

# Lubricants Product Program

1/2019

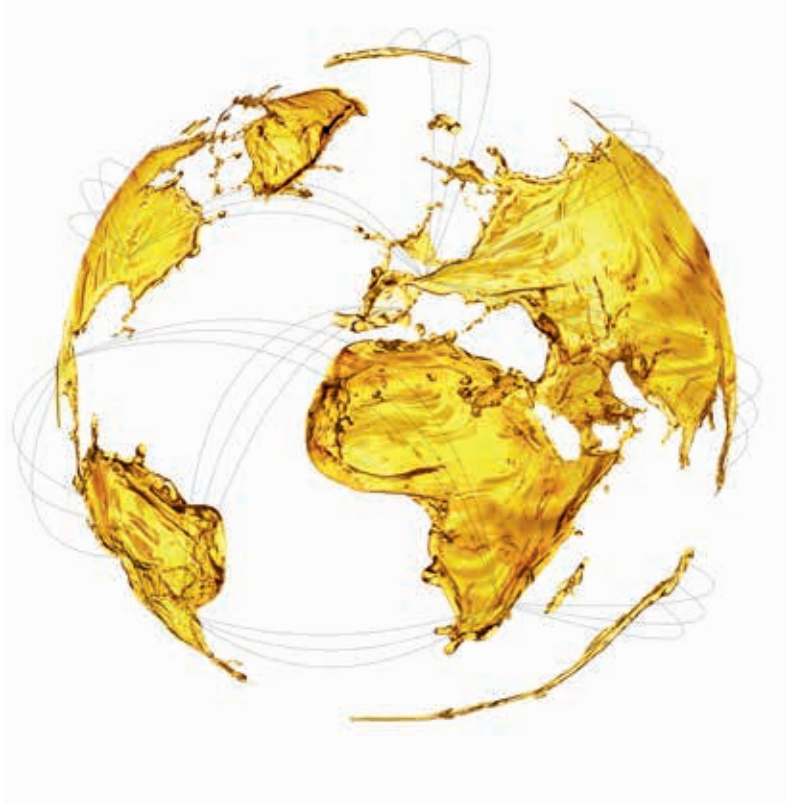


# LUBRICANTS. TECHNOLOGY. PEOPLE.

We focus consistently on high-quality lubricants and related specialties.

We develop innovative and holistic solutions for a wide variety of applications.

We value the high level of commitment of our employees and their trusting interaction with one another.



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### Facts and figures

**Company:** FUCHS SCHMIERSTOFFE GMBH, a company of the FUCHS Group

**Headquarters:** Mannheim

**Product range:** A full range of more than 2,000 products and 6,000 articles

**Certifications:** IATF 16949, ISO 14001, BS OHSAS 18001, ISO 50001

**References:** One of the leading lubricants OEM for the German automotive industry

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FUCHS has developed, produced and sold lubricants and related specialties for more than 85 years – for virtually all areas of application and sectors. With over 100,000 customers and 58 companies worldwide, the FUCHS Group is the leading independent supplier of lubricants.

A team of more than 900 specialists across Germany works to guarantee the satisfaction of our customers. Whatever their requirements, we have the ideal lubricant for their specific applications and processes. In our technology centre we link interdisciplinary expertise in a quick and efficient way – and work on innovative lubricant solutions to meet the demands of today and tomorrow every single day.



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Automotive Lubricants



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Imprint

## The World of Automotive Lubricants



### Engine Oils

FUCHS is one of the leading lubricant manufacturers for the initial filling of passenger cars, trucks and agricultural or construction machines. With a comprehensive range of lubricants for all automotive applications and the XTL®-Technology that is unique worldwide, FUCHS truly sets new standards. Upon starting the engine, engine oils with XTL®-Technology reach the places where their protective film is urgently needed quicker and easier, even under extreme conditions. This ensures reliable protection throughout the entire service life of the oil. For the driver, that means easier start processes, less wear and lower fuel consumption – and oil consumption is also significantly lower than in conventional oils of the same viscosity class. A pioneering engine oil technology.

**TITAN**



### Transmission Fluids

To ensure smooth running throughout their entire service life, modern car transmissions need state-of-the-art, high performance lubricants that protect the gearing from wear and considerably improve the ease with which gears are changed. Moreover, the extension of the replacement intervals right up to a lifetime filling increases the requirements placed on the quality of the oils. As a long-standing development partner of the world's leading gear manufacturers, we keep our finger on the pulse of the times. Stay on the safe side with the ultra-modern **TITAN** and **PENTOSIN** gear oils.

**TITAN, PENTOSIN**



### Lubricants for Agricultural Machinery

FUCHS has been active in the agricultural lubricant market for more than 70 years, both as an OEM for machine manufacturers and in the field of workshop services. The latest innovative lubricants under the **AGRIFARM** brand secure maximum operational reliability of all agricultural units – from engines and transmissions, right through to hydraulics in all machines and vehicles. **AGRIFARM** lubricants have proved extremely successful even under the very toughest conditions and thereby offer the highest level of reliability for your vehicle fleet.

**AGRIFARM**



### Motorcycle Lubricants

FUCHS offers more products that are specifically developed for the requirements of motorcycles and two-stroke engines than any other supplier on the market. Our new XP technology for motorized two-wheelers offers significantly reduced fuel and oil consumption, meets the highest API specifications and boosts performance with the Pro 4 and Comp 4 products.

**Silkolene®**



### Service Products

The FUCHS **MAINTAIN** range of workshop and service products is a comprehensive portfolio of coolant additives, brake fluids and fuel additives. These offer your vehicle optimum protection at all times – particularly in winter.

Our **MAINTAIN** products are individually matched to virtually every vehicle type and offer the best possible protection combined with the latest technology.

**MAINTAIN**



### Environmentally Friendly Lubricants

The dream of environmentally friendly lubricants is nothing new. Indeed, FUCHS was one of the first companies to enter the market with rapidly biodegradable lubricants back in the 70s. Since then, FUCHS has invested heavily in researching and further developing these lubricants.

The reward for all this hard work: a priceless and unparalleled wealth of expertise and practical experience. Because one thing is certain: a good product alone is not enough. The user also needs competent advice when choosing the right product, switching over to rapidly biodegradable lubricants and for application. It really pays off to have an expert partner by your side.

**PLANTO**



## The World of Industrial Lubricants



### Industrial Oils

Industrial lubricants have an important task in the generation and transmission of energy, in the reduction or transmission of drive forces, in the deployment of machine tools, when generating cooling air or compressed air and for many other applications in production. FUCHS industrial lubricants can make a significant contribution to achieving higher productivity, improving efficiency and saving energy, for example in hydraulic systems, gear units and many other applications. Furthermore, rapidly biodegradable lubricants from FUCHS present a real alternative to hydrocarbon-based lubricants.

**RENOLIN, RENISO,  
RENEP, PLANTO**

### Greases

Lubricating greases are consistent lubricants made up of base oil and a specially chosen thickener. To increase certain properties, additives are added to the lubricating greases. Lubricating greases are structural elements, especially when used as long-life lubricants for lifetime lubrication. **RENOLIT** industrial lubricating greases are a balanced and complete package offering the ideal technical and economical solution in the largest possible number of lubricating grease applications in industry.

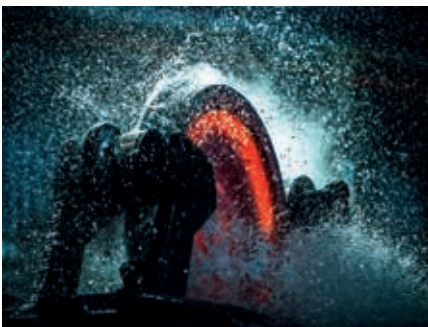
**RENOLIT, PLANTO**

### Cutting Fluids

Today, a modern cutting fluid is subjected to a variety of demands. Cooling lubricants for metalworking processes must be effective, economical and free from ingredients that are harmful to health and the environment. In process chains downstream of metalworking, customized cleaning agent solutions and process-compatible and reliable corrosion preventatives play a decisive role when it comes to production reliability and product quality. That's why optimally matched lubricant concepts are important – because all process steps must be taken into account. With its comprehensive range of lubricants and its many years of application experience, FUCHS understands the processes of its customers like no other lubricant manufacturer.

**ECOCOOL, ECOCUT**





### Quenching Products

Fluids are highly important in the area of heat treatment in particular: the required microstructure compositions and degrees of solidity can only be achieved with the right quenching medium. An altered quenching characteristic has a direct effect on the hardened microstructure, on the properties of the material and thereby also on its later deployment. Place your trust in a partner that understands the full heat treatment process, that uses that knowledge to advise you and provides you with system solutions – to your benefit.

**THERMISOL**



### Cleaner

When manufacturing metal products, all materials that have a negative impact on the subsequent production steps or disrupt the later use of the metallic object must be removed from the surfaces. In addition to an extensive consulting, FUCHS offers everything from a single source. Perfectly matched products together with a comprehensive spectrum of industrial cleaners ensure a high level of process safety by avoiding product incompatibility as well as delivering excellent performance in virtually all cleaning processes.

**RENOCLEAN**



### Corrosion Preventives Forming Lubricants

Corrosion protection measures must be optimally compatible with upstream process steps and the products used there. Our recommendation: the compatible **ANTICORIT** corrosion protection products. A wide range of film types is available, from oily to vaseline-type or waxy films. If no film is desired, we solve your corrosion protection problems with our complete VCI range comprising papers, foils, tablets, foams and many other special solutions.

**RENOFORM  
ANTICORIT**

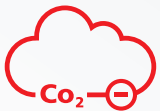
## FUCHS lubricants

stand for performance and sustainability, for safety and reliability, for efficiency and cost savings.

They represent a promise: **technology that pays back.**



Rapidly  
biodegradable



Reduced CO<sub>2</sub>



Food grade



Fuel saving



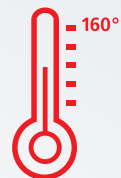
Process compatibility



Corrosion protection



Extension of  
maintenance intervals



High thermal  
resistance



Less wear



Reduced oil  
consumption

# Examples for Key Technologies

## **RENOLIN XTREMETEMP 46 INDUSTRIAL OIL**

A special product in terms of sustainability is the hydraulic oil RENOLIN XtremeTemp 46. Thanks to its special composition, it displays fuel saving potential of 3% to 6% in mobile hydraulics applications.

## **RENOLIN ZAF B HT INDUSTRIAL OIL**

The RENOLIN ZAF B HT range excels through high thermal and oxidative resistance and excellent wear-protection characteristics. In combination with selected mineral oil-based solvent raffinates, the innovative zinc-free and ash-free additive technology guarantees excellent hydraulic and gear oil properties.

## **RENOLIN GEAR VCI INDUSTRIAL OIL**

The new RENOLIN GEAR VCI product is a high performance industrial gear oil that combines the properties of a high performance gear oil with reliable corrosion protection. Thanks to its vapor phase corrosion protection, the product guarantees reliable long-term protection and is used in transmissions that have long downtimes or are stored for an extended period of time.

## **ECOCOOL PHH AL COOLING LUBRICANT**

With ECOCOOL PHH AL, FUCHS has developed a universally deployable cooling lubricant for aerospace applications that is suitable for all kinds of material groups, is boron-free and fulfils the requirements of REACH and TSCA. Beside the standard market engine materials (titanium, nickel and aluminium alloys), the test also had to be passed for older high-strength steels to be approved for use at Lufthansa Technik.

## **ANTICORIT CPX®**

### **LONG-TERM CORROSION PREVENTION**

With its ANTICORIT CPX® range, FUCHS has developed a new formulation category for long-term corrosion protection (10 years). This new wax system guarantees controlled runoff inhibition, both at increased temperatures and at normal ambient temperatures, without compromising penetration into gaps and flanges. It also easy to remove. Individual parameters – such as drying time, run-off tendency, period of corrosion protection and film flexibility – can be customized according to customer requirements. CPX® technology is extremely versatile and suitable for a whole host of different applications, whether cavity protection, long-term warehousing or transport protection.





## Ground-breaking XTL®-Technology.

While starting, engine oils with XTL®-Technology reach faster and easier the parts of an engine, which urgently require a protective oil film – even under extreme conditions and over the entire duration of the oil change interval.

This means: Easier start-ups, less wear and lower fuel consumption. Even oil consumption is significantly lower than with conventional SAE 5W-30 oils.





# Product Overview

## Automotive Lubricants

16-65

### Engine Oils

|                                                        |       |                                                  |       |
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| Engine Oils for Passenger Cars and Commercial Vehicles | 22    | Gas Engine Oils for Stationary Gas Engines       | 28-29 |
| Engine Oils for Commercial Vehicles                    | 23-25 | 4-Stroke Marine Engine Oil                       | 30    |
| Engine Oil for Commercial Vehicles with Gas Engines    | 25    | 2-Stroke Engine Oils                             | 31    |
| Railroad Engine Oil                                    | 26    |                                                  |       |

### Transmission Fluids

|                                                      |       |                                                      |       |
|------------------------------------------------------|-------|------------------------------------------------------|-------|
| Gear Oils for Passenger Cars                         | 32-33 | Multifunctional Gear Oils for Construction Machinery | 36    |
| Gear Oils for Passenger Cars and Commercial Vehicles | 33-34 | Double Clutch Transmission Fluids (DCTF)             | 37-38 |
| Gear Oils for Commercial Vehicles                    | 34-35 | Automatic Transmission Fluids (ATF)                  | 38-40 |

### Hydraulic Fluids

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### Lubricants for Agricultural Machinery

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| Engine Oils | 43-44 | Rapidly Biodegradable Lubricant, Gear Oil, Milking Machine Oil | 45 |

### Motorcycle Lubricants

|                               |       |          |       |
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| RACE, RIDE, SCOOT Engine Oils | 46-47 | MAINTAIN | 47-48 |
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### Cleaner, Fitting Product

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## Product Overview Industrial Lubricants

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| Gear and Circulating Oils | 77-82 | Refrigeration Oils                                                                                             | 91-94 |
| Slideway Oils             | 83    | Environmentally Friendly Industrial Oils                                                                       | 95-97 |
| Paper Machine Oils        | 84-85 | Cylinder Oils, Tacky Oils, Heat Transfer Oils,<br>Special Sealing Oils for Gasometers,<br>IRM Reference Fluids | 98-99 |
| Turbine Oils              | 86    |                                                                                                                |       |
| Oils for Transformers     | 87    |                                                                                                                |       |

### Greases

100-129

|                                       |         |                                         |         |
|---------------------------------------|---------|-----------------------------------------|---------|
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| Greases for Plain and Roller Bearings | 105-110 | Greases for Central Lubricating Systems | 120-121 |
| Greases for Gear Boxes                | 111-112 | Greases with Solid Lubricants           | 122-123 |
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### Metal Processing Lubricants

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#### Cutting Fluids – Water-miscible

|                                                           |         |                                                                                                  |     |
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| Machining Cast Iron and Low-Alloy Steels                  | 135     | Defoamers, Synergetically Matched to<br>ECOCOOL Water-miscible Metalworking Fluids               | 137 |
| Machining High-Alloy Steels and Hot Strength<br>Materials | 135     | Bactericides and Fungicides for the Maintenance<br>of ECOCOOL Water-miscible Metalworking Fluids | 138 |
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| Machining Magnesium                                       | 136     |                                                                                                  |     |

## Metal Processing Lubricants

### Neat Cutting Fluids

|                                                                                                    |     |                                                                                                                      |     |
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| ECOCUT 3000 Series, HFN Series                                                                     | 139 | Specific Application – Tool Grinding                                                                                 | 141 |
| ECOCUT FT Series Containing GTL-Base Oil,<br>ECOCUT 500 Series, 600 Series, 700 Series, 800 Series | 140 | Specific Applications – Gear Machining,<br>Spark Erosion, Threading, Honing, Finishing,<br>AERO and Medical Industry | 142 |
| PLANTOCUT Series – Environmentally Friendly<br>Metalworking Fluids                                 | 141 | Specific Applications – Lapping, Deep Hole Drilling                                                                  | 143 |
| Minimum Quantity Lubrication (MQL)                                                                 | 141 | Adjusting Concentrate for Cutting Oils                                                                               | 143 |

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|                                                            |     |                                                                                                                |     |
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| High-performance Hardening Oils based on<br>Mineral Oil    | 144 | Synthetic High-performance Hardening Oils<br>and High-performance Hot Bath Hardening Oils<br>or Tempering Oils | 145 |
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# AUTOMOTIVE LUBRICANTS

Never before lubricant technology has been as challenging for vehicles as it is today. Alternative fuels, new engine technologies, complex exhaust aftertreatment systems and significantly longer oil drain intervals require consistently high performance from the lubricants used.

To ensure that modern vehicles remain highly efficient in the long term, FUCHS, as one of the leading original equipment suppliers to the German automotive industry, has developed a comprehensive product range. The range of lubricants for cars, trucks, commercial vehicles and motorcycles includes high-quality oils for almost all engines, transmissions and also for all automated transmissions such as dual-clutch transmissions and torque converter transmissions, for central hydraulics and axles as well as service fluids such as antifreeze additives, brake fluids and much more.

With its comprehensive range of lubricants for all automotive applications and the world-wide unique XTL® technology, FUCHS sets new standards.

