressors. Low drop in viscosity owing to low solubility in gases. Particularly suitable for applications involving H₂S.</p>



Chemical composition	Technical data
Mineral oil Aluminium soap Solid lubricant (graphite)	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 00 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 500 mm²/s - Service temperature range approx.: 0 to 90 °C (5 to 194 °F) - Effectiveness of the lubricant film down to -30 °C (-22 °F)
Mineral oil Aluminium complex soap Solid lubricant (graphite)	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 1 - Service temperature range approx.: 0 to 120 °C (32 to 248 °F)
Mineral oil Aluminium soap Solid lubricant (graphite)	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 0 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 680 mm²/s - Service temperature range approx.: 0 to 90 °C (32 to 194 °F) - Effectiveness of the lubricating film down to -30 °C (-22 °F)
Mineral oil Aluminium complex soap Solid lubricant (graphite)	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 0 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 680 mm²/s - Service temperature range approx.: 0 to 120 °C (32 to 248 °F) - Effectiveness of the lubricating film down to -30 °C (-22 °F)
Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 68/100/125 mm²/s - Please observe viscosity recommendations by the compressor manufacturer.
Polyalkylene glycol oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 80 or approx. 220 mm²/s respectively - Viscosity is to be selected according to the application (composition of the gas flow). We will be pleased to assist you.
Polyalkylene glycol oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 68/100/150 mm²/s - Viscosity is to be selected according to the application (refrigerant, pressure, temperature). We will be pleased to assist you.
Polyalkylene glycol oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 68/100/150/220 mm²/s - Viscosity is to be selected according to the application (composition of the gas flow). We will be pleased to assist you.

Details on the lubricants (products in alphabetical order)



Klüber speciality lubricant	Application notes and product description
Klüber Summit R 100/200/300	Synthetic refrigerator oil particularly suitable for highly loaded ammonia and CO ₂ refrigeration compressors. Good compatibility with ammonia. High efficiency of the refrigeration installation due to few oil-related residues. Good viscosity-temperature behaviour.
Klüber Summit SH 32/46/68	Synthetic air compressor oil for low maintenance and operational costs due to longer oil change intervals. Low formation of oxidation residues in the oil circuit. Longer lifetime of oil filters and separators compared to mineral oils.
Klüberbio M 72-82	Fully synthetic, readily biodegradable special lubricating grease. Klüberbio M 72-82 has a good sealing effect due to its excellent resistance to water. It protects against corrosion, has a good pressure absorption capacity and offers high ageing resistance. The product can be used for the lubrication of bearings and steel ropes. Klüberbio M 72-82 has been approved by ABB Marine for Azipod slewing bearing seals.
Klüberbio RM 2-100/150	Synthetic, readily biodegradable stern tube oil suitable for lubrication of propeller shaft bushings. Non-toxic to marine organisms. Therefore less environmental impact in the event of leakage. Optimised for the lubrication of SIMPLEX-COMPACT seals from Blohm + Voss Industries GmbH. Klüberbio RM 2-100/150 has been approved by Blohm + Voss Industries for the lubrication of SIMPLEX-COMPACT seals with FPM 'Viton Pod' shaft sealing rings.
Klüberbio EG 2-150	Synthetic, readily biodegradable high-performance gear oil offering the following characteristics: <ul style="list-style-type: none"> – Non-toxic to marine organisms. Therefore less environmental impact in the event of leakage – Significantly longer oil lifetime than mineral oil due to excellent ageing and oxidation stability – Sufficient protection against fretting damage of gears, also under high peak loads due to high scuffing load capacity – Sealing rings made of NBR materials for RADIAMATIC and ROTOMATIC seals made by Merkel Freudenberg Fluidtechnik GmbH for turning shafts in steerable thrusters and those made of FPM material "Viton Pod" for SIMPLEX COMPACT propeller shaft seals are resistant to Klüberbio EG 2-150, preventing leakages and impurities.
Klüberfluid C-F 3 M ULTRA	Highly viscous, transparent operational lubricant for open gears with good adhesion, good load-carrying capacity, good wear protection and very high scuffing resistance. Optimised for use with anchor winches at ambient temperatures above 30 °C (86 °F). No dripping in tropical climate zones. Higher base oil viscosity than Klüberfluid C-F 3 ULTRA. Rolls Royce Marine has approved Klüberfluid C-F 3 M ULTRA for the lubrication of large anchor winches at high ambient temperatures.



