

your global specialist

## Powerful, naturally.

Environmentally acceptable and biodegradable  
lubricants for the marine industry



# Combine environmental and economic benefits with speciality lubricants from Klüber Lubrication



## Superior environmentally friendly lubricant portfolio – Powerful, naturally

Reducing impacts from shipping operations on the environment is important to the future of our planet. We are increasingly successful in developing products suited to comply with the requirements of the marine industry. Klüber Lubrication already has the most comprehensive range of lubricants for this industry, meeting the highest environmental requirements.

## Your economic benefits – we offer more than lubricants

Efficiency, sustainability, competitiveness and profitability are crucial for business success. Our products and services can contribute to your success and competitiveness. In a personal exchange with you, we would like to introduce our services and discuss the comprehensive advantages of our products.

## Klüber Lubrication – the benchmark for speciality lubricants

Our wide portfolio of synthetic, environmentally friendly lubricants is a real alternative to conventional mineral oils. Unique tribological know how, raw materials of highest quality, customised additive packages and our decades of experience in designing lubricants in close cooperation with leading OEMs from different industries are the backbone for our benchmark-setting marine product range.

Whether hydrodynamic oil film thickness, load carrying capacity, corrosion protection, water washout stability, resistance to hydrolysis and oxidation or low-temperature performance – our speciality lubricants are right at the forefront of lubrication.

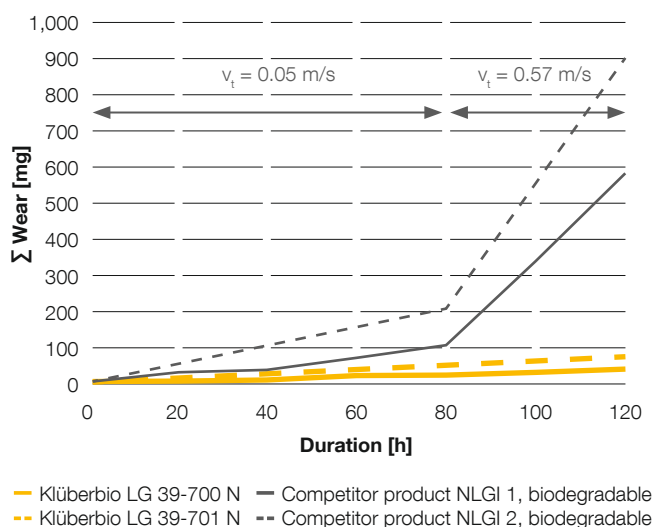
## An example: superior wear protection with Klüberbio LG 39-700 N / 701 N

Klüber Lubrication's new open gear greases – formulated with more than 90 % renewable materials – combine biodegradability and strong performance.

Klüberbio LG 39-700 N and 701 N set benchmarks in wear protection, low-temperature performance and reduced environmental impact:

- Lifetime of equipment
- Energy consumption
- Operational costs
- Reliability and efficiency

### Modified FZG slow speed wear test acc. to DGMK 377-01



**Klüberbio LG 39-700 N and 701 N show lower wear rates than other open gear lubricants.**



### Legislation, regulation and compliance – we are your reliable partner

Klüber Lubrication only launches a new lubricant after it has been put through extensive testing. Based on own and external test results and findings we develop powerful, innovative lubricants which are in line with the legal requirements, e.g. environmentally acceptable lubricants (EALs), Ecolabel and OSPAR.

### Market leader – more than 85 years of experience

Klüber Lubrication is the global market leader in speciality lubricants and tribological high-end solutions. Multinational groups as well as small- and medium-sized companies from a wide variety of industries have been relying on our competence and know-how.

### We are closer to you – wherever you are

Lubricants made by Klüber Lubrication are available in the same high quality worldwide. Due to our global standing, one of our experts is always close to you. We look forward to meeting you.

**Please see [www.kluebermanine.com](http://www.kluebermanine.com) for more information about us and our speciality lubricants for the marine industry.**

### An example: superior hydrodynamic oil film thickness with Klüberbio RM 2 stern tube oils

Oil film thickness ensuring hydrodynamic lubrication is a key prerequisite for reliable operation of propeller shafts.