FUCHS meets the extremely high performance requirements and quality standards of car manufacturers and is certified according to IATF 16949. The extensive product range meets almost all internationally valid specifications and original manufacturer approvals and includes lubricants for almost all vehicle manufacturers



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## Automotive Lubricants

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## Engine Oils



| Product name                                                                                                                           | Description                                                                                                                                                                                                                                                                                                                                                      | Specifications | Approvals                                                        | FUCHS Recommendations                                      |
|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------|------------------------------------------------------------|
| <b>Engine Oils for Passenger Cars</b>                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                  |                |                                                                  |                                                            |
| <b>TITAN<br/>GT1 EVO<br/>SAE 0W-20</b><br><br>      | Premium Performance Engine Oil with new XTL®-Technology in path-breaking viscosity class. Specially designed for highly stressed downsized engines with maximum power output, for extreme fuel-economy characteristics and reduced CO <sub>2</sub> emissions. Excellent cold starting behaviour, very fast oil circulation and outstanding performance reserves. | —              | BMW LONGLIFE-14 FE+                                              | ACEA A1/B1<br>JAGUAR LAND ROVER<br>STJLR.51.5122           |
| <b>TITAN<br/>GT1 PRO V<br/>SAE 0W-20</b><br><br>    | Premium Performance Engine Oil with new XTL®-Technology in ground-breaking viscosity class. Specially designed for modern VOLVO vehicles, for extreme fuel-economy characteristics and reduced CO <sub>2</sub> emissions. Excellent cold starting behaviour, very fast oil circulation and outstanding performance reserves.                                     | —              | VOLVO VCC RBS0-2AE                                               | ACEA A1/B1                                                 |
| <b>TITAN<br/>GT1 LONGLIFE IV<br/>SAE 0W-20</b>                                                                                         | Premium Performance Engine Oil in ground-breaking viscosity class. Specially designed for modern VW vehicles, for extreme fuel-economy characteristics and reduced CO <sub>2</sub> emissions. Excellent cold starting behaviour, very fast oil circulation and outstanding performance reserves.                                                                 | ACEA C5        | VW 508 00/509 00                                                 | PORSCHE C20                                                |
| <b>TITAN<br/>GT1 LL-12 FE<br/>SAE 0W-30</b><br><br> | Premium Performance Engine Oil with new XTL®-Technology. Specially developed for latest BMW gasoline and diesel vehicles with exhaust after treatment. Excellent cold starting, lower oil consumption and outstanding performance reserves.                                                                                                                      | ACEA C2        | BMW LONGLIFE-12 FE<br><b>JAGUAR LAND ROVER<br/>STJLR.03.5007</b> | —                                                          |
| <b>TITAN<br/>GT1<br/>SAE 0W-30</b>                                                                                                     | Premium Performance, fuel-economy engine oil for modern passenger cars and light commercial vehicles. Specially developed for latest PSA gasoline and diesel vehicles with exhaust after treatment and turbocharger. Excellent cold starting, lower oil consumption and minimized exhaust emissions.                                                             | ACEA C2        | PSA B71 2312                                                     | FIAT 9.55535-DS1/<br>GS1<br>IVECO 18-1811<br>CLASSE SC1 LV |

Performance upgrades in Specifications, Approvals and FUCHS Recommendations are highlighted in bold.

**TITAN**

| Product name                                                                                                                                      | Description                                                                                                                                                                                                                                                                                                                                                      | Specifications                            | Approvals                                                                                                                                                      | FUCHS Recommendations                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Engine Oils for Passenger Cars</b>                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                  |                                           |                                                                                                                                                                |                                                                                 |
| <b>TITAN<br/>GT1 FLEX 23<br/>SAE 5W-30</b><br><br><br><b>NEW</b> | Premium Performance, extreme fuel-economy engine oil with optimum cold start ability and outstanding performance reserves. For modern passenger cars and light commercial vehicles with or without extended service intervals. Specially developed for BMW, Mercedes-Benz and Opel vehicles with exhaust after treatment and turbocharger.                       | ACEA C2/C3<br>API SN                      | BMW LONGLIFE-04<br>dexos2™ (GXXX)<br>MB-APPROVAL 229.31<br>MB-APPROVAL 229.51<br>MB-APPROVAL 229.52<br>VW 505 00/505 01                                        | FIAT 9.55535-S1 / -S3<br>GM-LL-A-025<br>GM-LL-B-025<br>IVECO 18-1811 CLASSE SC1 |
| <b>TITAN<br/>GT1 PRO C-3<br/>SAE 5W-30</b><br><br>               | Premium Performance, extreme fuel-economy engine oil with new XTL®-Technology for optimum cold start ability and outstanding performance reserves. For modern passenger cars and light commercial vehicles with or without extended service intervals. Specially developed for BMW, VW and Mercedes-Benz vehicles with exhaust after treatment and turbocharger. | ACEA C3<br>API SN                         | BMW LONGLIFE-04<br>MB-APPROVAL 229.51<br>PORSCHE C30<br>VW 504 00/507 00                                                                                       | FIAT 9.55535-S3                                                                 |
| <b>TITAN<br/>GT1 PRO 229.6<br/>SAE 5W-30</b><br><br>           | Premium Performance, extreme fuel-economy engine oil with new XTL®-Technology. Specially designed for Mercedes-Gasoline-Vehicles. Optimum cold starting, lower oil consumption and minimized exhaust emissions.                                                                                                                                                  | ACEA A5/B5                                | MB-APPROVAL 229.6                                                                                                                                              | –                                                                               |
| <b>TITAN<br/>GT1 PRO C-1<br/>SAE 5W-30</b>                                                                                                        | Premium Performance, extreme fuel-economy engine oil for modern passenger cars and light commercial vehicles with or without extended service intervals. Specially developed for vehicles with exhaust after treatment and turbocharger. Optimum cold starting, lower oil consumption and minimized exhaust emissions.                                           | –                                         | JAGUAR LAND ROVER<br>STJLR.03.5005                                                                                                                             | JASO DL-1<br>FORD WSS-M2C934-B                                                  |
| <b>TITAN<br/>GT1 PRO 2290<br/>SAE 5W-30</b><br><br><b>NEW</b>                                                                                     | Premium Performance, extreme fuel-economy engine oil for modern passenger cars and light commercial vehicles with or without extended service intervals. Specially developed for PSA vehicles with exhaust after treatment and turbocharger. Optimum cold starting, lower oil consumption and minimized exhaust emissions.                                       | ACEA C2                                   | PSA B71 2290                                                                                                                                                   | –                                                                               |
| <b>TITAN<br/>GT1 PRO C-4<br/>SAE 5W-30</b>                                                                                                        | Premium Performance, extreme fuel-economy engine oil for modern passenger cars and light commercial vehicles with or without extended service intervals. Specially for Renault engines with exhaust after treatment and turbocharger. Optimum cold starting, lower oil consumption and minimized exhaust emissions.                                              | –                                         | MB-APPROVAL 226.51<br>RENAULT RN0720                                                                                                                           | –                                                                               |
| <b>TITAN<br/>GT1<br/>SAE 5W-40</b><br><br>                     | Premium Performance, fuel-economy engine oil with new XTL®-Technology for optimum cold start ability and outstanding performance reserves. For modern passenger cars and light commercial vehicles with or without extended service intervals. Specially developed for vehicles with exhaust after treatment and turbocharger.                                   | ACEA C3<br>API SN/SM<br>FORD WSS-M2C917-A | BMW LONGLIFE-04<br>dexos2™ (D20311HE075)<br>MB-APPROVAL 226.5<br>MB-APPROVAL 229.31<br>PORSCHE A40<br>RENAULT RN0700/<br>RN0710<br>VW 502 00/<br>505 00/505 01 | API CF<br>FIAT 9.55535-S2<br>FIAT 9.55535-T2                                    |
| <b>TITAN<br/>Supersyn<br/>LONGLIFE PLUS<br/>SAE 0W-30</b>                                                                                         | Ultra High Performance, extreme fuel-economy engine oil formulated with fully synthetic base oil for VW engines. Specially developed for VW Longlife Technology. For all passenger car gasoline and diesel engines with or without pump injector technology. Excellent cold starting and lower oil consumption.                                                  | –                                         | VW 503 00/506 00/<br>506 01                                                                                                                                    | –                                                                               |



## Engine Oils

| Product name                                     | Description                                                                                                                                                                                                       | Specifications                                                 | Approvals                                                                                                                                 | FUCHS Recommendations                                                                                                                                 |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Engine Oils for Passenger Cars</b>            |                                                                                                                                                                                                                   |                                                                |                                                                                                                                           |                                                                                                                                                       |
| <b>TITAN Supersyn LONGLIFE SAE 0W-30</b>         | Ultra High Performance, extreme fuel-economy engine oil for a variety of vehicles with or without extended service intervals. Excellent cold starting and lower oil consumption.                                  | ACEA A3/B4<br>API SL                                           | MB-APPROVAL 229.5<br>VW 502 00/505 00                                                                                                     | BMW LONGLIFE-01                                                                                                                                       |
| <b>TITAN Supersyn LONGLIFE SAE 0W-40</b>         | Ultra High Performance, fuel-economy engine oil for a variety of vehicles with or without extended service intervals. Excellent cold starting and lower oil consumption.                                          | ACEA A3/B4<br>API SN                                           | BMW LONGLIFE-01<br>MB-APPROVAL 229.5<br>PORSCHE A40<br>VW 502 00/505 00                                                                   | FORD WSS-M2C937-A                                                                                                                                     |
| <b>TITAN Supersyn LONGLIFE SAE 5W-40</b>         | Ultra High Performance, fuel-economy engine oil for a variety of vehicles with or without extended service intervals. Optimum cold starting and lower oil consumption.                                            | ACEA A3/B4<br>API SN/SM                                        | BMW LONGLIFE-01<br>MB-APPROVAL 226.5<br>MB-APPROVAL 229.5<br>PORSCHE A40<br>PSA B71 2296<br>RENAULT RN0700/<br>RN0710<br>VW 502 00/505 00 | API CF<br>GM-LL-B-025                                                                                                                                 |
| <b>TITAN Supersyn FE SAE 0W-30</b>               | Ultra High Performance, fuel-economy engine oil for a variety of vehicles with or without extended service intervals. Excellent cold starting properties and low oil consumption.                                 | ACEA A5/B5                                                     | VOLVO VCC<br>95200377                                                                                                                     | RENAULT RN0700                                                                                                                                        |
| <b>TITAN Supersyn F Eco-FE SAE 0W-30</b>         | Ultra High Performance, extreme fuel-economy engine oil especially developed for modern Ford Diesel engines. Excellent cold starting and lower oil consumption.                                                   | ACEA C2<br>FORD WSS-M2C950-A                                   | –                                                                                                                                         | –                                                                                                                                                     |
| <b>TITAN Supersyn F Eco-B SAE 5W-20</b>          | Ultra High Performance, extreme fuel-economy engine oil especially developed for Ford EcoBoost gasoline engines. Optimum cold starting and lower oil consumption.                                                 | ACEA C5<br>API SN<br>FORD WSS-M2C948-B                         | JAGUAR LAND ROVER<br>STJLR.03.5004                                                                                                        | ACEA A1/B1<br>CHRYSLER MS 6395<br>FORD WSS-M2C925-A<br>FORD WSS-M2C925-B                                                                              |
| <b>TITAN Supersyn F Eco-DT SAE 5W-30</b>         | Ultra High Performance, extreme fuel-economy engine oil especially suitable for Ford DuraTorq-Diesel engines. Optimum cold starting and lower oil consumption.                                                    | ACEA A5/B5<br>API SL<br>FORD WSS-M2C913-C<br>FORD WSS-M2C913-D | JAGUAR LAND ROVER<br>STJLR.03.5003                                                                                                        | ACEA A1/B1<br>API CF<br>CHRYSLER MS 6395<br>FORD WSS-M2C913-A<br>FORD WSS-M2C913-B<br>IVECO 18-1811 CLASSE S1/S2<br>JAGUAR M2C913-B<br>RENAULT RN0700 |
| <b>TITAN Supersyn D1 SAE 0W-20</b><br><b>NEW</b> | Ultra High Performance, extreme fuel-economy engine oil, specially developed for GM gasoline engines requiring dexos1™ Gen 2 fluid. Optimum cold starting, lower oil consumption and minimised exhaust emissions. | API SN PLUS RC<br>ILSAC GF-5                                   | dexos1™ Gen 2<br>(D10172GJ075)                                                                                                            | CHRYSLER MS 6395<br>FIAT 9.55535-CR1<br>FIAT 9.55535-GSX<br>FORD WSS-M2C947-A                                                                         |
| <b>TITAN Supersyn D1 SAE 5W-30</b>               | Ultra High Performance, extreme fuel-economy engine oil, specially developed for GM gasoline engines requiring dexos1™ Gen 2 fluid. Optimum cold starting, lower oil consumption and minimised exhaust emissions. | API SN PLUS RC<br>ILSAC GF-5                                   | dexos1™ Gen 2<br>(D10173GJ075)                                                                                                            | FORD WSS-M2C929-A<br>FORD WSS-M2C946-A<br>FIAT 9.55535-CR1<br>CHRYSLER MS 6395<br>GM 6094M<br>GM 4718M                                                |
| <b>TITAN Supersyn SAE 5W-30</b>                  | Ultra High Performance, extreme fuel-economy engine oil for a variety of vehicles with or without extended service intervals. Optimum cold starting and lower oil consumption.                                    | ACEA A3/B4<br>API SL                                           | MB-APPROVAL 229.3<br>VW 502 00/505 00                                                                                                     | API CF<br>BMW LONGLIFE-98<br>GM-LL-A-025<br>GM-LL-B-025<br>RENAULT RN0700/RN0710                                                                      |
| <b>TITAN Supersyn SAE 5W-40</b>                  | Ultra High Performance, fuel-economy engine oil for a variety of vehicles with or without extended service intervals. Optimum cold starting and lower oil consumption.                                            | ACEA A3/B4<br>API SN/SM                                        | MB-APPROVAL 229.3<br>PORSCHE A40<br>RENAULT RN0700/<br>RN0710<br>VW 502 00/505 00                                                         | API CF<br>BMW LONGLIFE-98<br>FIAT 9.55535-H2/M2/N2/Z2<br>GM-LL-A-025<br>GM-LL-B-025                                                                   |



| Product name                          | Description                                                                                                                                                                         | Specifications       | Approvals                                                                                           | FUCHS Recommendations                              |
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| <b>Engine Oils for Passenger Cars</b> |                                                                                                                                                                                     |                      |                                                                                                     |                                                    |
| <b>TITAN Supersyn SAE 5W-50</b>       | Ultra High Performance, fuel-economy engine oil for passenger cars. Optimum cold starting behaviour and low oil consumption. Highly durable lubricating film and high oil pressure. | –                    | –                                                                                                   | ACEA A3/B4<br>API SL/CF                            |
| <b>TITAN Supersyn SAE 10W-60</b>      | Ultra High Performance, fuel-economy engine oil for passenger cars. Low oil consumption. Highly durable lubricating film and high oil pressure.                                     | –                    | –                                                                                                   | ACEA A3/B3<br>API SL/CF<br>FIAT 9.55535-H3         |
| <b>TITAN SYN MC SAE 10W-40</b>        | Super High Performance, fuel-economy engine oil based on MC-synthesis for a variety of gasoline and diesel engines in passenger cars. Lower oil consumption.                        | ACEA A3/B4<br>API SN | MB-APPROVAL 229.1<br>MB-APPROVAL 229.3<br>PSA B71 2300<br>RENAULT RN0700/RN0710<br>VW 501 01/505 00 | API CF<br>FIAT 9.55535-D2/G2                       |
| <b>TITAN FORMULA SAE 15W-40</b>       | High Performance Engine Oil specially for all normally aspirated and turbocharged gasoline and diesel engines in passenger cars operated under normal conditions.                   | ACEA A3/B3<br>API SL | MB-APPROVAL 229.1                                                                                   | API CG-4<br>FIAT 9.55535-D2/G2<br>VW 501 01/505 00 |

## Engine Oils

| Product name                                                  | Description                                                                                                                                                                                                                                                                                                              | Specifications                                            | Approvals                                                                                                                                                                                                                        | FUCHS Recommendations                                                                                                                                    |
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| <b>Engine Oils for Passenger Cars and Commercial Vehicles</b> |                                                                                                                                                                                                                                                                                                                          |                                                           |                                                                                                                                                                                                                                  |                                                                                                                                                          |
| <b>TITAN<br/>UNIMAX ULTRA<br/>MC<br/>SAE 10W-40</b>           | Premium Performance Engine Oil based on MC-synthesis for all commercial vehicles, off-highway equipment and passenger cars. Substantial rationalisation opportunities for mixed fleets. Prolongation of drain intervals possible with many manufacturers. Good cold starting and lower oil consumption.                  | ACEA E7/B4/B3/A3<br>API CI-4<br>GLOBAL DHD-1<br>JASO DH-1 | <b>CUMMINS CES 20077/8</b><br>DETROIT DIESEL 93K215<br>DEUTZ DQC III-10<br>MACK EO-M PLUS<br>MAN M 3275-1<br>MB-APPROVAL 228.3<br>MB-APPROVAL 235.27<br>MTU DDC TYPE 2<br>RENAULT RLD/RLD-2<br>VOITH-RETARDER „A“<br>VOLVO VDS-3 | ALLISON C-4<br>CAT ECF-2<br>CUMMINS CES 20071/2/6<br>MB 229.1<br>VW 500 00/501 01/<br>505 00                                                             |
| <b>TITAN<br/>UNIMAX PLUS<br/>MC<br/>SAE 10W-40</b>            | Ultra High Performance, fuel-economy engine oil based on MC-synthesis for all commercial vehicles, off-highway equipment and passenger cars. Substantial rationalisation opportunities for mixed fleets. Prolongation of drain intervals possible with some manufacturers. Good cold starting and lower oil consumption. | ACEA E7/B3/A3<br>API CH-4                                 | DEUTZ DQC II-10<br>MAN M 3275-1<br>MB-APPROVAL 228.3<br>MB-APPROVAL 235.27<br>MTU DDC TYPE 2<br>RENAULT RD/RD-2<br>VOITH-RETARDER „A“<br>VOLVO VDS-2                                                                             | ALLISON C-4<br>CUMMINS CES 20071/2/6/7<br>MACK EO-M PLUS<br>MB 229.1                                                                                     |
| <b>TITAN<br/>UNIVERSAL HD<br/>SAE 15W-40</b>                  | High Performance Engine Oil for mixed fleets operated under normal conditions. Good performance in normally aspirated and turbocharged diesel engines.                                                                                                                                                                   | ACEA A3/B3<br>API SL                                      | DEUTZ DQC I-02<br>MB-APPROVAL 229.1<br>MTU DDC TYPE 2                                                                                                                                                                            | ACEA E2<br>API CG-4/CF<br>MIL-L-2104 E<br>ALLISON C-4<br>CASE MS 1120<br>MACK EO-L<br>MAN 271<br>NH 330G<br>STEYR A-202<br>VOLVO VDS<br>VW 501 01/505 00 |