Chemical composition	Technical data
Synthetic hydrocarbon oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 32/68/100 mm²/s - Viscosity is to be selected according to the application (refrigerant, pressure, temperature). We will be pleased to assist you.
Synthetic hydrocarbon oil Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 32/46/68 mm²/s - Please observe the viscosity specification by the compressor manufacturer.
Synthetic ester oil Polyurea	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 120 mm²/s - Service temperature range approx.: -40 to 140 °C (-40 to 284 °F) - Biodegradability according to CEC-L-33-A-93 test after 21 days > 70%
Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 100/150 mm²/s - Service temperature range approx.: -10 to 100 °C (14 to 212 °F) - Biodegradability according to OECD 301 F test after 28 days > 60%
Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 150 mm²/s - Service temperature range approx.: -25 to 100 °C (-13 to 212 °F) - Biodegradability according to OECD 301 F test after 28 days > 60%
Mineral oil Synthetic hydrocarbon oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: > 25 000 mm²/s - Service temperature range approx.: 25 to 100 °C (77 to 212 °F) - Effectiveness of the lubricant film down to 0 °C (32 °F)

Details on the lubricants (products in alphabetical order)

Klüber speciality lubricant	Application notes and product description
Klüberfluid C-F 3 ULTRA	<p>Highly viscous, transparent operational lubricant for open gears with good adhesion, good load-carrying capacity, good wear protection and very high scuffing resistance.</p> <p>Optimised for use on anchor winches at ambient temperatures of 5 to 30 °C (41 to 86 °F).</p> <p>Longer component lifetime owing to tooth flank protection.</p> <p>Lubricant consumption can be reduced by 20-25 % compared to graphite-containing adhesive lubricants.</p> <p>No oil leakages at the slewing bearing seals due to its high viscosity when used in Azipods. Klüberfluid C-F 3 ULTRA has therefore been approved by ABB Marine for the lubrication of slewing bearings.</p> <p>Wärtsilä has also approved this lubricant for the lubrication of gear teeth at the flywheel of all two-stroke diesel engines of the model series RTA from 1981 onwards and RT-flex from approx. 1998 onwards. Rolls Royce Marine has approved it for the lubrication of gear teeth on large anchor winches.</p>
Klüberfluid C-F 4 ULTRA	<p>Transparent operational lubricant for open gears with good adhesion, good load-carrying capacity, good wear protection and very high scuffing resistance.</p> <p>Optimised for use on anchor winches at ambient temperatures of –10 to 5 °C (14 to 41 °F).</p> <p>Lower base oil viscosity than Klüberfluid C-F 3 ULTRA.</p> <p>Rolls Royce Marine has approved Klüberfluid C-F 4 ULTRA for the lubrication of gear teeth on large anchor winches at low ambient temperatures.</p>
Klüberlub BE 41-1501	<p>Heavy-duty grease with good adhesion (stiffer than GRAFLOSCON C-SG 500 PLUS). Solid lubricant with emergency lubricating properties for high operational reliability.</p>
Klüberoil GEM 1-100 N/ 150 N/220 N	<p>High-performance gear and multipurpose oils based on mineral oil with high scuffing resistance, good ageing and oxidation stability and high wear protection.</p> <p>Viscosity is to be selected according to the application.</p>
Klüberoil GEM 1-460 N	<p>High-performance gear and multipurpose oils based on mineral oil with good ageing and oxidation stability and high wear protection.</p> <p>High scuffing resistance also at high peak loads, vibrations and oscillations.</p>
Klüberpaste 46 MR 401	<p>High-performance, white lubricating paste for positive and power-locking connections, e.g. screws on propeller blades</p> <p>Its high pressure absorption capacity protects against wear, also under high surface pressure.</p> <p>The product reduces wear caused by vibrations and protects against tribocorrosion.</p> <p>Klüberpaste 46 MR 401 is water and leach-resistant, facilitating long-term lubrication.</p> <p>Its good corrosion protection increases component lifetime.</p>
Klüberpaste HEL 46-450	<p>Black lubricating and assembly paste for bolted connections and connections at the turbocharger and exhaust gas lines.</p> <p>Facilitates easy loosening of bolted connections also after high and long-lasting thermal load.</p> <p>Dry lubrication is attained at temperatures above 200 °C (392 °F).</p>
Klüberplex AG 11-461	<p>White adhesive lubricating grease for open gears with very good load-carrying capacity and wear protection. The product has the same properties as Klüberplex AG 11-462, but its consistency is softer. Applicable through central lubrication systems down to approx. –10°C (14 °F).</p>