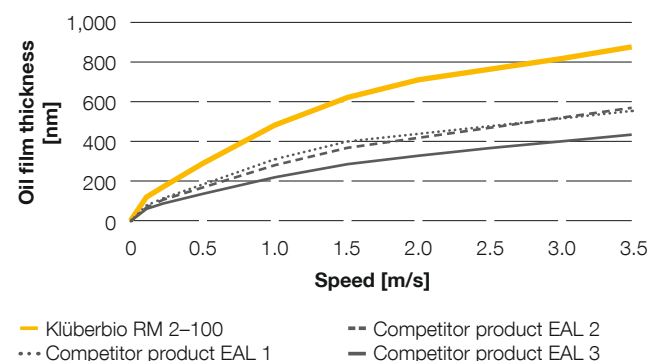
Klüberbio RM 2-100/150 oils provide a significantly higher oil film thickness and load carrying capacity under dynamic operation than other available EALs and thus prevent high-temperature alarms and journal bearing failures.

Further key performance characteristics and advantages are:

- Resistance against scoring/wear
- Shear and oxidation stability
- Inherent viscosity of base oil – no viscosity improvers added
- Good seal compatibility (approved by all leading OEMs)
- Demulsifying oil

#### Oil film thickness vs. speed

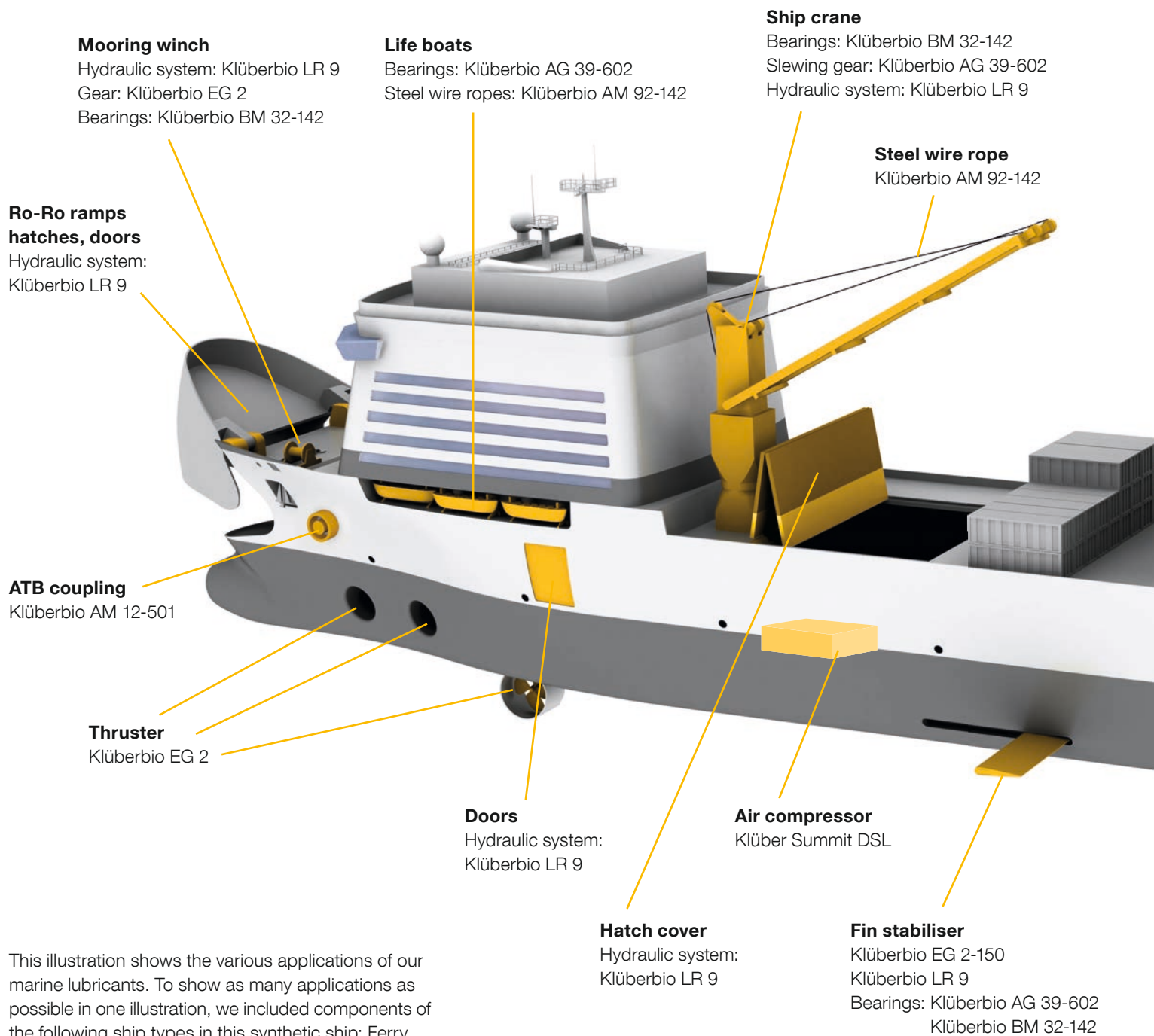
Test results of 100 mm<sup>2</sup>/s stern tube oils at 40° C