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| Product name                                                                                                                  | Description                                                                                                                                                                                                                                                        | Specifications                                                             | Approvals                                                                                                                                                                                                                                                           | FUCHS Recommendations                                                                                                       |
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| <b>Engine Oils for Commercial Vehicles</b>                                                                                    |                                                                                                                                                                                                                                                                    |                                                                            |                                                                                                                                                                                                                                                                     |                                                                                                                             |
| <b>TITAN CARGO MAXX SAE 5W-30</b><br><br>  | Premium MAXX Performance Engine Oil with new XTL®-Technology. Specially developed for vehicles with modern exhaust after treatment and turbocharger. Optimum cold starting properties and ageing stability for extreme fuel-economy over the whole drain-interval. | ACEA E9/E7/E6/E4<br>API CJ-4<br>CAT ECF-3<br><b>JASO DH-2</b><br>SCANIA LA | DEUTZ DQC IV-10 LA<br>DETROIT DIESEL 93K218<br>MACK EO-O PREMIUM PLUS<br>MAN M 3271-1<br>MAN M 3477<br>MAN M 3575<br>MAN M 3677<br>MB-APPROVAL 228.31<br>MB-APPROVAL 228.51<br>MTU DDC TYPE 2.1<br>MTU DDC TYPE 3.1<br>RENAULT RLD-3<br>SCANIA LDF-4<br>VOLVO VDS-4 | CUMMINS CES 20081<br>IVECO 18-1804 CLASSE TLS E6                                                                            |
| <b>TITAN CARGO MAXX SAE 10W-30</b><br><br><b>NEW</b>                                                                          | Premium MAXX Performance Engine Oil. Specially developed for vehicles with modern exhaust after treatment and turbocharger. Optimum cold starting properties and ageing stability for extreme fuel-economy over the whole drain-interval.                          | ACEA E9/E7/E6<br>API CK-4/SN<br>CAT ECF-3                                  | DEUTZ DQC IV-10 LA<br>MACK EOS-4.5<br>MAN M 3477<br>MAN M 3677<br>MB-APPROVAL 228.51<br>MTU DDC TYPE 3.1<br>RENAULT RLD-3<br>SCANIA LA<br>VOLVO VDS-4.5                                                                                                             | CUMMINS CES 20086<br>DETROIT DIESEL 93K218<br>DETROIT DIESEL 93K222<br>JASO DH-2                                            |
| <b>TITAN CARGO MAXX SAE 10W-40</b><br><br> | Premium MAXX Performance Engine Oil with new XTL®-Technology. Specially developed for vehicles with modern exhaust after treatment and turbocharger. Good cold starting properties and ageing stability for fuel-economy over the whole drain-interval.            | ACEA E9/E7/E6/E4<br>API CJ-4<br>JASO DH-2<br>CAT ECF-3                     | DEUTZ DQC IV-10 LA<br>MACK EO-O PREMIUM PLUS<br>MAN M 3271-1<br>MAN M 3477<br>MAN M 3575<br>MB-APPROVAL 228.31<br>MB-APPROVAL 228.51<br>MTU DDC TYPE 2.1<br>MTU DDC TYPE 3.1<br>RENAULT RLD-3<br>SCANIA LA<br>VOLVO VDS-4                                           | CUMMINS CES 20081<br>DETROIT DIESEL 93K218<br>IVECO 18-1804 CLASSE TLS E9<br>IVECO 18-1809 CLASSE NG2<br>VOITH-RETARDER „B“ |



## Engine Oils

| Product name                               | Description                                                                                                                                                                                                                                        | Specifications                         | Approvals                                                                                                                                                                                                | FUCHS Recommendations                                         |
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| <b>Engine Oils for Commercial Vehicles</b> |                                                                                                                                                                                                                                                    |                                        |                                                                                                                                                                                                          |                                                               |
| <b>TITAN CARGO SL SAE 5W-30</b>            | Ultra High Performance, extreme fuel-economy engine oil for a variety of commercial vehicle diesel engines, with optimum cold starting and lower oil consumption. Specially developed for extended service intervals.                              | ACEA E7/E4<br>FORD WSS-M2C212-A1       | DEUTZ DQC IV-10<br>MACK EO-N<br>MAN M 3277<br>MB-APPROVAL 228.5<br>MB-APPROVAL 235.28<br>MTU DDC TYPE 3<br>RENAULT RXD/RLD-2<br>SCANIA LDF-3<br>VOITH-RETARDER „B“<br>VOLVO VDS-3                        | CUMMINS CES 20077<br>IVECO 18-1804 CLASSE TFE<br>SCANIA LDF-2 |
| <b>TITAN CARGO LA SAE 5W-30</b>            | Ultra High Performance, extreme fuel-economy engine oil, specially developed for commercial vehicles with modern exhaust after treatment systems and turbocharger. Offers good cold starting and lower oil consumption.                            | ACEA E7/E6<br>API CI-4<br>JASO DH-2    | DEUTZ DQC III-10 LA<br>MACK EO-N<br>MAN M 3271-1<br>MAN M 3477<br>MB-APPROVAL 228.51<br>MTU DDC TYPE 3.1<br>RENAULT RLD-2/RXD/RGD<br>VOLVO VDS-3                                                         | CUMMINS CES 20076/7/8                                         |
| <b>TITAN CARGO LA SAE 10W-40</b>           | Ultra High Performance, fuel-economy engine oil, specially developed for commercial vehicles with modern exhaust after treatment systems and turbocharger. Offers good cold starting and lower oil consumption.                                    | ACEA E9/E7/E6<br>API CI-4<br>JASO DH-2 | DEUTZ DQC IV-10 LA<br>MACK EO-N<br>MAN M 3271-1<br>MAN M 3477<br>MB-APPROVAL 228.51<br>MTU DDC TYPE 3.1<br>RENAULT RLD-2/RXD/RGD<br>VOLVO VDS-3                                                          | CUMMINS CES 20076/7                                           |
| <b>TITAN CARGO 228.61 SAE 5W-30</b>        | Ultra High Performance, extreme fuel-economy engine oil. Specially developed for Mercedes Benz commercial vehicles with modern exhaust after treatment systems. Suitable for Euro VI engines. Offers good cold starting and lower oil consumption. | API FA-4                               | MB-APPROVAL 228.61                                                                                                                                                                                       | CUMMINS CES 20087<br>DETROIT DIESEL 93K223                    |
| <b>TITAN CARGO LD4 SAE 5W-30</b>           | Ultra High Performance, fuel-economy engine oil for use in Scania Euro VI vehicles. Specially developed for extended service intervals.                                                                                                            | –                                      | SCANIA LDF-4                                                                                                                                                                                             | –                                                             |
| <b>TITAN CARGO LD3 SAE 10W-40</b>          | Ultra High Performance, fuel-economy engine oil for use in Scania Euro VI vehicles. Specially developed for extended service intervals.                                                                                                            | ACEA E7/E4                             | MACK EO-N<br>MAN M 3277<br>MB-APPROVAL 228.5<br>RENAULT RLD-2<br>SCANIA LDF-3<br>VOLVO VDS-3                                                                                                             | API CF                                                        |
| <b>TITAN CARGO MC SAE 10W-40</b>           | Ultra High Performance, fuel-economy engine oil based on MC-synthesis for a variety of commercial vehicle diesel engines. Specially developed for extended service intervals. Good cold starting and lower oil consumption.                        | ACEA E7/E4<br>API CI-4<br>GLOBAL DHD-1 | CUMMINS CES 20077/8<br>DETROIT DIESEL 93K215<br>DEUTZ DQC III-10<br>MACK EO-M PLUS<br>MACK EO-N<br>MAN M 3277<br>MB-APPROVAL 228.5<br>MTU DDC TYPE 3<br>RENAULT RXD/RLD-2<br>SCANIA LDF-2<br>VOLVO VDS-3 | IVECO 18-1804<br>SDFG OM-1901A                                |

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| Product name                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                  | Specifications                                              | Approvals                                                                                                                                                                  | FUCHS Recommendations                                                                                      |
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| <b>Engine Oils for Commercial Vehicles</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                             |                                                                                                                                                                            |                                                                                                            |
| <b>TITAN CARGO SAE 5W-40</b><br><b>NEW</b>                 | Ultra High Performance, fuel-economy engine oil, specially developed for commercial vehicle diesel engines with extended service intervals, exhaust after treatment and turbocharger.                                                                                                                                                                                                                                        | ACEA E9<br>API CK-4/CJ-4/SN<br>CAT ECF-3                    | CUMMINS CES 20086<br>DEUTZ DQC III-10 LA<br>FORD M2C171-F1<br>MACK EOS-4.5<br>MAN M 3775<br>MB-APPROVAL 228.31<br>MTU DDC TYPE 2.1<br>RENAULT RLD-3<br>VOLVO VDS-4.5       | DETROIT DIESEL 93K222<br>MAN M 3575                                                                        |
| <b>TITAN CARGO SAE 10W-30</b><br><b>NEW</b>                | Ultra High Performance, fuel-economy engine oil, specially developed for commercial vehicle diesel engines with extended service intervals, exhaust after treatment and turbocharger.                                                                                                                                                                                                                                        | ACEA E9<br>API CK-4/CJ-4<br>CAT ECF-3<br>JASO DH-2          | CUMMINS CES 20086<br>DEUTZ DQC III-10 LA<br>FORD M2C171-F1<br>MACK EOS-4.5<br>MAN M 3775<br>MB-APPROVAL 228.31<br>MTU DDC TYPE 2.1<br>RENAULT RLD-3<br>VOLVO VDS-4.5       | DETROIT DIESEL 93K222<br>MAN M 3575                                                                        |
| <b>TITAN CARGO SAE 15W-40</b><br><b>NEW</b>                | Ultra High Performance, fuel-economy engine oil for a variety of commercial vehicle diesel engines. Specially developed for Volvo with extended service intervals, exhaust after treatment and turbocharger.                                                                                                                                                                                                                 | ACEA E9<br>API CK-4/CJ-4/SN<br>CAT ECF-3<br>JASO DH-2       | CUMMINS CES 20086<br>DEUTZ DQC III-10 LA<br>FORD M2C171-F1<br>MACK EOS-4.5<br>MAN M 3775<br>MB-APPROVAL 228.31<br>MTU DDC TYPE 2.1<br>RENAULT RLD-3<br>VOLVO VDS-4.5       | DETROIT DIESEL 93K222<br>MAN M 3575                                                                        |
| <b>TITAN TRUCK PLUS SAE 15W-40</b>                         | Super High Performance Engine Oil for a variety of diesel and gasoline engines. Specially for highly-loaded commercial vehicle diesel engines. Lower oil consumption.                                                                                                                                                                                                                                                        | ACEA E7<br>API CI-4/SL<br>GLOBAL DHD-1<br>CAT ECF-1-a/ECF-2 | CUMMINS CES 20076/7/8<br>DETROIT DIESEL 93K215<br>DEUTZ DQC III-10<br>MACK EO-N<br>MAN M 3275-1<br>MB-APPROVAL 228.3<br>MTU DDC TYPE 2<br>RENAULT RLD/RLD-2<br>VOLVO VDS-3 | ALLISON C-4<br>CAT TO-2<br>CASE M5 1121<br>CUMMINS CES 20071/2<br>IVECO 18-1804<br>CLASSE T2 E7<br>NH 330H |
| <b>TITAN TRUCK PLUS SAE 20W-50</b>                         | Super High Performance Engine Oil for a variety of diesel and gasoline engines. Specially for highly-loaded commercial vehicle diesel engines. Lower oil consumption.                                                                                                                                                                                                                                                        | ACEA E7<br>API CI-4/SL<br>GLOBAL DHD-1<br>CAT ECF-1-a/ECF-2 | MB-APPROVAL 228.3                                                                                                                                                          | MAN M 3275-1                                                                                               |
| <b>Engine Oil for Commercial Vehicles with Gas Engines</b> |                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                             |                                                                                                                                                                            |                                                                                                            |
| <b>TITAN CARGO PRO GAS SAE 10W-40</b>                      | Premium Performance, extreme fuel-economy engine oil for highly-supercharged commercial vehicle gas engines as well as diesel engines with exhaust gas after treatment systems. Specially developed for gas powered engines with and without turbocharger. Optimum cold starting, lower oil consumption and minimized exhaust emissions. For MAN gas engines extended drain intervals are possible depending on engine type. | ACEA E9/E7/E6                                               | DEUTZ DQC IV-10 LA<br>MACK EO-N<br>MAN M 3271-3<br>MAN M 3477<br>MB-APPROVAL 228.51<br>RENAULT RLD-2<br>VOLVO VDS-3                                                        | —                                                                                                          |

## Engine Oils



| Product name                                            | Description                                                                                                                                                                                   | Specifications | Approvals                                                   | FUCHS Recommendations                                                                                    |
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| <b>Railroad Engine Oil</b>                              |                                                                                                                                                                                               |                |                                                             |                                                                                                          |
| <b>TITAN RAILGEN 13 SAE 40</b>                          | High Performance Rail Locomotive Monograde Engine Oil according to API CF utilizing zinc and chlorine free additive technology.                                                               | —              | GE Generation 4LL<br>GM - EMD GENERATION 5                  | API CD/CF<br>LMOA GENERATION 5<br>CATERPILLAR 3600                                                       |
| <b>Monograde Engine Oils for Construction Machinery</b> |                                                                                                                                                                                               |                |                                                             |                                                                                                          |
| <b>TITAN UNIVERSAL HD SAE 10W</b>                       | High Performance Monograde Engine Oil for gasoline and diesel engines. Specially developed for off-road vehicles. Depending upon manufacturer regulation also in other aggregates applicable. | —              | MAN 270<br>ZF TE-ML 03B (ZF002013)                          | ACEA E2<br>API CF-4/SG<br>MIL-L-2104 D<br>ALLISON C-4<br>CAT TO-2<br>MB 228.0<br>ZF TE-ML 02C            |
| <b>TITAN UNIVERSAL HD SAE 20W-20</b>                    | High Performance Monograde Engine Oil for gasoline and diesel engines. Specially developed for off-road vehicles. Depending upon manufacturer regulation also in other aggregates applicable. | —              | MB-APPROVAL 235.27<br>VOITH-RETARDER „A“                    | ACEA E2<br>API CF-4/SG<br>MIL-L-2104 D<br>ALLISON C-4<br>CAT TO-2<br>MAN 270<br>MB 228.0<br>ZF TE-ML 02C |
| <b>TITAN UNIVERSAL HD SAE 30</b>                        | High Performance Monograde Engine Oil for gasoline and diesel engines. Specially developed for off-road vehicles. Depending upon manufacturer regulation also in other aggregates applicable. | —              | DEUTZ DQC I-02<br>MTU DDC TYPE 2<br>ZF TE-ML 04B (ZF001189) | ACEA E2<br>API CF-4/SG<br>MIL-L-2104 D<br>ALLISON C-4<br>CAT TO-2<br>MAN 270<br>MB 228.2<br>ZF TE-ML 02C |



| Product name                                            | Description                                                                                                                                                                                   | Specifications | Approvals                                                                         | FUCHS Recommendations                                                                                      |
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| <b>Monograde Engine Oils for Construction Machinery</b> |                                                                                                                                                                                               |                |                                                                                   |                                                                                                            |
| <b>TITAN UNIVERSAL HD SAE 40</b>                        | High Performance Monograde Engine Oil for gasoline and diesel engines. Specially developed for off-road vehicles. Depending upon manufacturer regulation also in other aggregates applicable. | —              | DEUTZ DQC I-02<br>MB-APPROVAL 235.12<br>MTU DDC TYPE 2<br>ZF TE-ML 04B (ZF001190) | ACEA E2<br>API CF-2/CF-4/SG<br>MIL-L-2104 D<br>ALLISON C-4<br>CAT TO-2<br>MAN 270 MB 228.2<br>ZF TE-ML 02C |
| <b>TITAN UNIVERSAL HD SAE 50</b>                        | High Performance Monograde Engine Oil for gasoline and diesel engines. Specially developed for off-road vehicles. Depending upon manufacturer regulation also in other aggregates applicable. | —              | DEUTZ DQC I-02<br>MAN M 3275-2                                                    | ACEA E2<br>API CF-4/SG<br>MIL-L-2104 D<br>ALLISON C-4<br>CAT TO-2<br>MB 228.0<br>ZF TE-ML 02C              |
| <b>TITAN UNIVERSAL HD SAE 30 MTU</b>                    | High Performance dedicated break in engine oil for MTU diesel and gas engines, developed to improve operating characteristics with enhanced corrosion protection.                             | —              | MTU DDC TYPE 1                                                                    | —                                                                                                          |



## Engine Oils



| Product name                                      | Description                                                                            | Specifications | Approvals                                                                                                                                                                                                                                                                                                                                                                  | FUCHS Recommendations                          |
|---------------------------------------------------|----------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Gas Engine Oils for Stationary Gas Engines</b> |                                                                                        |                |                                                                                                                                                                                                                                                                                                                                                                            |                                                |
| <b>TITAN GANYMET ULTRA</b>                        | Premium Performance Engine Oil, zinc-free, for stationary gas engines.                 | –              | 2G TA-003 agenitor series 2,3<br>AGROGEN<br>CAT CG132, CG170, CG260<br>CAT / MWM TR 0199-99-02105<br>GE JENBACHER TA 1000-1109<br>- A, CAT: series 2, 3, 4 (Version B), 6 (Version C, E)<br>- B, CAT: series 2, 3<br>MAN M 3271-4<br>MTU Onsite Energy DK-BS-0001 (E, P, B)<br>MTU Onsite Energy DK-BS-0002 (B)<br>SEVA TRS-07<br>SPANNER RE2<br>TEDOM 61-0-0281.1/L, B, S | –                                              |
| <b>TITAN GANYMET PLUS</b>                         | Super High Performance Engine Oil, zinc-free, for stationary gas engines.              | –              | CAT CG132, CG170, CG260<br>CAT / MWM TR 0199-99-02105<br>DREYER & BOSSE<br>GE JENBACHER TA 1000-1109<br>- B: series 2, 3<br>MTU Onsite Energy DK-BS-0001 (B)<br>SEVA TRS-07                                                                                                                                                                                                | –                                              |
| <b>TITAN GANYMET PLUS LA</b>                      | „Low Ash“ Super High Performance Engine Oil, zinc-free, for stationary gas engines.    | –              | CAT CG132, CG170, CG260<br>CAT / MWM TR 0199-99-02105<br>DEUTZ TR 0199-99-01213<br>SEVA TRS-07<br>TEDOM 61-0-0281.1/G, P                                                                                                                                                                                                                                                   | CATERPILLAR<br>CUMMINS<br>WAUKESHA             |
| <b>TITAN GANYMET PRO MA</b>                       | High Performance Engine Oil for stationary gas engines.                                | –              | GE JENBACHER TA 1000-1109<br>- B, C: series 2, 3, 4 (Version B), 6 (Version C, E)<br>MAN M 3271-4                                                                                                                                                                                                                                                                          | CATERPILLAR<br>(special gas)                   |
| <b>TITAN GANYMET PRO LA</b>                       | High Performance Engine Oil with low sulphated ash content for stationary gas engines. | –              | CAT CG132, CG170, CG260<br>CAT / MWM TR 0199-99-02105<br>GE JENBACHER TA 1000-1109<br>- A, B: series 2, 3, 4 (Version B), 6 (Version C, E)                                                                                                                                                                                                                                 | CATERPILLAR<br>CUMMINS<br>WAUKESHA<br>WÄRTSILÄ |



| Product name                                      | Description                                                                            | Specifications | Approvals                                                                                                                                                                                                                                       | FUCHS Recommendations              |
|---------------------------------------------------|----------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Gas Engine Oils for Stationary Gas Engines</b> |                                                                                        |                |                                                                                                                                                                                                                                                 |                                    |
| <b>TITAN GANYMET</b>                              | High Performance Engine Oil for stationary gas engines.                                | –              | ASJA AMBIENTE ITALIA<br>GE JENBACHER TA 1000-1109<br>- C: series 2, 3<br>MAN M 3271-4<br>MTU Onsite Energy DK-BS-0001 (B,K)<br>SEVA TRS-07                                                                                                      | –                                  |
| <b>TITAN GANYMET LA</b>                           | High Performance Engine Oil with low sulphated ash content for stationary gas engines. | –              | CAT CG132, CG170, CG260<br>CAT / MWM TR 0199-99-02105<br>DEUTZ TR 0199-99-01213<br>GE JENBACHER TA 1000-1109<br>- A, CAT: series 2, 3, 4 (Version B), 6 (Version C, E)<br>MAN M 3271-2<br>MTU Onsite Energy DK-BS-0001 (E, P, K)<br>SEVA TRS-07 | CATERPILLAR<br>CUMMINS<br>WAUKESHA |