Chemical composition	Technical data
Mineral oil Synthetic hydrocarbon oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 16 500 mm²/s - Service temperature range approx.: 0 to 120 °C (32 to 248 °F) - Effectiveness of the lubricating film down to -30 °C (-22 °F)
Mineral oil Synthetic hydrocarbon oil Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 3 100 mm²/s - Service temperature range approx.: 0 to 80 °C (32 to 176 °F) - Effectiveness of the lubricating film down to -30 °C (-22 °F)
Mineral oil Lithium complex soap Solid lubricants (MoS ₂ and graphite)	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 1 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 1 500 mm²/s - Service temperature range approx.: -10 to 150 °C (14 to 302 °F)
Mineral oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 100/150/220 mm²/s - Service temperature range approx.: -5 to 100 °C (23 to 212 °F)
Mineral oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 460 mm²/s - Service temperature range approx.: 0 to 100 °C (32 to 212 °F)
Polyglycol oil Lithium soap Solid lubricant	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 0 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: 350 to 375 mm²/s - Service temperature range approx.: -40 to 150 °C (-40 to 302 °F)
Synthetic hydrocarbon oil Synthetic ester oil Solid lubricant	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 1 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 42 mm²/s - Service temperature range approx.: -40 to 1 000 °C (-40 to 1832 °F), dry lubrication above 200 °C
Mineral oil Aluminium complex soap White solid lubricant	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 1 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 460 mm²/s - Service temperature range approx.: -10 to 150 °C (14 to 302 °F) - Effectiveness of the lubricating film down to -40 °C (-40 °F)

Details on the lubricants (products in alphabetical order)

Klüber speciality lubricant	Application notes and product description
Klüberplex AG 11-462	<p>White adhesive grease for open gears with very good load-carrying capacity and very good wear protection due to selected solid lubricants and additives.</p> <p>Good wear protection, also for highly loaded rolling and plain bearings at low speeds (not suitable for high speed factors).</p> <p>Very good adhesion, also at low temperatures (e.g. intense sunlight, tropical climate zones).</p> <p>No dripping or flinging off, reducing lubricant consumption.</p> <p>Very good water resistance and good corrosion protection in contact with seawater.</p> <p>Its white colour facilitates simple checks of load-carrying patterns (as it is the contrast to the dark tooth flank surface).</p> <p>Applicable through central lubrication systems down to approx. 0°C (32 °F).</p> <p>Also available as spray.</p> <p>Clean handling, particularly suitable as rope lubricant for cruise ships as it is white and free from graphite.</p>
Klüberplex BE 11-462	<p>Rolling and plain bearing grease offering good wear protection, very good adhesion and good corrosion protection. The grease is therefore applicable for the lubrication of twistlocks to increase their reliability (quick and easy locking and unlocking when loading or unloading containers). The product is also available as spray for easy relubrication.</p>
Klüberplex BEM 41-132	<p>Very versatile long-term lubricating grease, especially for rolling bearings with a high percentage of sliding friction (e.g. cylindrical roller bearings).</p> <p>It can be used for both low and high-speed bearings subject to high or low temperatures.</p> <p>Another possible use is the long-term lubrication of traction motor bearings. The special additivation extends component lifetime.</p> <p>Low maintenance requirements due to the long grease lifetime.</p> <p>The product offers good water resistance and good corrosion protection in contact with seawater.</p>
Klüberplex EM 91-102	<p>Special lubricating grease for rolling bearings at low speeds, also under high loads and at low temperatures.</p> <p>Can be used for the lubrication of bearings in contact with seawater owing to its excellent resistance to water and good corrosion protection.</p>
Klüberplex GE 11-680	<p>Very soft fluid grease offering good adhesion without solid lubricants.</p> <p>It is high-pressure resistant, contains wear-minimising additives and corrosion and oxidation inhibitors.</p>
Klübersynth GEM 2-220/320	<p>Synthetic, readily biodegradable high-performance gear oil offering the following advantages over mineral oil of the same viscosity:</p> <ul style="list-style-type: none"> - Significantly longer oil lifetime due to excellent ageing and oxidation stability - Reduced power loss, lower operating temperature and improved efficiency owing to optimum friction behaviour of the synthetic base oil - Suitable for use at both high and low temperatures - Higher load-carrying capacity of the oil film at operating temperatures above 40 °C (104 °F) due to better viscosity-temperature behaviour - Sufficient protection against fretting damage of gears, also under high peak loads due to high scuffing load capacity <p>Viscosity is to be selected according to the application.</p>