**Klüberbio RM 2-100 achieves higher oil film thickness in hydrodynamic operation than other EAL stern tube oils.**



## Selection of speciality lubricants on board





### Jacking system

Tooth rack & pinion: Klüberbio LG 39-700 N/-701 N,  
Klüberbio AG 39-602

**Planetary gearbox**  
Klüberbio EG 2-320

### Anchor handling winch

Open gear: Klüberbio AG 39-602, Klüberbio LG 39-700 N/-701 N  
Enclosed gear: Klüberbio EG 2-320  
Hydraulic motor: Klüberbio LR 9  
Steel wire rope: Klüberbio AM 92-142

### Offshore crane

Bearings: Klüberbio BM 32-142  
Slewing gear: Klüberbio AG 39-602  
Hydraulic system: Klüberbio LR 9  
Steel wire rope: Klüberbio AM 92-142

### Rail crane

Bearings: Klüberbio BM 32-142  
Hydraulic system: Klüberbio LR 9  
Steel wire rope: Klüberbio AM 92-142  
Rack & pinion: Klüberbio AG 39-602

### Stern roller

Bearings:  
Klüberbio LG 39-700 N

### Towing pins

Klüberbio AG 39-602

### Rudder

Bearings and seals:  
Klüberbio LG 39-700 N/-701 N  
Klüberbio AG 39-602

### Thruster / rudder propeller

Steering shaft seal: Klüberbio AG 39-602  
Gear: Klüberbio EG 2

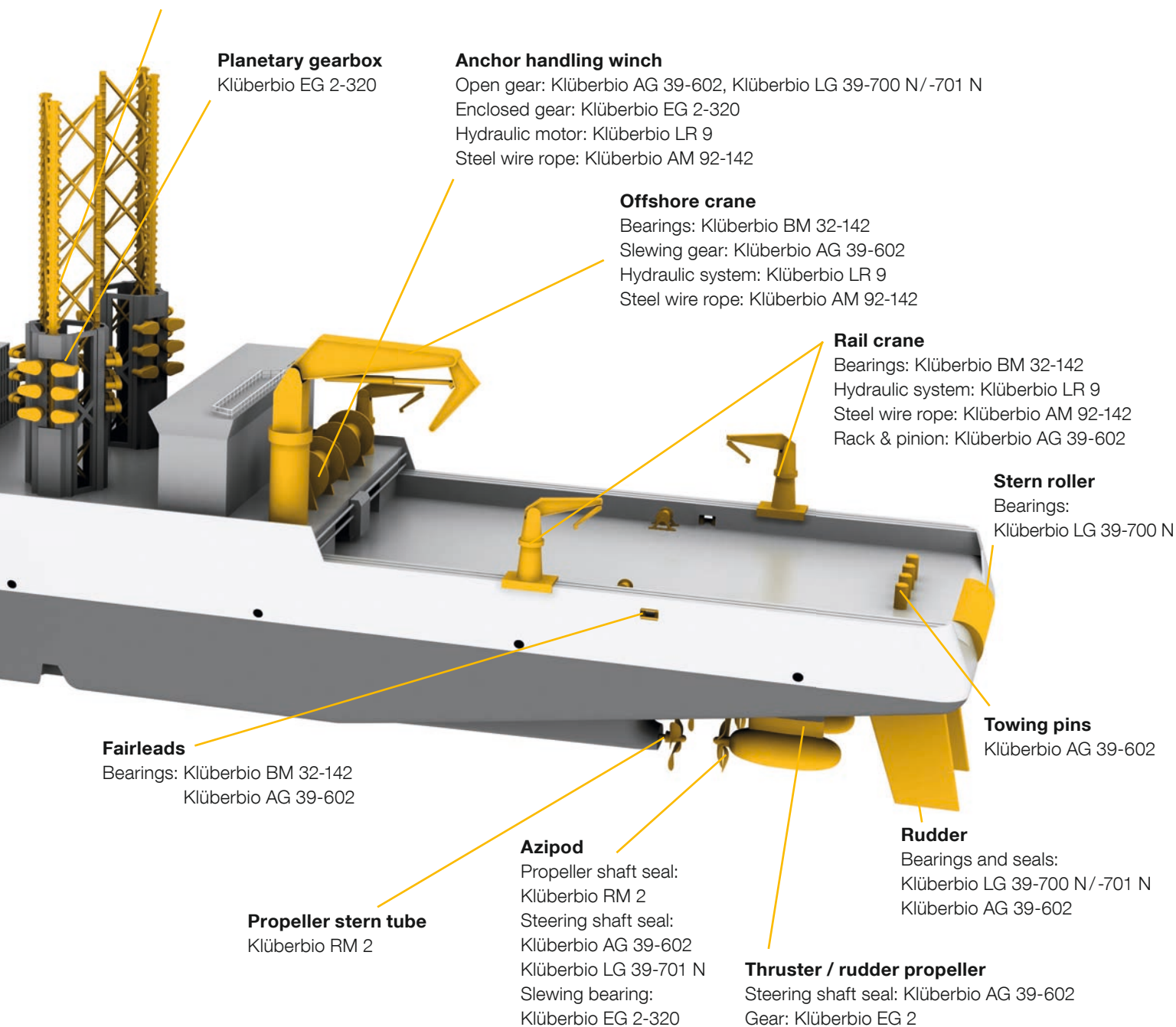
### Azipod

Propeller shaft seal:  
Klüberbio RM 2  
Steering shaft seal:  
Klüberbio AG 39-602  
Klüberbio LG 39-701 N  
Slewing bearing:  
Klüberbio EG 2-320