## Engine Oils



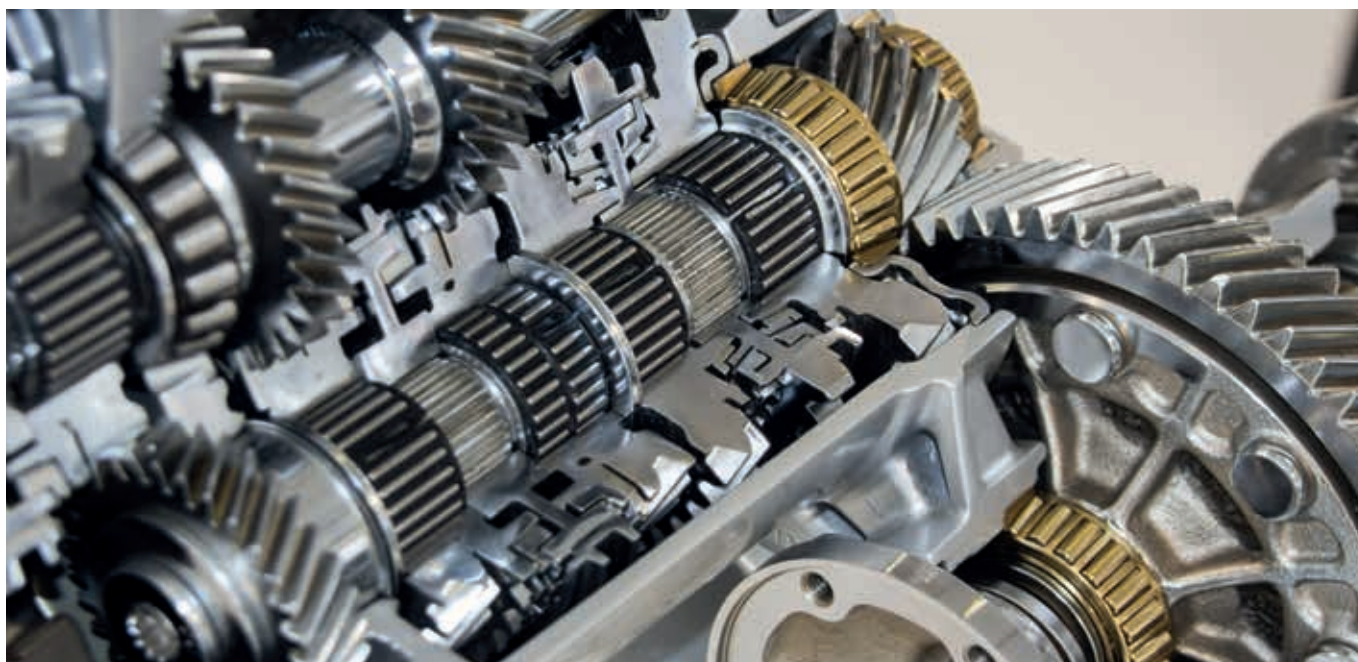
| Product name                                | Description                                                                                                                            | Specifications | Approvals | FUCHS Recommendations                                                               |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-------------------------------------------------------------------------------------|
| <b>4-Stroke Marine Engine Oil</b>           |                                                                                                                                        |                |           |                                                                                     |
| <b>TITAN<br/>MARINE FC-W<br/>SAE 10W-30</b> | Super High Performance Engine Oil for marine leisure four-stroke gasoline engines, in accordance with the latest requirements of NMMA. | —              | NMMA FC-W | BOMBARDIER<br>EVINRUDE<br>HONDA<br>JOHNSON<br>MERCURY<br>SEADOO<br>SUZUKI<br>YAMAHA |

**TITAN**

| Product name                | Description                                                                                                                                      | Specifications                 | Approvals | FUCHS Recommendations |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|-----------------------|
| <b>2-Stroke Engine Oils</b> |                                                                                                                                                  |                                |           |                       |
| <b>TITAN 2T 100S</b>        | Ultra High Performance two-stroke engine oil for Autolube and Premix systems formulated with fully synthetic base oils.<br>Product dyeing: blue. | API TC<br>JASO FD<br>ISO L-EGD | –         | TISI                  |
| <b>TITAN 2T S</b>           | Super High Performance two-stroke engine oil. Mixes rapidly. Suitable for Autolube as well as Premix systems.<br>Product dyeing: blue.           | API TC<br>JASO FC<br>ISO L-EGC | –         | –                     |
| <b>TITAN 2T M</b>           | High Performance two-stroke engine oil. Mixes rapidly. Suitable for Autolube as well as Premix systems.<br>Product dyeing: blue.                 | API TC                         | –         | –                     |



## Transmission Fluids



| Product name                                                         | Description                                                                                                                                                                                                                                                                       | Specifications | Approvals                                                         | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gear Oils for Passenger Cars</b>                                  |                                                                                                                                                                                                                                                                                   |                |                                                                   |                                                                                                                                                                                                                                                                                                                                                          |
| <b>TITAN SINTOFLUID FE SAE 75W</b>                                   | Premium Performance Manual Transmission Fluid offering increased gear box efficiency in passenger cars due to low viscosity level. Reduces fuel consumption and offers best properties at low temperature. Suitable as fill for life fluid according to manufacturer.             | API GL-4       | –                                                                 | VW TL 521 71 (G 052 171 A1/A2)<br>VW TL 521 78 (G 052 178 A2)<br>VW TL 525 12 (G 052 512 A2)<br>VW TL 525 27 (G 052 527 A2)<br>VW TL 726 (G 052 726 A2/G 055 726 A2/ G 060 726 A2/G 070 726 A2)                                                                                                                                                          |
| <b>TITAN SINTOFLUID SAE 75W-80</b>                                   | Premium Performance Manual Transmission Fluid for passenger cars. Offering good gear box efficiency. Suitable as fill for life fluid according to manufacturer.                                                                                                                   | API GL-5       | –                                                                 | MIL-L-2105 D<br>BMW 83 22 0 309 031<br>BMW 83 22 0 403 247<br>BMW 83 22 2 339 219<br>BMW 83 22 7 533 818<br>BMW 2300 1434 404<br>BMW 2300 7533 513<br>BMW 2300 7533 818<br>FORD WSS-M2C200-C3<br>OPEL 19 40 182<br>OPEL 19 40 757<br>OPEL 19 40 768<br>OPEL 19 40 776<br>VOLVO 97308<br>VW 501 50 (G 005 000 05/G 005 000/ G 005 000 20/G 052 911 A1/A2) |
| <b>TITAN SINTOPOID FE SAE 75W-85</b><br><br><b>XTL</b><br>TECHNOLOGY | Premium Performance fuel-economy passenger car axle fluid offering increased gear box efficiency in passenger cars due to low viscosity level. Reduces fuel consumption and offers best properties at low temperature. Suitable as fill for life fluid according to manufacturer. | API GL-5       | MB-APPROVAL 235.7<br>MB-APPROVAL 235.74<br>ZF TE-ML 18 (ZF002195) | MB 239.71<br>MB 239.72<br>VW TL 521 45-X (G 052 145 A1)<br>VW TL 521 90 (G 052 190 A2/ G 055 190 A2)                                                                                                                                                                                                                                                     |



| Product name                                                | Description                                                                                                                                                                                                                                                        | Specifications                  | Approvals                                                                                                             | FUCHS Recommendations                                                                                                                                                        |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gear Oils for Passenger Cars</b>                         |                                                                                                                                                                                                                                                                    |                                 |                                                                                                                       |                                                                                                                                                                              |
| <b>TITAN SINTOPOID SAE 75W-90</b>                           | Premium Performance Axle Gear Oil for passenger cars, also for high-offset hypoid drives offering good gear box efficiency. Suitable as fill for life fluid according to manufacturer.                                                                             | API GL-5                        | –                                                                                                                     | MIL-L-2105 D<br>VW TL 521 45-Y<br>(G 052 145 A2)                                                                                                                             |
| <b>TITAN SINTOPOID LS SAE 75W-90</b>                        | Premium Performance, fully-synthetic multifunctional gear oil, formulated with fully-synthetic base oils. Suitable for axles and transfer gear-boxes with or without self-locking differentials and also as trouble shooter for conventional manual transmissions. | API GL-4/-5/-5 incl. LS         | –                                                                                                                     | FORD WSS-M2C200-C/C2<br>VW G50/G51                                                                                                                                           |
| <b>TITAN SINTOPOID LS SAE 75W-140</b>                       | Premium Performance Gear Oil for axle and transfer gear boxes, formulated with fully-synthetic base oils. Suitable for axle and transfer gear boxes with and without limited slip differential.                                                                    | API GL-5                        | –                                                                                                                     | BMW 83 22 2 282 583<br>BMW 83 22 9 407 870<br>CHRYSLER MS-8985<br>FORD WSL-M2C192-A<br>GM 12346140<br>JOHN DEERE JDM J11G<br>SCANIA STO 1:0                                  |
| <b>Gear Oils for Passenger Cars and Commercial Vehicles</b> |                                                                                                                                                                                                                                                                    |                                 |                                                                                                                       |                                                                                                                                                                              |
| <b>TITAN SUPERGEAR MC SAE 80W-90</b>                        | Super High Performance Gear Oil based on MC-Synthesis for extended oil change intervals.                                                                                                                                                                           | API GL-4/GL-5<br>SCANIA STO 1:0 | MAN 341 TYPE Z2<br>MAN 342 TYPE M2<br>MB-APPROVAL 235.0<br>ZF TE-ML 02B, 05A, 12L, 12M, 16B, 17H, 19B, 21A (ZF000722) | CASE MS 1316<br>FORD WSP-M2C197-A<br>JOHN DEERE JDM J11E<br>MAN M 3343 TYPE M<br>MAN 341 TYPE E2<br>NH 520A<br>SDFG OP 1705<br>STEYR B-101<br>VOLVO 97310<br>ZF TE-ML 07, 08 |
| <b>TITAN SUPERGEAR MC SAE 80W-140</b>                       | Super High Performance Gear Oil based on MC-Synthesis for extended oil change intervals.                                                                                                                                                                           | API GL-4/GL-5<br>SCANIA STO 1:0 | –                                                                                                                     | JOHN DEERE JDM J11E<br>OPEL 19 42 386<br>RENAULT VI<br>VOLVO 97310<br>ZF TE-ML 08                                                                                            |
| <b>TITAN SUPERGEAR SAE 80W-90</b>                           | High Performance Gear Oil for extended oil change intervals.                                                                                                                                                                                                       | API GL-4/GL-5                   | MAN 342 TYPE M2<br>ZF TE-ML 05A, 12E, 17B, 19B, 21A (ZF000647)                                                        | MIL-L-2105 D<br>VOLVO 97310<br>NH 520A<br>STEYR B-101                                                                                                                        |
| <b>TITAN SUPERGEAR SAE 85W-140</b>                          | High Performance Gear Oil for extended oil change intervals.                                                                                                                                                                                                       | API GL-4/GL-5                   | ZF TE-ML 05A, 12E, 16D, 21A (ZF000650)                                                                                | MIL-L-2105 D<br>VOLVO 97310                                                                                                                                                  |
| <b>TITAN GEAR LS SAE 90</b>                                 | High Performance LS (Limited Slip) hypoid gear oil for axles with or without limited slip differentials.                                                                                                                                                           | API GL-5<br>SAE J306: 85W-90    | ZF TE-ML 05C, 12C, 16E, 21C (ZF000651)                                                                                | MIL-L-2105 D<br>FORD M2C104-A<br>JOHN DEERE JDM J11F<br>NH 520B<br>VOLVO 97310                                                                                               |
| <b>TITAN GEAR MP SAE 80</b>                                 | High Performance Gear Oil for synchronized and non-synchronized manual gear boxes as well as auxiliary drives, axles and differentials in commercial vehicles and passenger cars.                                                                                  | API GL-4                        | MB-APPROVAL 235.1<br>ZF TE-ML 17A (ZF000654)                                                                          | BMW 81 22 9 407 052<br>BMW 81 22 9 407 053<br>FORD M2C9008-A<br>VW TL 726<br>ZF TE-ML 08                                                                                     |
| <b>TITAN GEAR MP SAE 90</b>                                 | High Performance Gear Oil for synchronized and non-synchronized manual gear boxes as well as auxiliary drives, axles and differentials in commercial vehicles and passenger cars.                                                                                  | API GL-4                        | –                                                                                                                     | MAN 341 TYPE E1, Z1<br>MB 235.1<br>ZF TE-ML 02A, 16A, 17A, 19A                                                                                                               |

## Transmission Fluids

| Product name                                                | Description                                                                                                                                                                                                                                                                                          | Specifications                                                                 | Approvals                                                                                                                                                                                             | FUCHS Recommendations                                                                                                        |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Gear Oils for Passenger Cars and Commercial Vehicles</b> |                                                                                                                                                                                                                                                                                                      |                                                                                |                                                                                                                                                                                                       |                                                                                                                              |
| <b>TITAN GEAR HYP SAE 90</b>                                | High Performance Gear Oil for highly-stressed differentials in commercial vehicles and passenger cars.                                                                                                                                                                                               | API GL-5<br>SAE J306:<br>85W-90                                                | MB-APPROVAL 235.0<br>ZF TE-ML 16C, 17B, 19B, 21A (ZF000656)                                                                                                                                           | FORD SR-M2C9102-A<br>JOHN DEERE JDM J11E<br>MAN 342 TYPE M1<br>OPEL 19 42 387<br>VOLVO 97310<br>VW TL 727<br>ZF TE-ML 07, 08 |
| <b>Gear Oils for Commercial Vehicles</b>                    |                                                                                                                                                                                                                                                                                                      |                                                                                |                                                                                                                                                                                                       |                                                                                                                              |
| <b>TITAN CYTRAC TD SAE 75W-90</b>                           | Premium Performance Gear Oil for highly-stressed manual transmissions and hypoid axles in commercial vehicles formulated with fully-synthetic base oils. Developed for the longest oil change intervals.                                                                                             | API GL-4/GL-5<br>API MT-1<br>SAE J2360<br>SCANIA STO 1:0<br>SCANIA STO 2:0A FS | DETROIT DIESEL 93K219.01<br>MAN 341 TYPE Z2<br>MAN 342 TYPE M3<br>MAN 342 TYPE S1<br>MB-APPROVAL 235.8<br>VOLVO 97312<br>ZF TE-ML 02B, 05A, 12L, 12N, 16F, 17B, 19C, 21A (ZF003341)                   | JOHN DEERE JDM J11E<br>JOHN DEERE JDM J11G<br>MAN 341 TYPE E3                                                                |
| <b>TITAN CYTRAC SL SAE 75W-90</b>                           | Premium Performance Gear Oil for highly-stressed hypoid axles in commercial vehicles formulated with fully-synthetic base oils. Developed for the longest oil change intervals in commercial vehicle axle drives.                                                                                    | API GL-5<br>SCANIA STO 1:0                                                     | MAN 342 TYPE S1                                                                                                                                                                                       | JOHN DEERE JDM J11E<br>JOHN DEERE JDM J11G<br>MB 235.8<br>VOLVO 97312<br>ZF TE-ML 05B, 07, 08, 12B, 16F, 17B                 |
| <b>TITAN CYTRAC RR SAE 75W-90</b>                           | Fully synthetic Premium Performance Hypoid Gear Oil for axle drives in railcars and heavy duty vehicles.                                                                                                                                                                                             | API GL-5<br>API MT-1<br>SCANIA STO 1:0                                         | SAE J2360<br>SIEMENS FLENDER Gear Units for Railway Vehicles<br>VOITH TURBO 132.00374401 (3.325-340)<br>VOITH TURBO 132.00374402 (3.325-342)<br>ZF TE-ML 05A, 12L, 12N, 16F, 17B, 19C, 21A (ZF000732) | Gmeinder Getriebebau railway applications<br>ZF TE-ML 05B, 21B                                                               |
| <b>TITAN CYTRAC FE SYNTH SAE 75W-85</b>                     | Premium Performance Gear Oil for gear boxes in commercial vehicles, specially for the latest version of Mercedes-Benz CO <sub>2</sub> transmissions, formulated with fully-synthetic base oils. Most fuel efficient by improving gear box efficiency. Suitable for the longest oil change intervals. | API GL-4                                                                       | MB-APPROVAL 235.16                                                                                                                                                                                    | –                                                                                                                            |
| <b>TITAN CYTRAC MB SYNTH SAE 75W-90</b>                     | Premium Performance Gear Oil for gear boxes in commercial vehicles, specially developed for Mercedes-Benz Actros vehicles, formulated with fully-synthetic base oils. Reduces fuel consumption by improving gear box efficiency. Suitable for the longest oil change intervals.                      | API GL-4                                                                       | MAN 341 TYPE MB<br>MB-APPROVAL 235.11                                                                                                                                                                 | ZF TE-ML 08                                                                                                                  |
| <b>TITAN CYTRAC ULTRA SYNTH SAE 75W-80</b>                  | Premium Performance Gear Oil for gear boxes in commercial vehicles, especially developed for ZF heavy duty transmissions with and without Intarder. Reduces fuel consumption by improving gear box efficiency. Suitable for longest oil change intervals.                                            | API GL-4<br>VOLVO 97307                                                        | MAN 341 TYPE Z5<br>ZF TE-ML 01E, 02E, 16P (ZF001457)                                                                                                                                                  | –                                                                                                                            |