Chemical composition	Technical data
Mineral oil Aluminium complex soap White solid lubricant	<ul style="list-style-type: none"> - Consistency class according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 460 mm²/s - Service temperature range approx.: -10 to 150 °C (14 to 302 °F) - Effectiveness of the lubricating film down to -40 °C (-40 °F)
Mineral oil Aluminium complex soap	<ul style="list-style-type: none"> - Consistency class according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 500 mm²/s - Service temperature range approx.: -15 to 140 °C (5 to 302 °F)
Synthetic hydrocarbon oil Mineral oil Lithium special soap	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 120 mm²/s - Service temperature range approx.: -40 to 150 °C (-40 to 302 °F)
Mineral oil Calcium complex soap	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 100 mm²/s - Service temperature range approx.: -30 to 100 °C (-22 to 212 °F) - The lubricant should be selected according to the application. We will be pleased to assist you.
Mineral oil Aluminium complex soap	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 0/00 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 680 mm²/s - Service temperature range approx.: 0 to 140 °C (32 to 284 °F)
Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 220/320 mm²/s - Service temperature range approx.: -30 to 130 °C (-22 to 266 °F) - Biodegradability according to CEC-L-33-A-93 test after 21 days > 70%

Details on the lubricants (products in alphabetical order)

Klüber speciality lubricant	Application notes and product description
<p>Klübersynth GEM 4-100 N/150 N 220 N and 320 N</p>	<p>Synthetic high-performance and multipurpose oil offering the following advantages over mineral oil of the same viscosity:</p> <ul style="list-style-type: none"> - Significantly longer oil lifetime due to excellent ageing and oxidation stability - Lower operating temperature and improved efficiency due to a reduction of power losses through the optimum friction behaviour of the synthetic base oil - For use at both high and low temperatures - Better load-carrying capacity of the oil film at operating temperatures above 40 °C (104 °F) due to better viscosity-temperature behaviour - Better wear protection, also in rolling bearings - High scuffing load capacity to sufficiently protect gears against seizure, also at high peak loads - Good protection against premature component failure of gears with high micro pitting risk due to high micro pitting resistance <p>Klübersynth GEM 4-320 N has been approved by ABB Marine for slewing bearings, plain thrust bearings and propeller shaft bearings at the ABB Azipod Viscosity is to be selected according to the application.</p>
<p>LAMORA HLP 32/46/68</p>	<p>Hydraulic oil, complying with DIN 51524, part 2.</p>
<p>MICROLUBE GL 262</p>	<p>Special lubricating grease with optimum lubricating effect under boundary friction. Increases bearing lifetime due to its special composition of active ingredients, particularly suitable for vibrations and micro-movement. Approved by ABB Marine for Compact Azipod slewing bearings and propeller shaft bearings.</p>
<p>STABURAGS NBU 30</p>	<p>Lubricating grease with high resistance against media. Good sealing effect due to its good water resistance. Approved by ABB Marine for Azipod slewing bearing seals.</p>
<p>STRUCTOVIS BHD 75 S</p>	<p>Adhesive lubricant with good wear and corrosion protection and hydrocapillary effect (displaces water from the friction point), especially for chains subject to moisture. The lubricant contains a solvent for better penetration of the lubricant into the chain links.</p>
<p>STRUCTOVIS BHD MF</p>	<p>Adhesive lubricant with good wear and corrosion protection for increased component lifetime. The product can be used for curved gear couplings and drive chains subject to moisture. High operational reliability is ensured by solid lubricants with emergency lubricating properties.</p>



Chemical composition	Technical data
Synthetic hydrocarbon oil Synthetic ester oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 100/150/220/320 mm²/s - Service temperature range approx.: -40 to 140 °C (-40 to 284 °F) - Complying with the requirements of DIN 51 517 - 03 (CLP)
Mineral oil	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 32 / 46 / 68 mm²/s - Service temperature range approx.: -12 to 120 °C (10 to 248 °F)
Mineral oil Lithium complex soap	<ul style="list-style-type: none"> - Consistency class according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 280 mm²/s - Service temperature range approx.: -25 to 140 °C (-13 to 284 °F)
Mineral oil Barium complex soap	<ul style="list-style-type: none"> - Consistency grade according to DIN 51818: NLGI 2 - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 500 mm²/s - Service temperature range approx.: -10 to 150 °C (14 to 302 °F)
Mineral oil Synthetic hydrocarbon oil	<ul style="list-style-type: none"> - Base oil viscosity of the solvent-free lubricant at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 4 750 mm²/s - Service temperature range approx.: -5 to 120 °C (23 to 248 °F)
Mineral oil Synthetic hydrocarbon oil Solid lubricant (MoS ₂)	<ul style="list-style-type: none"> - Base oil viscosity at 40 °C (104 °F) according to DIN 51562 part 1/ASTM D-445/ASTM D-7042: approx. 4 500 - 5 000 mm²/s - Service temperature range approx.: -5 to 120 °C (23 to 248 °F)





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