**Propeller stern tube**  
Klüberbio RM 2

### Fairleads

Bearings: Klüberbio BM 32-142  
Klüberbio AG 39-602



# Environmentally acceptable (EAL) and biodegradable lubricants for the marine industry

Product type	Speciality lubricant from Klüber Lubrication	Characteristic and environmentally relevant information	Module (selection)	Component (selection)
Stern tube oil	Klüberbio RM 2-100 Klüberbio RM 2-150	<ul style="list-style-type: none"> <li>– ISO VG 100</li> <li>– Biodegradability &gt; 60 %</li> <li>– European Ecolabel</li> <li>– EAL</li> </ul> 	<ul style="list-style-type: none"> <li>– Controllable pitch propeller</li> <li>– Fixed pitch propeller</li> </ul>	<ul style="list-style-type: none"> <li>– Stern tube bearing and propeller shaft seal</li> </ul>
Gear oil	Klüberbio EG 2-68 Klüberbio EG 2-100 Klüberbio EG 2-150 Klüberbio EG 2-320	<ul style="list-style-type: none"> <li>– ISO VG 68/100/150/320</li> <li>– Meet CLP requirements according to ISO 51517-3</li> <li>– Biodegradability &gt; 60 %</li> <li>– European Ecolabel</li> <li>– EAL</li> </ul> 	<ul style="list-style-type: none"> <li>– Thruster</li> <li>– Azipod from ABB</li> <li>– Anchor handling/mooring winch</li> </ul>	<ul style="list-style-type: none"> <li>– Gear set, bearings and seal</li> </ul>
Hydraulic oil	Klüberbio LR 9-32 Klüberbio LR 9-46 Klüberbio LR 9-68	<ul style="list-style-type: none"> <li>– ISO VG 32/46/68</li> <li>– Meet HEES requirements according to DIN ISO 15380</li> <li>– Biodegradability &gt; 60 %</li> <li>– European Ecolabel</li> <li>– EAL</li> </ul> 	<ul style="list-style-type: none"> <li>– Anchor handling/mooring winch</li> <li>– Ship crane</li> <li>– Offshore crane</li> <li>– Controllable pitch propeller</li> </ul>	<ul style="list-style-type: none"> <li>– Hydraulic motor</li> <li>– Hydraulic components</li> <li>– Servo piston inside the hub</li> </ul>
Chain oil	Klüberbio C 2-46	<ul style="list-style-type: none"> <li>– ISO VG 46</li> <li>– Biodegradability &gt; 60 %</li> </ul>	<ul style="list-style-type: none"> <li>– Derrick</li> </ul>	<ul style="list-style-type: none"> <li>– Chain</li> </ul>
Compressor oil	Klüber Summit DSL 32 Klüber Summit DSL 46 Klüber Summit DSL 68 Klüber Summit DSL 100 <sup>1)</sup>	<ul style="list-style-type: none"> <li>– ISO VG 32/46/68</li> <li>– Biodegradability &gt; 60 %</li> </ul>	<ul style="list-style-type: none"> <li>– Air compressor</li> </ul>	<ul style="list-style-type: none"> <li>– Air compressor</li> </ul>
Open gear grease	Klüberbio LG 39-700 N Klüberbio LG 39-701 N	<ul style="list-style-type: none"> <li>– NLGI 0, NLGI 1</li> <li>– Biodegradability &gt; 60 %</li> <li>– OSPAR, Denmark, Norway Yellow 1</li> <li>– EAL</li> </ul>	<ul style="list-style-type: none"> <li>– Jack-up system</li> <li>– Anchor handling winch</li> <li>– Stern roller</li> <li>– Rudder bearing</li> </ul>	<ul style="list-style-type: none"> <li>– Rack and pinion gear</li> <li>– Open gear</li> <li>– Slow turning bearing</li> </ul>