| Product name                                | Description                                                                                                                                                                                                                                                                                                            | Specifications                                      | Approvals                                                                                                                                               | FUCHS Recommendations                                                                                                                                               |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gear Oils for Commercial Vehicles</b>    |                                                                                                                                                                                                                                                                                                                        |                                                     |                                                                                                                                                         |                                                                                                                                                                     |
| <b>TITAN<br/>CYTRAC MAT<br/>SAE 75W-80</b>  | Premium Performance Gear Oil for gear boxes in commercial vehicles, specially developed for manual and automatic ZF-gear boxes, formulated with selected base oils. Reduces fuel consumption by improving gear box efficiency. Suitable for the longest oil change intervals and compatible with Carbon-Synchronizers. | API GL-4                                            | MAN 341 TYPE Z4<br>VOLVO 97307<br>ZF TE-ML 01L, 02L, 16K<br>(ZF003373)                                                                                  | –                                                                                                                                                                   |
| <b>TITAN<br/>CYTRAC LD<br/>SAE 75W-80</b>   | Ultra High Performance Gear Oil for extended oil change intervals in commercial vehicles fitted with integral retarders or supplementary retarders.                                                                                                                                                                    | API GL-4                                            | EATON                                                                                                                                                   | MAN 341 TYPE E3<br>MAN 341 TYPE Z3<br>VOLVO 97305<br>ZF TE-ML 02D, 08                                                                                               |
| <b>TITAN<br/>CYTRAC HSY<br/>SAE 75W-90</b>  | Ultra High Performance Gear Oil for commercial vehicle manual transmissions and axle drives formulated with fully-synthetic base oils.                                                                                                                                                                                 | API GL-4/GL-5                                       | ZF TE-ML 05A, 12L, 12N,<br>16F, 17B, 19C, 21A<br>(ZF000642)                                                                                             | MAN 341 TYPE E3<br>MAN 341 TYPE Z2<br>MAN 342 TYPE M3<br>MAN M 3343 TYPE S<br>JOHN DEERE JDM J11E<br>JOHN DEERE JDM J11G<br>SCANIA STO 1:0<br>ZF TE-ML 05B, 07, 21B |
| <b>TITAN<br/>GEAR HYP LD<br/>SAE 80W-90</b> | Super High Performance Gear Oil specially developed for Mercedes-Benz commercial vehicles. Offering enhanced thermal stability and fuel-economy potential.                                                                                                                                                             | API GL-5<br>API MT-1<br>SAE J2360<br>SCANIA STO 1:0 | DETROIT DIESEL<br>93K219.02<br>MAN 341 TYPE GA1<br>MAN 342 TYPE M3<br>MB-APPROVAL 235.20<br>ZF TE-ML 05A, 12L, 12M,<br>16B, 17B, 19B, 21A<br>(ZF000645) | MIL-PRF-2105 E<br>ARVIN MERITOR 0-76-D<br>MACK GO-J<br>JOHN DEERE JDM J11E<br>ZF TE-ML 07A                                                                          |



## Transmission Fluids

| Product name                                                | Description                                                                                                                                                                             | Specifications                   | Approvals                              | FUCHS Recommendations                                                                                                                                                                                                                                           |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Multifunctional Gear Oils for Construction Machinery</b> |                                                                                                                                                                                         |                                  |                                        |                                                                                                                                                                                                                                                                 |
| <b>TITAN UTTO PRO</b>                                       | Ultra High Performance Multifunctional Oil for gears, axles and hydraulic systems with improved wear protection and wide range of application temperatures.                             | API GL-4<br>SAE J 306:<br>75W-80 | VOLVO WB 101                           | ALLISON C-4<br>CASE MS 1207/1209/1210<br>FORD M2C86-C<br>FORD ESN-M2C134-D<br>JOHN DEERE JDM J20C<br>JOHN DEERE JDM J20D<br>KOMATSU AXO 80 (KES 07.866)<br>KUBOTA UDT FLUID<br>MASSEY FERGUSON CMS M 1143, 1135<br>VOLVO WB 102<br>ZF TE-ML 03E, 03F, 05F, 06K  |
| <b>TITAN UTTO PLUS</b>                                      | Ultra High Performance Multifunctional Oil for gears, axles and hydraulic systems on construction and agricultural machinery with or without wet brakes and limited slip differentials. | SAE J300: 5W-30                  | –                                      | SAE J306: 75W-80<br>CASE MS 1207/1209/1210<br>FORD M2C86-C, ESN-M2C134-D<br>JOHN DEERE JDM J20C<br>JOHN DEERE JDM J20D<br>JOHN DEERE JDM J14<br>KOMATSU KES 07.866<br>KUBOTA UDT FLUID<br>MASSEY FERGUSON CMS M 1143, 1135<br>STEYR 397.88.0001<br>VOLVO WB 101 |
| <b>TITAN UTTO ZF</b>                                        | Super High Performance Gear Oil for ZF axles with limited slip differentials. Recommended for construction machinery and material-handling vehicles axles.                              | –                                | ZF TE-ML 05F, 06K, 17E, 21F (ZF000661) | VOLVO WB 101<br>ZF TE-ML 03E                                                                                                                                                                                                                                    |
| <b>TITAN UTTO TO-4 SAE 10W</b>                              | Super High Performance multifunctional lubricant for hydraulics in construction machinery.                                                                                              | API GL-4<br>CAT TO-4             | ZF TE-ML 03C (ZF002186)                | ALLISON C-4<br>KOMATSU KES 07.868.1                                                                                                                                                                                                                             |
| <b>TITAN UTTO TO-4 SAE 30</b>                               | Super High Performance multifunctional transmission lubricant for construction machinery.                                                                                               | API GL-4<br>CAT TO-4             | ZF TE-ML 03C, 07F (ZF002185)           | ALLISON C-4<br>ALLISON TES-439<br>KOMATSU KES 07.868.1                                                                                                                                                                                                          |
| <b>TITAN UTTO TO-4 SAE 50</b>                               | Super High Performance multifunctional lubricant for final drives in construction machinery.                                                                                            | API GL-4<br>CAT TO-4             | –                                      | KOMATSU KES 07.868.1                                                                                                                                                                                                                                            |

**TITAN, PENTOSIN**


| Product name                                                          | Description                                                                                                                                                                                                                           | Specifications | Approvals                                    | FUCHS Recommendations                                                                                                               |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Double Clutch Transmission Fluids (DCTF)</b>                       |                                                                                                                                                                                                                                       |                |                                              |                                                                                                                                     |
| <b>PENTOSIN FFL-52529</b><br><br><b>XTL<sup>®</sup></b><br>TECHNOLOGY | Premium Performance DCTF with XTL <sup>®</sup> -Technology for ultimate friction stability and best fuel-economy properties. Specially developed for the wet clutch of the DL382 (0CK) transmission of VW group.                      | –              | VW TL 52 529-C<br>(G 055 529)                | –                                                                                                                                   |
| <b>PENTOSIN FFL-2</b>                                                 | Premium Performance DCTF. Specially developed for VW Double Clutch Transmission with wet clutch.                                                                                                                                      | –              | JAC DTF630<br>VW TL 52 182<br>(G 052 182)    | –                                                                                                                                   |
| <b>PENTOSIN FFL-3</b>                                                 | Premium Performance DCTF. Specially developed for ZF/Porsche Double Clutch Transmission with wet clutch.                                                                                                                              | –              | MB-APPROVAL 236.24<br>ZF TE-ML 11 (ZF001747) | BMW 83 22 2 167 666 (MTF-LT-5)<br>JAGUAR LAND ROVER GX73-M1R564-AA<br>PORSCHE 999 917 080 00                                        |
| <b>PENTOSIN FFL-4</b>                                                 | Premium Performance DCTF. Specially developed for GETRAG/BMW Double Clutch Transmission with wet clutch.                                                                                                                              | –              | GETRAG (PWA05043)                            | BMW 83 22 0 440 214<br>BMW 83 22 2 147 477<br>BMW 83 22 2 148 578<br>BMW 83 22 2 148 579<br>BMW 83 22 2 446 673<br>McLaren: MP4-12C |
| <b>PENTOSIN FFL-6</b>                                                 | Premium Performance DCTF. Specially developed for BYD Double Clutch Transmission with wet clutch.                                                                                                                                     | –              | BYD 6DT35<br>(Q/BYD-A1909.0058-2013)         | –                                                                                                                                   |
| <b>PENTOSIN FFL-8</b>                                                 | Premium Performance DCTF. Specially developed for ZF / Porsche Double Clutch Transmission with wet clutch. Provides optimized friction properties and best load carrying capacity even under hard conditions over the whole lifetime. | –              | ZF TE-ML 11 (ZF002271)                       | PORSCHE 000 043 210 44<br>PORSCHE 971 094 307 02A                                                                                   |

## Transmission Fluids

| Product name                                    | Description                                                                                                                                                                                                                                                                                                                   | Specifications | Approvals                                                                                                                                                                                                    | FUCHS Recommendations                                                                                                                                                                                       |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Double Clutch Transmission Fluids (DCTF)</b> |                                                                                                                                                                                                                                                                                                                               |                |                                                                                                                                                                                                              |                                                                                                                                                                                                             |
| <b>PENTOSIN FFL-10</b>                          | Premium Performance DCTF. Specially developed for Mercedes-Benz-8-speed Double Clutch Transmissions with wet clutch. Provides optimum wear protection and excellent friction properties over the whole lifetime and offers best shifting performance even under hard conditions.                                              | –              | MB-APPROVAL 236.22                                                                                                                                                                                           | –                                                                                                                                                                                                           |
| <b>PENTOSIN FFL-RACING</b>                      | Premium Performance DCTF. Specially developed for highly stressed double clutch transmissions.                                                                                                                                                                                                                                | –              | –                                                                                                                                                                                                            | NISSAN GT-R (R35)                                                                                                                                                                                           |
| <b>Automatic Transmission Fluids (ATF)</b>      |                                                                                                                                                                                                                                                                                                                               |                |                                                                                                                                                                                                              |                                                                                                                                                                                                             |
| <b>TITAN ATF 7134 FE</b>                        | Premium Performance ATF with reduced viscosity, especially developed to further optimize fuel-economy and gear box efficiency of latest generation Mercedes-Benz 7-speed automatic transmissions. Not downwards compatible with previous MB-ATF-Specifications. Product dyeing: blue.                                         | –              | MB-APPROVAL 236.15                                                                                                                                                                                           | –                                                                                                                                                                                                           |
| <b>TITAN ATF 6009</b><br><b>NEW</b>             | Premium Performance ATF, specially developed to optimize the shifting performance of latest generation ZF automatic transmissions. Product dyeing: green.                                                                                                                                                                     | –              | –                                                                                                                                                                                                            | BMW 83 22 2 289 720 (ATF 3+)<br>HONDA ATF TYPE 3.1<br>ZF AA01.500.001                                                                                                                                       |
| <b>TITAN ATF 6008</b><br><b>NEW</b>             | Premium Performance ATF, specially developed to optimize the shifting performance of ZF automatic transmissions. Product dyeing: green.                                                                                                                                                                                       | –              | –                                                                                                                                                                                                            | BMW 83 22 2 289 720 (ATF 3+)<br>CHRYSLER 68157995AA<br>JAGUAR 02JDE 26444<br>LAND ROVER LR023288<br>VW G 055 162<br>VW G 060 162<br>ZF S671 090 312                                                         |
| <b>TITAN ATF 6006</b><br><b>NEW</b>             | Ultra High Performance ATF, specially developed to optimize the shifting performance of ZF automatic transmissions. Product dyeing: none.                                                                                                                                                                                     | –              | –                                                                                                                                                                                                            | BENTLEY PY112995PA<br>BMW 83 22 0 142 516<br>HYUNDAI 040000C90SG<br>JAGUAR FLUID 8432<br>LAND ROVER TYK500050<br>MASERATI 231603<br>VW G 055 005<br>ZF S671 090 255                                         |
| <b>TITAN ATF 6000 SL</b>                        | Premium Performance ATF offering maximum performance in passenger car applications such as automatic transmissions with torque converters or wet clutches as well as power steering systems. Formulation is licensed according to DEXRON VI and downwards compatible to any former DEXRON-specification. Product dyeing: red. | –              | DEXRON VI<br>VOITH H55.6335.xx<br>ZF TE-ML 09                                                                                                                                                                | BMW 81 22 9 400 272<br>BMW 81 22 9 400 275<br>BMW 81 22 9 407 738<br>BMW 83 22 0 397 114<br>BMW 83 22 0 403 248<br>BMW 83 22 0 403 249<br>BMW 83 22 0 432 807<br>BMW 83 22 9 407 858<br>BMW 83 22 9 407 859 |
| <b>TITAN ATF 5500</b>                           | Premium Performance ATF for automatic transmission in motor vehicles. Outstanding base oil quality for optimal cold temperature properties and high ageing stability. Durable friction properties for excellent wet clutch performance. Product dyeing: none.                                                                 | –              | MAN 339 TYPE V1<br>MAN 339 TYPE V2<br>MAN 339 TYPE Z3<br>MAN 339 TYPE Z12<br>MB-APPROVAL 236.9<br>VOITH 150.014524.xx<br><b>VOLVO 97341</b><br>ZF TE-ML 04D, 14C,<br>16M, 16S, 20C, <b>25C</b><br>(ZF001797) | DEXRON III (H)<br>ALLISON TES 295<br>ALLISON TES 389<br>MAN 339 TYPE Z4                                                                                                                                     |

**PENTOSIN, TITAN**

| Product name                               | Description                                                                                                                                                                                                                                                                 | Specifications       | Approvals                                                                                                                                 | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Automatic Transmission Fluids (ATF)</b> |                                                                                                                                                                                                                                                                             |                      |                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>TITAN ATF 5005</b>                      | Premium Performance ATF for automatic transmission in motor vehicles. Outstanding base oil quality for optimal cold temperature properties and high ageing stability. Durable friction properties for excellent wet clutch performance.<br>Product dyeing: red.             | –                    | MAN 339 TYPE L1<br>MAN 339 TYPE V2<br>MAN 339 TYPE Z2<br>MB-APPROVAL 236.6<br>VOITH H55.6336.xx<br>ZF TE-ML 04D, 14B, 16L, 17C (ZF000717) | DEXRON III (H)<br>ALLISON TES 295<br>ALLISON TES 389<br>BMW 81 22 9 400 272<br>BMW 81 22 9 400 275<br>BMW 83 22 0 403 248<br>BMW 83 22 9 407 738<br>BMW 83 22 9 407 807<br>BMW 83 22 9 407 858<br>BMW 83 22 9 407 859<br>FORD MERCON V<br>MAN 339 TYPE Z3<br>OPEL 19 40 707<br>VOLVO 97341<br>VW TL 521 62 (G 052 162)<br>ZF TE-ML 02F, 11B, 14C                                                                                                                                                                                                                                           |
| <b>TITAN ATF 1</b>                         | Ultra High Performance ATF especially developed for highly stressed step automatic transmissions in passenger cars as well as in commercial vehicles.<br>Product dyeing: none.                                                                                              | –                    | VOITH 150.014524.xx<br>ZF TE-ML 04D, 11B, 14B, 16L, 17C (ZF000734)                                                                        | BMW 83 22 9 407 807<br>CHRYSLER MS 9602 (ATF +4)<br>CITROËN/PEUGEOT Z 000 169756<br>DEXRON III<br>JAGUAR JLM 20238<br>MB 236.11<br>PORSCHE 999.917.547.00<br>VW TL 521 62 (G 052 162)                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>TITAN ATF 4400</b>                      | Ultra High Performance ATF specifically formulated for Japanese passenger cars and light commercial vehicles, as well as for several European and American manufacturers. The high torque capacity exceeds the performance of many original fluids.<br>Product dyeing: red. | JASO M315<br>TYPE 1A | –                                                                                                                                         | DEXRON III<br>AISIN WARNER/AW-1<br>BMW MINI 83 22 0 402 413<br>BMW MINI 83 22 7 542 290<br>DAIHATSU ALUMIX ATF MULTI<br>FIAT 9.55550-AV1/AV2/AV4<br>FORD MERCON<br>FORD M2C924-A/M2C922-A1<br>GM 9986195<br>HONDA ATF Z-I<br>HYUNDAI SP III, SP IV<br>ISUZU BESCO ATF -II/ATF -III<br>JATCO 3100 PL085/FWD (N402)/JF506E (K17)<br>JWS 3309/TYP T-IV<br>KIA SP-IV<br>MAZDA ATF D-III/ATF M-3<br>MITSUBISHI SP-II/-III<br>NISSAN MATIC C/D/J/S<br>SAAB 3309<br>SUBARU ATF OIL/ATF OIL SPECIAL/ATF HP<br>SUZUKI ATF 3309/3317<br>TOYOTA TYPE D-2/T-T-II/T-III/T-IV/WS<br>VW G 052 990/055 025 |
| <b>TITAN ATF 4134</b>                      | Ultra High Performance ATF, specially developed to optimise shifting performance of Mercedes automatic transmissions.<br>Product dyeing: red.                                                                                                                               | –                    | MB-APPROVAL 236.14<br>SSANG YONG<br>(MB-automatic transmissions)                                                                          | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



# Transmission Fluids



| Product name                               | Description                                                                                                                                                                                                                                                        | Specifications | Approvals                                                                                                                                                                                                               | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Automatic Transmission Fluids (ATF)</b> |                                                                                                                                                                                                                                                                    |                |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>TITAN ATF 4000</b>                      | Ultra High Performance ATF for use in automatic transmissions as well as other ATF applications. Licensed according to DEXRON III (H). Improved low-temperature shifting compared to DEXRON II. Product dyeing: red.                                               | –              | ALLISON C-4<br>ALLISON TES 389<br>DEXRON III (H)<br>MAN 339 TYPE L1<br>MAN 339 TYPE V1<br>MAN 339 TYPE Z1<br>MB-APPROVAL 236.1<br>MB-APPROVAL 236.9<br>VOITH H55.6335.xx<br>VOLVO 97341<br>ZF TE-ML 04D, 14A (ZF000728) | BMW 81 22 9 400 272<br>BMW 81 22 9 400 275<br>BMW 81 22 9 407 738<br>BMW 83 22 0 403 248<br>BMW 83 22 9 407 765<br>BMW 83 22 9 407 807<br>BMW 83 22 9 407 858<br>BMW 83 22 9 407 859<br>CAT TO-2<br>FORD MERCON<br>OPEL 19 40 707; OPEL 19 40 767<br>VW TL 521 62 (G 052 162)<br>ZF TE-ML 02F, 03D, 09, 11B, 17C                                                                                                                                                                 |
| <b>TITAN ATF CVT</b>                       | Ultra High Performance ATF specially designed for use in many CVT-gear-boxes using push-belts or transmission chains made of steel. Product dyeing: none.                                                                                                          | –              | MB-APPROVAL 236.20<br>FORD WSS-M2C928-A                                                                                                                                                                                 | BMW 83 22 0 136 376<br>BMW 83 22 0 429 154<br>CHRYSLER CVTF+4<br>DAIHATSU AMMIX CVTF-DC/-DFE<br>DODGE/JEEP NS-2/CVTF+4<br>FORD WSS-M2C933-A/MERCON C<br>GM 19260800<br>GM DEX-CVT<br>HONDA HCF-2<br>HYUNDAI/KIA SP-CVT1<br>MAZDA CVTF 3320<br>MITSUBISHI CVTF-J1/J4<br>NISSAN NS-1/NS-2/NS-3<br>SUBARU Lineartronic CV-30/CVTF/CVTF II/E-CVT/CVT<br>SUZUKI TC/NS-2/CVT Green 1/CVT Green 2/CVTF 3320<br>TOYOTA TC/CVT FE<br>VW TL 521 80 (G 052 180)<br>VW TL 525 16 (G 052 516) |
| <b>TITAN ATF 3353</b>                      | Ultra High Performance DEXRON III-generation-ATF for automatic transmissions as well as any other ATF-applications. Developed for the MB automatic transmissions and transfer cases according manufacturer. Offers fuel-efficiency potential. Product dyeing: red. | –              | MB-APPROVAL 236.12<br>VW TL 52533 (G 052 533)                                                                                                                                                                           | DEXRON III<br>BMW 83 22 9 407 765<br>FORD WSA-M2C195-A<br>FORD WSS-M2C202-B<br>FORD WSS-M2C922-A1<br>SSANG YONG                                                                                                                                                                                                                                                                                                                                                                  |
| <b>TITAN ATF 3000</b>                      | Super High Performance DEXRON II (D) ATF for automatic transmissions in commercial vehicles, machinery and passenger cars according to manufacturer's documentation. Product dyeing: red.                                                                          | –              | MAN 339 TYPE L2<br>MAN 339 TYPE V1<br>MAN 339 TYPE Z1<br>MB-APPROVAL 236.1<br>VOITH H55.6335.xx<br>ZF TE-ML 04D, 14A (ZF000720)                                                                                         | DEXRON II (D)<br>ALLISON C-4<br>BMW 81 22 9 400 272<br>BMW 81 22 9 400 275<br>BMW 81 22 9 407 738<br>CAT TO-2<br>FORD MERCON<br>FORD M2C185-A<br>FORD ESP-M2C138-CJ<br>FORD ESP-M2C166-H<br>FORD M2C9010-A<br>OPEL 19 40 700<br>OPEL 19 40 707<br>RENK-DOROMAT<br>ZF TE-ML 02F, 03D, 09, 11A, 17C                                                                                                                                                                                |
| <b>TITAN ATF 10</b>                        | High Performance ATF for transmissions, power steering systems and hydraulic drives which require a GM-specification TYPE A, Suffix A fluid. Product dyeing: red.                                                                                                  | –              | MB-APPROVAL 236.2                                                                                                                                                                                                       | TASA<br>MAN 339 TYPE A                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Hydraulic Fluids

**PENTOSIN**


| Product name                                     | Description                                                                                                                                                                           | Specifications     | Approvals                                                                                                                   | FUCHS Recommendations                                                                                                                                                                         |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Central Hydraulic / Power Steering Fluids</b> |                                                                                                                                                                                       |                    |                                                                                                                             |                                                                                                                                                                                               |
| <b>PENTOSIN CHF 115</b>                          | Premium Performance Power Steering and Central Hydraulic Fluid with a wide application and approval profile for various manufacturers.<br>Product dyeing: green.                      | FORD WSS-M2C204-A  | CHRYSLER MS-11655B<br>MAN M 3289<br>MB-APPROVAL 345.0<br>PSA S712710<br>ZF TE-ML 02K (ZF000832)<br>VW TL 52 146 (G 002 000) | BENTLEY JNV862564F<br>BMW 81 22 9 407 758<br>BMW 82 11 1 468 041<br>BMW 83 29 0 429 576<br>FENDT X 902 011 622<br>OPEL B 040 0070<br>PORSCHE 000 043 203 33<br>SAAB 3032 380<br>VOLVO 1161529 |
| <b>PENTOSIN CHF 202</b>                          | Premium Performance Power Steering and Central Hydraulic Fluid with a wide application and approval profile for various manufacturers.<br>Product dyeing: green.                      | FORD WSS-M2C204-A2 | OPEL B 040 2012<br>HYUNDAI 00232-19017<br>VW TL 52 146.01 (G 004 000)                                                       | AUDI/VW G 004 012<br>PORSCHE 000 043 206 56<br>SAAB 93160548<br>VOLVO 30741424<br>LAND ROVER LR003401                                                                                         |
| <b>PENTOSIN CHF 5364 B</b>                       | Premium Performance Central Hydraulic Fluid approved by Mercedes-Benz for level control systems in passenger cars formulated with fully-synthetic base oils.<br>Product dyeing: none. | —                  | MB-APPROVAL 344.0                                                                                                           | —                                                                                                                                                                                             |
| <b>PENTOSIN LHM+</b>                             | Ultra High Performance Central Hydraulic Fluid for use in the comfort and safety area of PSA vehicles.<br>Product dyeing: green-yellow.                                               | —                  | PSA B71 2710                                                                                                                | IVECO 18-1823<br>MASSEY FERGUSON NH 610A<br>SDFG OF16115                                                                                                                                      |
| <b>PENTOSIN PSF</b>                              | Super High Performance Power Steering Fluid approved by Mercedes-Benz for passenger cars and commercial vehicles.<br>Product dyeing: none.                                            | —                  | MB-APPROVAL 236.3                                                                                                           | —                                                                                                                                                                                             |

## Lubricants for Agricultural Machinery



| Product name                           | Description                                                                                                                                                                               | Specifications                      | Approvals                                              | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>STOU Oils</b>                       |                                                                                                                                                                                           |                                     |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>AGRIFARM STOU MC PRO SAE 10W-40</b> | Ultra High Performance Multi-functional Oil (STOU/MFO) of the latest generation for agricultural vehicles.                                                                                | SAE J300:<br>SAE 10W-40             | DEUTZ DQC III-10                                       | ACEA E7(E5/E3),E4, API CI-4,<br>API GL-3/GL-4/API GL-5 in tractors*<br>MAN 3275<br>AFNOR NFE 48603 HV, ALLISON C-4<br>CASE MS 1207, 1209, 1210, 1230<br>CNH MAT 3505, 3509, 3525, 3526<br>DIN 51524-3: HVLP (-D)<br>FNHA 2C-200.00, 201.00<br>FORD M2C48-C3, M2C86-B, M2C134-D,<br>M2C159-B/C<br>JOHN DEERE JDM J20C<br>NEW HOLLAND 82009201/2/3<br>NH 030C, 330G, 330H, 410B, 420A, 526C<br>MASSEY FERGUSON CMS M 1145, 1144, 1143,<br>1139, 1135<br>SAE J306: SAE 80W-90<br>ZF TE-ML 06A, 06B, 06C, 06F, 06L, 07B<br>* without HOLMER |
| <b>AGRIFARM STOU MC SAE 10W-30</b>     | MC-synthesis Super High Performance Multifunctional, Oil (STOU/MFO) for engines, manual gear boxes, wet brakes, hydraulics and turbo-drives in tractors and other agricultural machinery. | API GL-4<br>SAE J300:<br>SAE 10W-30 | DEUTZ DQC I-02<br>ZF TE-ML 06B, 06F,<br>07B (ZF000733) | AFNOR NFE 48603 HV<br>DIN 51524-3: HVLP (-D)<br>ACEA E3<br>API CG-4<br>ALLISON C-4<br>CASE MS 1207, 1209, 1210, 1230<br>CNH MAT 3505, 3509, 3525, 3526<br>FORD M2C48-C3, M2C86-B, M2C134-D,<br>M2C159-B/C<br>JOHN DEERE JDM J20 C<br>NEW HOLLAND 82009201/2/3<br>NH 410B, 420A<br>MASSEY FERGUSON CMS M 1145, 1144, 1143,<br>1139, 1135<br>SAE J306: SAE 75W-80<br>ZF TE-ML 06A, 06C                                                                                                                                                    |

# AGRIFARM

| Product name                        | Description                                                                                                                                                                                                                                                                   | Specifications                                                         | Approvals                                                                | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>STOU Oils</b>                    |                                                                                                                                                                                                                                                                               |                                                                        |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>AGRIFARM STOU MC SAE 10W-40</b>  | Super High Performance Multifunctional Oil (STOU / MFO) based on MC-base-oil technology for engines, manual gear boxes, wet brakes, hydraulics and turbo-drives in tractors and other agricultural and other commercial vehicles.                                             | API GL-4<br>SAE J300:<br>SAE 10W-40                                    | DEUTZ DQC I-02<br>FENDT KDM 17/2012<br>ZF TE-ML 06B, 06F, 07B (ZF000729) | API GL-5 in tractors*<br>ACEA E3<br>API CG-4<br>MAN 271<br>AFNOR NFE 48603 HV<br>ALLISON C-4<br>CASE MS 1207, 1209, 1210, 1230<br>CNH MAT 3505, 3509, 3525, 3526<br>DIN 51524-3: HVLP (-D)<br>FORD M2C134-D, M2C159-B/C<br>FNHA 2C-200.00, 201.00, FORD M2C48-C3, M2C-86 B<br>JOHN DEERE JDM J20C<br>NEW HOLLAND 82009201/2/3<br>NH 030C, 330G, 410B, 420A, 526C<br>MASSEY FERGUSON CMS M 1145, 1144, 1143, 1139, 1135<br>SAE J306: SAE 80W-90<br>ZF TE-ML 06A, 06C, 06L<br>* without HOLMER |
| <b>AGRIFARM STOU SAE 15W-40</b>     | High Performance Multifunctional Oil (STOU / MFO) for engines, manual gear boxes, wet brakes, hydraulics in tractors and other agricultural equipment.                                                                                                                        | API GL-4                                                               | FENDT KDM 17/2012                                                        | ACEA E2<br>API CF-4<br>CNH MAT 3525, 3526<br>DIN 51524 : HLP (-D)<br>FNHA 200.00, 201.00<br>FORD M2C134-D, M2C159-B/C<br>JOHN DEERE JDM J20C<br>MASSEY FERGUSON CMS M 1145, 1144, 1143, 1139, 1135<br>NEW HOLLAND 82009201/2/3<br>NH 420A<br>SAE J306: 80W-90<br>SDFG OU 1391, OT 1891<br>STEYR D-401<br>ZF TE-ML 06A, 06B, 06C, 07B                                                                                                                                                         |
| <b>Engine Oils</b>                  |                                                                                                                                                                                                                                                                               |                                                                        |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>AGRIFARM MOT X-LA SAE 10W-40</b> | Premium Performance Engine Oil for agricultural vehicles. Universal engine oil for application in modern vehicles with exhaust after treatment as well as in older vehicles. Best engine cleanliness and outstanding wear protection.                                         | ACEA E9/E7/E6/E4<br>API CJ-4/<br>CI-4 PLUS/ CI-4/<br>CH-4<br>CAT ECF-3 | DEUTZ DQC IV-10 LA (incl. TTCD)<br>MB-APPROVAL 228.51                    | CNH MAT 3521<br>CUMMINS CES 20081                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>AGRIFARM MOT SAE 10W-40</b>      | Ultra High Performance Engine Oil of the latest conception of the SAE grade 10W-40. It was developed for advanced diesel engines which made high demands on service intervals and engine cleanliness. Specially recommended for normally aspirated and turbo-charged engines. | ACEA E7<br>API CI-4<br>GLOBAL DHD-1<br>JASO DH-1                       | —                                                                        | ALLISON C-4<br>CAT ECF-2<br>CUMMINS CES 20071/2/6/7/8<br>DAF<br>DEUTZ DQC III<br>MACK EO-M PLUS<br>MAN M 3275-1<br>MTU DDC TYPE 2<br>RENAULT RLD/RLD-2<br>VOLVO VDS-3                                                                                                                                                                                                                                                                                                                        |



## Lubricants for Agricultural Machinery

| Product name                   | Description                                                                                                                                                                                              | Specifications                                                  | Approvals                                   | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Engine Oils</b>             |                                                                                                                                                                                                          |                                                                 |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>AGRIFARM MOT SAE 15W-40</b> | Super High Performance Engine Oil for normally aspirated and turbocharged diesel engines in tractors and other machinery which make high demands on service intervals and engine cleanliness.            | ACEA E7<br>API CI-4/SL<br>GLOBAL DHD-1<br>CAT ECF-1-a/<br>ECF-2 | DEUTZ DQC III-10<br>MB-APPROVAL 228.3       | ALLISON C-4<br>CAT TO-2<br>CASE MS 1121<br>CUMMINS CES 20071/2/6/7/8<br>DETROIT DIESEL 93K215<br>IVECO 18-1804 CLASSE T2 E7<br>MACK EO-N<br>MAN M 3275-1<br>MTU DDC TYPE 2<br>NH 330H<br>RENAULT RLD/RLD-2<br>STEYR A-201<br>VOLVO VDS-3                                                                                                                                                                                                                  |
| <b>UTTO Oils</b>               |                                                                                                                                                                                                          |                                                                 |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>AGRIFARM UTTO VT</b>        | Ultra High Performance Multi-functional Oil (UTTO/MFO) for use in transmission and hydraulic systems with integrated wet brakes, clutches and differentials for agricultural and construction machinery. | API GL-4                                                        | ZF TE-ML 06B, 06D, 06N, 07B (ZF002035)      | ACEA E2<br>API CF-4/ CG-4/SF<br>ALLISON C-4<br>CAT TO-2<br>FORD M2C159-B/C<br>JOHN DEERE JDM J20C<br>JOHN DEERE JDM J27<br>MASSEY FERGUSON CMS M 1145 (1144, 1143, 1139, 1135)<br>SAE J300: 10W-30; SAE J306: 80W-80<br>ZF TE-ML 06C, 06F, 06Q, 06R                                                                                                                                                                                                       |
| <b>AGRIFARM UTTO MP</b>        | Super High Performance Multi-functional Oil (UTTO/MFO) for use in transmission and hydraulic systems with integrated wet brakes, clutches and differentials for agricultural and construction machinery. | API GL-4                                                        | ZF TE-ML 03E, 05F, 06K, 17E, 21F (ZF002183) | AGCO Powerfluid 821 XL<br>AGCO Q-186 (Whitefarm)<br>ALLISON C-4<br>CASE MS 1230, 1210, 1209, 1207, 1206<br>CLAAS / LANDINI / SAME-Transmission<br>CNH MAT 3505, 3506, 3509, 3525, 3526, 3540<br>FNHA-2-C-200.00 / -201.00<br>FORD M2C48-C3, ESN M2C86-B/C, M2C134-D<br>JOHN DEERE JDM J20C<br>KUBOTA UDT FLUID<br>MASSEY FERGUSON CMS M 1145, 1143, 1141, 1135<br>NH 410B<br>SAE J300: 10W-30; SAE J306: 75W-80<br>SDFG OT 1891 A<br>VALTRA G2-08, G2-B10 |
| <b>AGRIFARM UTTO LN</b>        | Super High Performance Transmission Hydraulic Fluid developed as a problem-solver for tractors in which conventional UTTO oils led to noisy wet brakes.                                                  | API GL-4<br>SAE J300: 20W-30                                    | —                                           | AGCO Powerfluid 821 XL<br>AGCO Q-186 (Whitefarm)<br>ALLISON C-4<br>CASE MS 1206, 1207, 1209, 1210, 1230<br>CNH MAT 3505, 3506, 3509, 3525, 3526<br>FNHA-2-C-200.00 / -201.00<br>FORD M2C48C3, ESN M2C86-B/C, M2C134-D<br>JOHN DEERE JDM J20C<br>MASSEY FERGUSON CMS M 1141, 1135<br>SAE J306: 80W-85<br>CLAAS / LANDINI / SAME-Transmission /<br>DEUTZ-FAHR<br>FENDT (non Vario)                                                                          |

## AGRIFARM, PLANTO

| Product name                                | Description                                                                                                                                                                                                                                                     | Specifications       | Approvals | FUCHS Recommendations                                                                                                                                                                             |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rapidly Biodegradable Lubricant</b>      |                                                                                                                                                                                                                                                                 |                      |           |                                                                                                                                                                                                   |
| <b>PLANTO<br/>HYTRAC PLUS</b>               | Biodegradable Super High Performance Multifunctional Oil (UTTO) for tractor gear boxes with or without wet brakes.                                                                                                                                              | SAE 10W-30<br>SAE 80 | —         | CASE MS 1207, 1209<br>FORD M2C134-D<br>JOHN DEERE JDM J20C<br>NEW HOLLAND NH 410 BS<br>MASSEY FERGUSON CMS M1127, 1135, 1143<br>HLP/HVLP ISO VG 32, 46, 68, 100<br>according to DIN 51 524-2 /-3) |
| <b>Gear Oil</b>                             |                                                                                                                                                                                                                                                                 |                      |           |                                                                                                                                                                                                   |
| <b>AGRIFARM<br/>GEAR LS<br/>SAE 90</b>      | Super High Performance EP Gear Oil for axles fitted with limited-slip differentials in agricultural and other machinery.                                                                                                                                        | API GL-5             | —         | NH 520B<br>SDFG OP 1705LS<br>VOLVO 97310<br>ZF TE-ML 05C, 12C, 16E                                                                                                                                |
| <b>Milking Machine Oil</b>                  |                                                                                                                                                                                                                                                                 |                      |           |                                                                                                                                                                                                   |
| <b>AGRIFARM<br/>MILKING<br/>MACHINE OIL</b> | Ultra High Performance Milking Machine Oil specially developed for use in the vacuum pumps of milking machines. It contains additives which protect against wear and corrosion and foaming. These features increase the functional reliability of such systems. | —                    | —         | ALFA LAVAL<br>WESTFALIA                                                                                                                                                                           |