Open gear and steel wire rope grease	Klüberbio AG 39-602	<ul style="list-style-type: none"> <li>– NLGI 1 – 1.5</li> <li>– Biodegradability &gt; 60 %</li> <li>– EAL</li> </ul>	<ul style="list-style-type: none"> <li>– Jack-up system</li> <li>– Anchor handling/mooring winch</li> <li>– Ship crane</li> <li>– Offshore crane</li> <li>– Thruster/azipod (sealing grease)</li> </ul>	<ul style="list-style-type: none"> <li>– Rack and pinion gear</li> <li>– Open gear</li> <li>– Steel wire rope</li> <li>– Bar guide at spooling device</li> <li>– Slow turning slide bearing</li> <li>– Seal</li> </ul>
Multi-purpose EP 2 grease	Klüberbio BM 32-142	<ul style="list-style-type: none"> <li>– NLGI 2</li> <li>– Biodegradability &gt; 60 %</li> <li>– European Ecolabel</li> <li>– EAL</li> </ul> 	<ul style="list-style-type: none"> <li>– Deck machinery</li> </ul>	<ul style="list-style-type: none"> <li>– Bearings</li> </ul>
Multi-purpose EP 2 grease	Klüberbio M 72-82	<ul style="list-style-type: none"> <li>– NLGI 2</li> <li>– Biodegradability &gt; 60 %</li> </ul>	<ul style="list-style-type: none"> <li>– Deck machinery</li> </ul>	<ul style="list-style-type: none"> <li>– Bearings</li> <li>– Seal</li> </ul>
Wire rope grease	Klüberbio AM 92-142	<ul style="list-style-type: none"> <li>– NLGI 2</li> <li>– Biodegradability &gt; 60 %</li> <li>– EAL</li> </ul>	<ul style="list-style-type: none"> <li>– Offshore crane</li> <li>– Ship crane</li> <li>– Anchor handling/mooring winch</li> </ul>	<ul style="list-style-type: none"> <li>– Steel wire rope</li> </ul>
ATB coupling grease	Klüberbio AM 12-501	<ul style="list-style-type: none"> <li>– NLGI 1</li> <li>– Biodegradability &gt; 60 %</li> <li>– EAL</li> </ul>	<ul style="list-style-type: none"> <li>– ATB coupling</li> </ul>	<ul style="list-style-type: none"> <li>– Bearings</li> <li>– Pin</li> </ul>
Rust removing agent	Klüberbio Z 2-5	<ul style="list-style-type: none"> <li>– ISO VG 5</li> <li>– Biodegradability &gt; 60 %</li> </ul>	<ul style="list-style-type: none"> <li>– Miscellaneous</li> </ul>	

ISO viscosity class according to DIN ISO 3448; Consistency grade according to DIN 51818; Biodegradability according to OECD 301 F/B test after 28 days

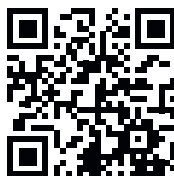
EAL – lubricant complies with requirements of Environmentally Acceptable Lubricants as defined in Appendix A of the 2013 Vessel General Permit

<sup>1)</sup> Biodegradability according to OECD 301 B after 35 days



**For an overview of our other lubricants for the marine industry, please see our brochure “Seaworthy“**

Find our brochures on [www.kluebermarine.com/brochures](http://www.kluebermarine.com/brochures)



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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 85 years.



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