## Motorcycle Lubricants



| Product name                                                                                               | Description                                                                                                                                                                  | Specifications                    | Approvals | FUCHS Recommendations                |
|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------|--------------------------------------|
| <b>RACE Engine Oils – For professional racers and everybody who rides at the limit</b>                     |                                                                                                                                                                              |                                   |           |                                      |
| <b>SILKOLENE PRO 4</b><br>SAE 5W-40 XP<br>SAE 10W-40 XP<br>SAE 10W-50 XP<br>SAE 15W-50 XP<br>SAE 10W-60 XP | Premium Performance four-stroke engine oil for all high performance motorcycles with latest XP Technology.                                                                   | API SM/SN                         | JASO MA2  | –                                    |
| <b>SILKOLENE PRO KR2</b>                                                                                   | Two-stroke race cart oil formulated with synthetic base oils and castor oil. Use manufacturer's recommended mixing ratios. Not miscible with other lubricants.               | –                                 | CIK-FIA   | –                                    |
| <b>SILKOLENE PRO 2</b>                                                                                     | Fully-synthetic two-stroke racing engine oil. Specially formulated for extreme conditions. Not miscible with conventional two-stroke oils. Only suitable for Premix systems. | –                                 | CIK-FIA   | –                                    |
| <b>SILKOLENE COMP 2 PLUS</b>                                                                               | Fully-synthetic two-stroke racing engine oil. Perfect for GP racing engines. Suitable for Premix and Autolube systems.                                                       | API TC<br>JASO FC/FD<br>ISO-L-EGD | –         | –                                    |
| <b>RIDE Engine Oils– For the tourer and street rider</b>                                                   |                                                                                                                                                                              |                                   |           |                                      |
| <b>SILKOLENE COMP 4</b><br>SAE 10W-30 XP<br>SAE 15W-50 XP                                                  | Ultra High Performance four-stroke engine oil for all high performance motorcycles with latest XP Technology.                                                                | API SL                            | JASO MA2  | –                                    |
| <b>SILKOLENE SUPER 4</b><br>SAE 15W-40                                                                     | Four-stroke engine oil formulated with selected base oils. Specially for use in BMW motorcycles with and without wet clutches.                                               | –                                 | –         | API SF/SG<br>BMW Motorrad<br>JASO MA |
| <b>SILKOLENE SUPER 4</b><br>SAE 10W-40                                                                     | MC-synthesis four-stroke engine oil. High-quality standard product offering excellent protection.                                                                            | API SJ                            | JASO MA2  | –                                    |

**Silkolene®**

| Product name                                               | Description                                                                                                                                                                                                                                                           | Specifications                    | Approvals | FUCHS Recommendations |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------|-----------------------|
| <b>RIDE Engine Oils– For the tourer and street rider</b>   |                                                                                                                                                                                                                                                                       |                                   |           |                       |
| <b>SILKOLENE SUPER 4 SAE 20W-50</b>                        | MC-synthesis four-stroke engine oil. High-quality standard product offering excellent protection.                                                                                                                                                                     | –                                 | JASO MA2  | API SF/SG             |
| <b>SILKOLENE V-TWIN SAE 20W-50</b>                         | Mineral four-stroke engine oil. Specially developed for Harley-Davidson and European/ Japanese Metric V-Twins.                                                                                                                                                        | API SL                            | JASO MA2  | –                     |
| <b>SILKOLENE COMP 2</b>                                    | Synthetic two-stroke engine oil. Reliable protection against seizures, ring sticking and coking. Suitable for Premix and Autolube systems.                                                                                                                            | API TC<br>JASO FC/FD<br>ISO-L-EGD | –         | –                     |
| <b>SCOOT Engine Oils – The name says it all</b>            |                                                                                                                                                                                                                                                                       |                                   |           |                       |
| <b>SILKOLENE SCOOT SPORT 2</b>                             | Synthetic two-stroke engine oil for highly-stressed scooter engines. Suitable for Premix and Autolube systems.                                                                                                                                                        | API TC<br>JASO FC/FD<br>ISO-L-EGD | –         | –                     |
| <b>SILKOLENE SCOOT 2</b>                                   | MC-synthesis two-stroke engine oil for scooters and mopeds. Suitable for Premix and Autolube systems.                                                                                                                                                                 | API TC<br>JASO FC                 | –         | –                     |
| <b>MAINTAIN – Maintenance and protection for your bike</b> |                                                                                                                                                                                                                                                                       |                                   |           |                       |
| <b>SILKOLENE PRO SRG 75</b>                                | Fully-synthetic, ester-based racing gear oil. Excellent protection against wear and easy shifting even at extreme temperatures.                                                                                                                                       | –                                 | –         | –                     |
| <b>SILKOLENE COMP GEAR OIL SAE 80W-90</b>                  | Synthetic, high-performance, ester-based gear oil. Particularly recommended when the gear box contains aluminium components.                                                                                                                                          | API GL-4/GL-3                     | –         | –                     |
| <b>SILKOLENE MAG COOL</b>                                  | Ready to use, powerful engine coolant for all year round use. Anti-cavitation performance exceeds that of conventional ethylene glycol based anti-freezes, providing the user with superior protection against engine and coolant pump damage due to this phenomenon. | –                                 | –         | –                     |
| <b>SILKOLENE RSF 2.5 / 5 / 7.5 / 10 / 15</b>               | Fully-synthetic shock-absorber fluids and special fork oils with a high viscosity index in diferent viscosity ranges. Specially developed for racing.                                                                                                                 | –                                 | –         | –                     |
| <b>SILKOLENE FOAM FILTER CLEANER</b>                       | Special water-soluble cleaner used to wash foam filter elements.                                                                                                                                                                                                      | –                                 | –         | –                     |
| <b>SILKOLENE PRO CHAIN</b>                                 | Fully-synthetic racing chain lube spray for high-performance road, racing and motocross applications. For all chains with or without O-rings.                                                                                                                         | –                                 | –         | –                     |
| <b>SILKOLENE TITANIUM DRI GEL</b>                          | Advanced chain lubricating gel: Effectively resists fling-off and appears whitish when applied.                                                                                                                                                                       | –                                 | –         | –                     |
| <b>SILKOLENE CHAIN LUBE</b>                                | Synthetic chain lube spray for optimum wear and rust protection. For all motorcycle chains with or without O-rings.                                                                                                                                                   | –                                 | –         | –                     |
| <b>SILKOLENE PRO PREP</b>                                  | Special conditioning spray for plastics and painted surfaces restores the „brand-new“ look.                                                                                                                                                                           | –                                 | –         | –                     |

## Motorcycle Lubricants

**Silkolene®**

| Product name                                               | Description                                                                                                                                                                                                                                                                                  | Specifications | Approvals | FUCHS Recommendations |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-----------------------|
| <b>MAINTAIN – Maintenance and protection for your bike</b> |                                                                                                                                                                                                                                                                                              |                |           |                       |
| <b>SILKOLENE ALL-IN-ONE</b>                                | Multipurpose maintenance spray with a multitude of uses: SILKOLENE ALL-IN-ONE can be used to dry out damp ignitions or free rusted fasteners. It has excellent dewatering properties, repels moisture, penetrates corroded threads, lubricates and even offers protection against corrosion. | –              | –         | –                     |
| <b>SILKOLENE BRAKE &amp; CHAIN CLEANER</b>                 | Highly effective cleaner for brakes and drive chains. Effectively removes caked residue.                                                                                                                                                                                                     | –              | –         | –                     |



## Service Products

## MAINTAIN



| Product name                | Description                                                                                                                                      | Specifications                                                                                                                                                                       | Approvals                                                                                                                                    | FUCHS Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Antifreezes</b>          |                                                                                                                                                  |                                                                                                                                                                                      |                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>MAINTAIN FRICOFIN LL</b> | Premium Performance Coolant Additive based on monoethylene glycol. Free from nitrite, amine, phosphate and silicates.<br>Product dyeing: orange. | ASTM D 3306 TYPE I<br>ASTM D 6210 TYPE I-FF<br>BS 6580:2010<br>SAE J814<br>FORD WSS-M97-B44-D<br>JAGUAR LAND ROVER<br>STJLR.651.5003<br>FVV Heft R443<br>KSM 2142<br>UNE 26-361-88/1 | Bez.Reg.Arnsbg.<br>E62.12.22.64-2011-1<br>CAT / MWM TR 0199-99-2091<br>DAF 74002<br>DEUTZ DQC CB-14<br>MAN 324 TYPE SNF<br>MB-APPROVAL 325.3 | AFNOR NFR 15-601 TYPE I<br>AS/NZS 2108:2004 TYPE A<br>ASTM D 4985<br>SAE J1034<br>ADE (ATLANTIS DIESEL ENGINES)<br>BAIC GROUP FOTON Q-FPT<br>2313005-2013<br>CATERPILLAR MAK A4.05.09.01<br>CHRYSLER MS 12106<br>CNH MAT 3624<br>CUMMINS (ISBe engines at DAF and Leyland)<br>CUMMINS CES 14603, CES 14439<br>DETROIT DIESEL 93K217<br>FIAT 9.55523<br>GM GMW 3420 (6277M)/<br><b>GME L 1301</b><br>HYUNDAI MS 591-08<br>JASO M325<br>JIS K2234<br>JOHN DEERE JDM H5<br>KOMATSU AF-NAC<br>(07.892 (2009))<br>LIEBHERR MD 1-36-130<br>MACK 014 GS 17009<br>MAZDA MEZ MN 121 D<br>PSA B 71 5110<br>RENAULT 41-01-001/-S Type D<br>SAAB B 040 1065<br>SKODA 61-0-0257<br>TOYOTA TSK 2601G-8A<br>VW TL 774-D/F<br>(G12+ / different colour)<br>VOLVO COOLANT VCS<br>(STD 418-0001) |

Performance upgrades in Specifications, Approvals and FUCHS Recommendations are highlighted in bold.

## Service Products

| Product name                    | Description                                                                                                                                                                       | Specifications                                                                                                                                                                                                                                                                                                           | Approvals                                                                                                                                                                                                                                         | FUCHS Recommendations                                                                                                                                                                                                                        |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Antifreezes</b>              |                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                              |
| <b>MAINTAIN FRICOFIN V</b>      | Ultra High Performance Coolant Additive based on monoethylene glycol. Free of nitrites, amines and phosphates. Product dyeing: pink-violet.                                       | ASTM D 3306 TYPE I<br>BS 6580:2010                                                                                                                                                                                                                                                                                       | VW TL 774-J (G13)                                                                                                                                                                                                                                 | —                                                                                                                                                                                                                                            |
| <b>MAINTAIN FRICOFIN DP</b>     | Ultra High Performance Coolant Additive based on monoethylene glycol. Free from nitrite, amine and phosphate. Product dyeing: pink-violet.                                        | AFNOR NF R 15-601 TYPE 1<br>AS/NZS 2108:2004 TYPE A<br>ASTM D 3306 TYPE I<br>ASTM D 4985<br>BS 6580:2010<br>SAE J814<br>CUMMINS CES 14603                                                                                                                                                                                | DEUTZ DQC CC-14<br>MAN 324 TYPE Si-OAT<br>MB-APPROVAL 325.5<br>MB-APPROVAL 325.6                                                                                                                                                                  | DETROIT DIESEL 93K217<br>SCANIA TB 1451<br>VW TL 774-G (G12++)                                                                                                                                                                               |
| <b>MAINTAIN FRICOFIN DP -35</b> | Ultra High Performance Coolant Ready-Mix based on monoethylene glycol. Offers frost protection down to -35°C. Free from nitrite, amine and phosphate. Product dyeing: pink-violet | AFNOR NF R 15-601 TYPE 3<br>ASTM D 3306 TYPE III<br><b>ASTM D 4985</b><br>BS 6580:2010<br>SAE J814<br>CUMMINS CES 14603                                                                                                                                                                                                  | DEUTZ DQC CC-14<br>MB-APPROVAL 326.5<br>MB-APPROVAL 326.6                                                                                                                                                                                         | DETROIT DIESEL 93K217<br>MAN 324 TYPE Si-OAT<br>SCANIA TB 1451<br>VW TL 774-G (G12++)                                                                                                                                                        |
| <b>MAINTAIN FRICOFIN HDD</b>    | Ultra High Performance Engine Coolant concentrate based on monoethylene glycol. Free of amines and phosphates with low silicate technology. Product dyeing: yellow.               | ASTM D 3306 TYPE I<br>ASTM D 4985<br>ASTM D 6210 TYPE I-FF<br>ASTM D 7583<br>AS/NZS 2108:2004 TYPE A<br>BS 6580:2010<br>SAE J814<br>CHRYSLER MS 7170<br>CHRYSLER MS 9769<br>DETROIT DIESEL 7SE298<br>FORD ESE-M97B44-A<br>FORD ESE-M97B18-C<br>FORD WSS M97B51-A1<br>GM 1825M & GM 1899M<br>JIS K2234<br>MACK 014GS17004 | MTU MTL 5048                                                                                                                                                                                                                                      | CASE MS 1710<br>CAT EC-1<br>CUMMINS CES 14603<br>DETROIT DIESEL 93K217 (NOAT)<br>FREIGHTLINER 48-2288D<br>IVECO 18-1830<br>KENWORTH R026-170-97<br>MAN 324 TYPE N<br>NEW HOLLAND WSN-M97B18-D<br>PACCAR CS 0185<br>TOYOTA Motor Corp. RP 329 |
| <b>MAINTAIN FRICOFIN</b>        | Super High Performance Coolant Additive based on monoethylene glycol. Free from nitrite, amine and phosphate. Product dyeing: blue-green.                                         | AFNOR NF R 15-601 TYPE 1<br>AS/NZS 2108:2004 TYPE A<br>ASTM D 3306 TYPE I<br>ASTM D 4985<br>BS 6580:2010<br>CUNA NC 956-16<br>SAE J814<br>SAE J1034                                                                                                                                                                      | BMW GS 94000<br>(BMW N 600 69.0)<br>CAT / MWM TR 0199-99-2091<br>DEUTZ DQC CA-14<br>GE JENBACHER TA 1000-0201<br>MAN 324 TYPE NF<br>MAN 324 TYPE NF PRITARDER<br>MB-APPROVAL 325.0<br>MTU MTL 5048<br>PN-C 40007:2000<br>VOITH TURBO 172.00225010 | DAF 74001<br>LIEBHERR TLV 035/TLV 23009 A<br>OPEL/GM B 040 0240<br>VW TL 774-C (G11)                                                                                                                                                         |

# MAINTAIN

| Product name                  | Description                                                                                                                                                                        | Specifications                                                                                        | Approvals                            | FUCHS Recommendations                                                                                                                                                                                                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Antifreezes</b>            |                                                                                                                                                                                    |                                                                                                       |                                      |                                                                                                                                                                                                                                                                                                |
| <b>MAINTAIN FRICOFIN -35</b>  | Super High Performance Coolant Ready-Mix based on monoethylene glycol. Offers frost protection down to -35 °C. Free from nitrite, amine and phosphate. Product dyeing: blue-green. | AFNOR NF R 15-601<br>TYPE 3<br>ASTM D 3306 TYPE III<br><b>ASTM D 4985</b><br>BS 6580:2010<br>SAE J814 | DEUTZ DQC CA-14<br>MB-APPROVAL 326.0 | BMW GS 94000<br>(BMW N 600 69.0)<br>DAF 74001<br>JENBACHER TA 1000-0201<br>LIEBHERR TLV 035/TLV 23009 A<br>MAN 324 TYPE NF<br>MAN 324 TYPE NF PRITARDER<br>MTU MTL 5048<br>CAT / MWM TR 0199-99-2091<br>OPEL/GM B 040 0240<br>PN-C 40007:2000<br>VOITH TURBO 172.00225010<br>VW TL 774-C (G11) |
| <b>MAINTAIN FRICOFIN S</b>    | High Performance Coolant Additive based on monoethylene glycol. Free from nitrite, amine and phosphate. Product dyeing: light green.                                               | ASTM D 3306 TYPE I<br>BS 6580:2010                                                                    | —                                    | —                                                                                                                                                                                                                                                                                              |
| <b>Brake Fluids</b>           |                                                                                                                                                                                    |                                                                                                       |                                      |                                                                                                                                                                                                                                                                                                |
| <b>MAINTAIN DOT 5.1</b>       | Ultra High Performance Brake Fluid for hydraulic brake systems and clutch actuation in passenger cars, trucks and motorcycles.                                                     | FMVSS NR. 116 DOT 5.1<br>ISO 4925 CLASS 3/4/5.1<br>SAE J 1703/J 1704                                  | —                                    | —                                                                                                                                                                                                                                                                                              |
| <b>MAINTAIN DOT 4</b>         | Super High Performance Brake Fluid for hydraulic brake systems and clutch actuation in passenger cars, trucks and motorcycles.                                                     | FMVSS NR. 116 DOT 3/<br>DOT 4<br>ISO 4925 CLASS 3/4<br>SAE J1703/J1704                                | —                                    | FORD M6C62-A<br>FORD M6C9103-A<br>NH 800A<br>OPEL 19 42 421                                                                                                                                                                                                                                    |
| <b>Fuel Additives</b>         |                                                                                                                                                                                    |                                                                                                       |                                      |                                                                                                                                                                                                                                                                                                |
| <b>MAINTAIN DIESEL EFFECT</b> | Super High Performance Fuel Additive improving diesel fuel properties for singular as well as constant treatment.                                                                  | —                                                                                                     | —                                    | —                                                                                                                                                                                                                                                                                              |
| <b>MAINTAIN GASOLINE PLUS</b> | Super High Performance Fuel Additive designed to clean the entire fuel system of gasoline engines. Recommended for constant use.                                                   | —                                                                                                     | —                                    | —                                                                                                                                                                                                                                                                                              |
| <b>MAINTAIN WINTERFIT</b>     | Super High Performance Diesel Fuel and Heating Oil Additive to prevent waxing and plugging at low temperatures.                                                                    | —                                                                                                     | —                                    | —                                                                                                                                                                                                                                                                                              |
| <b>Oil Binder</b>             |                                                                                                                                                                                    |                                                                                                       |                                      |                                                                                                                                                                                                                                                                                                |
| <b>MAINTAIN ABSORPEX</b>      | Oil Binder Type III R, Chemical Binder                                                                                                                                             | Reported by Hygiene Institut Gelsenkirchen MPL                                                        | —                                    | —                                                                                                                                                                                                                                                                                              |

## Specialities



| Product name                     | Description                                                                                                                                                                                                                                                                                                                           | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                    |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Multigrade Hydraulic Oils</b> |                                                                                                                                                                                                                                                                                                                                       |                                       |                         |                                           |                                            |     |                  |                                                                                                                                          |
| <b>TITAN<br/>HYD MR 530 MC</b>   | Ultra High Performance multigrade hydraulic oil for working machines (construction machines) as well as other automotive passenger car applications. Fulfils and surpasses the requirements on hydraulic oils HVLPD acc. to DIN 51524-3 (except: detergent / dispersant) HVLPD covers SAE 5W until 30 resp. ISO VG 32 until 68 (100). | 864                                   | 234                     | 46                                        | 8.3                                        | 154 | -48              | For application in working machines (construction machines) as well as other automotive vehicles.                                        |
| <b>TITAN<br/>HYD 1030</b>        | Super High Performance multigrade hydraulic oil for hydraulic systems in vehicles and working machines. Fulfils and surpasses the requirements on hydraulic oils HVLP acc. to DIN 51524-3 resp. HV acc. to ISO 11158.                                                                                                                 | 885                                   | 240                     | 100                                       | 11.8                                       | 107 | -24              | For application in hydraulic systems in vehicles and working machines.<br><br>Approved for Denison HF0.<br>Recommended for CASE MS 1216. |

# TITAN, RENOLIN

| Product name                              | Description                                                                                                                                                                                                                                                                                                                                                                                             | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hydraulic and Industrial Gear Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                            |
| <b>RENOLIN XtremeTemp 46</b>              | Universal, high-performance hydraulic oil with high viscosity index and increased shear stability (VI 180). Based on special hydrogenated base oils, very good ageing behaviour, long lifetime, excellent corrosion protection and very good wear protection, fulfils and surpasses DIN 51524-3: HVLV ISO 6743-4: HV ISO 11158: HV zinc containing AW/EP additive system                                | 853                                   | 230                     | 48                                        | 9.3                                        | 180 | -34              | Universal high-performance multigrade hydraulic oil for stationary and mobile hydraulic systems, improvement of efficiency. Allows oil drain intervals to be extended. Energy and fuel saving through high efficiency.<br><br>Denison HF0, HF1, HF2<br>Bosch Rexroth RD90235/<br>RDE90245                                                                  |
| <b>RENOLIN XtremeTemp 46 Plus</b>         | As RENOLIN XtremeTemp, but with additives which help to avoid stick-slip phenomena. For high-pressure applications; helps to reduce friction under mixed friction conditions<br><br>DIN 51524-3: HVLVD ISO 6743-4: HV                                                                                                                                                                                   | 855                                   | 234                     | 48                                        | 9.3                                        | 181 | -34              | Slightly detergent, multigrade hydraulic oil for stationary and mobile hydraulic systems if the use of HVLPD fluids acc. to DIN 51524-3, with wide temperature application range and excellent shear stability, is recommended. Helps to avoid stick-slip problems, especially at low speed and high load. Energy and fuel saving through high efficiency. |
| <b>RENOLIN UNISYN XT 220</b>              | Fully-synthetic industrial gear oils based on new, innovative polyalphaolefins with very high, natural, shear stable viscosity index and excellent low temperature behaviour. Excellent wear protection, high micropitting resistance. RENOLIN UNISYN XT oils exceed the requirements on industrial gear oils CLP-HC acc. to DIN 51517-3, ISO 6743-6, ISO 12925-1: CKC, CKD, CKE and AGMA 9005/E02: EP. | 860                                   | 242                     | 220                                       | 29.4                                       | 174 | -42              | For the use in applications with high requirements on wide temperature range.                                                                                                                                                                                                                                                                              |
| <b>RENOLIN UNISYN XT 320</b>              |                                                                                                                                                                                                                                                                                                                                                                                                         | 860                                   | 242                     | 320                                       | 40.2                                       | 179 | -42              | Approved by leading gear box manufacturers.                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN UNISYN XT 460</b>              |                                                                                                                                                                                                                                                                                                                                                                                                         | 860                                   | 242                     | 460                                       | 54.4                                       | 188 | -39              | <b>Based on PAO</b>                                                                                                                                                                                                                                                                                                                                        |



## Specialities

## RENISO

| Product name           | Description                                                                                                                                                                                                                                          | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point<br>Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refrigeration Oils     |                                                                                                                                                                                                                                                      |                                       |                            |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                            |
| <b>RENISO PAG 46</b>   | Synthetic refrigeration oils based on special polyalkylene glycols (PAG) for automotive air conditioning units with R134a. NH <sub>3</sub> – partly miscible refrigeration oils. Also suitable for hydrocarbon applications. DIN 51503: KAB, KD, KE. | 992                                   | 240                        | 55                                        | 10.6                                       | 187 | -45              | Refrigeration oils based on polyalkylene glycols for application with the refrigerant R134a used in car and truck air conditioning systems (a/c systems). RENISO PAG 100 is especially suitable for vane compressors. RENISO PAG 46 and PAG 100 are also recommended for the use with hydrocarbon refrigerants and ammonia.                |
| <b>RENISO PAG 100</b>  |                                                                                                                                                                                                                                                      | 996                                   | 240                        | 120                                       | 21.0                                       | 202 | -45              |                                                                                                                                                                                                                                                                                                                                            |
| <b>RENISO PAG 1234</b> | Synthetic refrigeration oil based on double-end-capped polyalkylene glycols (PAG). For vehicle a/c systems with R1234yf. Also suitable for R134a. DIN 51503: KD.                                                                                     | 993                                   | 224                        | 44                                        | 9.8                                        | 218 | -45              | RENISO PAG 1234 has been newly developed for car air-conditioning systems with R1234yf. The product combines both good miscibility properties and high thermo-chemical stability in contact with the refrigerant. Basic fluid and additivation of RENISO PAG 1234 guarantee best lubrication properties and wear protection.               |
| <b>RENISO ACC HV</b>   | Synthetic refrigeration oil based on special, double-end capped PAGs for trans-critical CO <sub>2</sub> applications (industrial and commercial applications). DIN 51503: KB.                                                                        | 991                                   | 229                        | 65                                        | 13.5                                       | 216 | -45              | RENISO ACC HV was developed in close collaboration with leading compressor manufacturers and OEMs specific for CO <sub>2</sub> air conditioning systems in vehicles. RENISO ACC HV is based on chemical and thermal extremely stable double end-capped PAG fluids with efficient additivation – especially with regard to wear protection. |

## Rapidly Biodegradable Lubricants

## PLANTO



| Product name                                                                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmentally Friendly Hydraulic and Lubricating Oils</b>                                               |                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>PLANTOSYN 3268</b><br> | PLANTOSYN 3268 is a biodegradable hydraulic and lubricating oil based on fully saturated synthetic esters. Biodegradable acc. to OECD 301 B >60%. High wear protection, good elastomer and yellow metal compatibility, very good oxidation stability. Surpasses the requirements on hydraulic oils HEES acc. to ISO 15380 and HVLP acc. to DIN 51524-3 (except: Dry TOST test).<br>Awarded the EU Ecolabel: DE / 027 / 149 | 913                                   | 280                     | 46                                        | 8.2                                        | 150 | -36              | Suitable for all mobile and stationary hydraulic systems for which the use of a rapidly biodegradable HEES hydraulic oil according to DIN ISO 15380 is recommended (e.g. in agriculture and forestry). Can be used where unsaturated, synthetic esters have failed. Extension of oil changing intervals possible. Oil sump temperature: -30 °C to 100 °C. Observe DIN ISO 15380 when making changeovers.<br><br>Approved by:<br>MANNESMANN<br>REXROTH<br>Sauer SUNDSTRAND<br>FENDT KDM 28/2006,<br>O&K Baumaschinen<br><br>Recommended for CAT BF-1, KRAMER ALLRAD; PLAFINGER; SAUER DANFOSS; TIMBERJACK; VALMET/ KOMATSU; FOREST; PONSSE |

## Rapidly Biodegradable Lubricants

**PLANTO**

| Product name                                                                                                   | Description                                                                                                                                                                                                                                                                                                  | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point<br>Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmentally Friendly Hydraulic and Lubricating Oils</b>                                                 |                                                                                                                                                                                                                                                                                                              |                                       |                            |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                           |
| <b>PLANTOSYN 3268 ECO</b><br> | PLANTOSYN 3268 ECO – hydraulic oil based on synthetic esters with additives to increase ageing stability. Biodegradable acc. to OECD 301 B >60%. High wear protection. Surpasses the requirements acc. to ISO 15380: HEES DIN 51524-3: HVLP (except: Dry TOST test). Awarded the EU Ecolabel: DE / 027 / 160 | 920                                   | 300                        | 47                                        | 9.5                                        | 191 | -33              | Universally recommended for hydraulic systems from -30 °C to +90 °C (oil sump temperature). The changeover guidelines according to DIN ISO 15380 must be observed.<br><br>Approved by FENDT KDM 28/2006                                                                                                   |
| <b>PLANTOLUBE KS 32-N</b>                                                                                      | Biodegradable tacky and lubricating oil based on rapeseed oils. For chains and other so-called loss lubrication points.                                                                                                                                                                                      | 921                                   | 205                        | 32                                        | 7.6                                        | 230 | -36              | Universally usable as lubricating oil in chains and other so-called loss lubrication points in the agriculture and forestry sector. For the lubrication of conveyor machines in saw mills and in the animal feed stuff industry. For the use in applications where a biodegradable chain oil is required. |
| <b>PLANTO TAC 68</b><br>    | Biodegradable high performance chain saw oil based on rapeseed oils. Excellent lubrication behaviour, good ageing resistance. Awarded the EU Ecolabel.                                                                                                                                                       | 924                                   | >270                       | 68                                        | 12.0                                       | 216 | -39              | For the professional use in chain saws.<br><br>KWF Approvals<br><br>Recommendations: Husqvarna, Stihl, Solo, Dolmar                                                                                                                                                                                       |

## Greases

## PLANTO



| Product name                                                                                                                                        | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rapidly Biodegradable Greases</b>                                                                                                                |                                           |                       |                  |            |                                        |                           |                            |                                                                                                                                                                                                                                          |
| <b>PLANTOGEL ECO 1 N</b><br>                                     | —                                         | Calcium Rape seed oil | —                | 1          | 36                                     | -20 / +70                 | EU Ecolabel                | Rapidly biodegradable lubricating grease with Ecolabel, e.g. for lock gates or in agriculture and forestry.                                                                                                                              |
| <b>PLANTOGEL ECO 2 N</b><br>                                     | —                                         | Calcium Rape seed oil | —                | 2          | 36                                     | -20 / +70                 | EU Ecolabel                | Rapidly biodegradable lubricating grease with Ecolabel, e.g. for lock gates or in agriculture and forestry.                                                                                                                              |
| <b>PLANTOGEL ECO 000 S</b>                                                                                                                          | —                                         | Li/Ca synth. ester    | —                | 00-000     | 55                                     | -40 / +120                | —                          | Rapidly biodegradable semi-fluid grease for lubrication of plain and roller bearings in commercial vehicles and construction machinery with central lubrication systems. Also for gear systems which are exposed to low to medium loads. |
| <b>PLANTOGEL ECO 2 S</b><br>(Spray can: PLANTO MULTISPRAY S)<br> | —                                         | Li/Ca synth. ester    | —                | 2          | 105                                    | -40 / +120                | EU Ecolabel                | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                              |

## Greases

| Product name                                                                                                                                            | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil                  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Approvals,<br>recommen-<br>dations | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rapidly Biodegradable Greases</b>                                                                                                                    |                                           |                                        |                          |               |                                                   |                                        |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PLANTOGEL<br/>ECO 2 FS</b>                                                                                                                           | —                                         | Li/Ca<br>synth.<br>ester               | •                        | 2             | 200                                               | -30 /<br>+120                          | —                                  | Rapidly biodegradable EP multipurpose grease with solid lubrications for lubrication of plain and roller bearings, e.g. commercial vehicles and construction machinery.                                                                                                                                                                                                                                                                                                                                                          |
| <b>PLANTOGEL<br/>ECO 402 S</b><br>                                     | —                                         | Ca<br>synth.<br>ester                  | —                        | 2             | 390                                               | -40 /<br>+120                          | EU Ecolabel                        | High performance bio-grease, water (salt water) resistant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Greases in Spray Cans or Rattle Cans</b>                                                                                                             |                                           |                                        |                          |               |                                                   |                                        |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>DUOTAC<br/>ZAHNRADSPRAY</b>                                                                                                                          | —                                         | Wax<br>Mineral oil                     | •                        | —             | —                                                 | -20 /<br>+150                          | —                                  | Dry, tenacious lubricating film. Open gears, gear rims, racks, chains, outer lubrication of wire ropes in crane installations, excavators, agricultural machines, rack and pinion railways; to be applied in cold condition, for open toothed-wheel gearing, transportation and conveying systems in the metallurgical industry and roller mills, lubrication/conservation of drag ropes and chains, e.g. in non-metallic mineral processing, solid lubricating film up to +300 °C; Bitumen-free special lubricant with graphite |
| <b>PLANTO<br/>MULTISPRAY S</b><br>(Grease:<br>PLANTOGEL ECO 2 S)<br> | —                                         | Li/Ca<br>synth.<br>ester               | —                        | 2             | 105                                               | -40 /<br>+120                          | EU Ecolabel                        | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                                                                                                                                                                                                                                                                                                                      |
| <b>RENAX<br/>GLEITSPRAY</b><br>(Grease: RENOLIT GL 1)                                                                                                   | —                                         | Lithium<br>Semi-<br>synth.<br>base oil | —                        | 1             | —                                                 | -30 /<br>+140                          | —                                  | Very adhesive, reduces friction and wear, protects from corrosion, temperature stable, noise-suppressing, suitable for plain and roller bearings and for gear boxes, bowden cables, guide rails, sun roofs, etc.                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIT<br/>CA-LZ SPRAY</b>                                                                                                                          | KP2K-30<br>ISO-L-X-<br>CCHB2              | Calcium<br>Mineral oil                 | —                        | 2             | 700                                               | -30 /<br>+120                          | —                                  | Strongly adhesive, protects from wear even under extreme conditions, very resistant to water wash-out from metallic surfaces, long-term lubrication of passenger cars and commercial vehicles, construction industry, industrial and agricultural machines                                                                                                                                                                                                                                                                       |
| <b>RENOLIT<br/>UNILOAD</b><br>(Grease:<br>RENOLIT CX-HT 2)                                                                                              | —                                         | CaSX<br>Mineral oil                    | •                        | 2             | 400                                               | -20 /<br>+180                          | —                                  | Lubrication of high loaded, low speed plain and roller bearings, e.g. for kiln cars, construction machinery, steel mills, coal and ore mills.                                                                                                                                                                                                                                                                                                                                                                                    |



## PLANTO, RENOLIT

| Product name                                             | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm <sup>2</sup> /s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|-----------------------------------------------------|---------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assembly Pastes</b>                                   |                                           |                       |                  |            |                                                     |                           |                            |                                                                                                                                                                                                                                                                                                                               |
| <b>RENOLIT CHUCK PASTE</b>                               | —                                         | Li/Ca Mineral oil     | •                | 2-3        | 166                                                 | -30 / +155                | —                          | Chucks for machine tools and as mounting aide for gears and electrical motors, etc., ejectors of plastic injection moulding machines (up to +100 °C), prevent corrosion and fretting corrosion                                                                                                                                |
| <b>RENOLIT PASTE PW</b>                                  | —                                         | CaSX Mineral oil      | •                | 2          | 350                                                 | -20 / +1200               | —                          | Assembly paste for prevent fretting corrosion, e.g. gears, electrical motors, etc., chucks, superheated steam valves, bearing seats on knuckle pins, or spline connections in length adjusters of car-dan shafts                                                                                                              |
| <b>RENOLIT SI 300 M</b>                                  | MSI2P-70                                  | Lithium Silicone oil  | —                | 2          | 75                                                  | -70 / +160                | DBL 6812.10<br>VW TL 767 X | Low temperature grease for electric and electronic equipment, precision machines, sealing grease for radial waves sealing rings, groove rings, sealing rings; lubrication of sealing bellows                                                                                                                                  |
| <b>Automotive Applications</b>                           |                                           |                       |                  |            |                                                     |                           |                            |                                                                                                                                                                                                                                                                                                                               |
| <b>RENOLIT CA-LZ</b><br>(Spray can: RENOLIT CA-LZ SPRAY) | KP2K-30<br>ISO-L-X-CCHB2                  | Calcium Mineral oil   | —                | 2          | 700                                                 | -30 / +120                | —                          | Strongly adhesive, protects from wear even under extreme conditions, very resistant to water wash-out from metallic surfaces, long-term lubrication of passenger cars and commercial vehicles, construction industry, industrial and agricultural machines                                                                    |
| <b>RENOLIT CX-HT 0</b>                                   | —                                         | CaSX Mineral oil      | •                | 0          | 400                                                 | -20 / +160                | —                          | Lubrication of high loaded, low speed plain and roller bearings, open gears and gear boxes, e.g. in construction machinery, steel mills, coal and ore mills; can be used in spray and dipping applications.                                                                                                                   |
| <b>RENOLIT CX-HT 2</b><br>(Spray can: RENOLIT UNILOAD)   | —                                         | CaSX Mineral oil      | •                | 2          | 400                                                 | -20 / +180                | —                          | Lubrication of high loaded, low speed plain and roller bearings, e.g. for kiln cars, construction machinery, steel mills, coal and ore mills.                                                                                                                                                                                 |
| <b>RENOLIT CXI 2</b>                                     | —                                         | CaSX Mineral oil      | —                | 2          | 400                                                 | -20 / +160                | —                          | Lubrication of high loaded, low speed plain and roller bearings and can be applied when the grease has to meet high demands on corrosion protection and working stability. Typical applications are plain and roller bearings in steel mills, paper industry, mining, concrete industry, quarries and construction equipment. |
| <b>RENOLIT DURAPLEX EP 1</b>                             | —                                         | Li-X Mineral oil      | —                | 1          | 105                                                 | -30 / +160                | —                          | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO                                                                                                                                                                                        |
| <b>RENOLIT DURAPLEX EP 2</b>                             | —                                         | Li-X Mineral oil      | —                | 2          | 105                                                 | -30 / +160                | —                          | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles, machine tools                                                                                                                                  |

Ca-X: Calcium complex; CaSX: Calcium sulfonate complex; HDK: Gel thickener; Li/Ca: Lithium/Calcium; Li-X: Lithium complex; PU: Polyurea; Synth. NaX: Synthetic sodium complex; PFPE: Perfluoropolyether

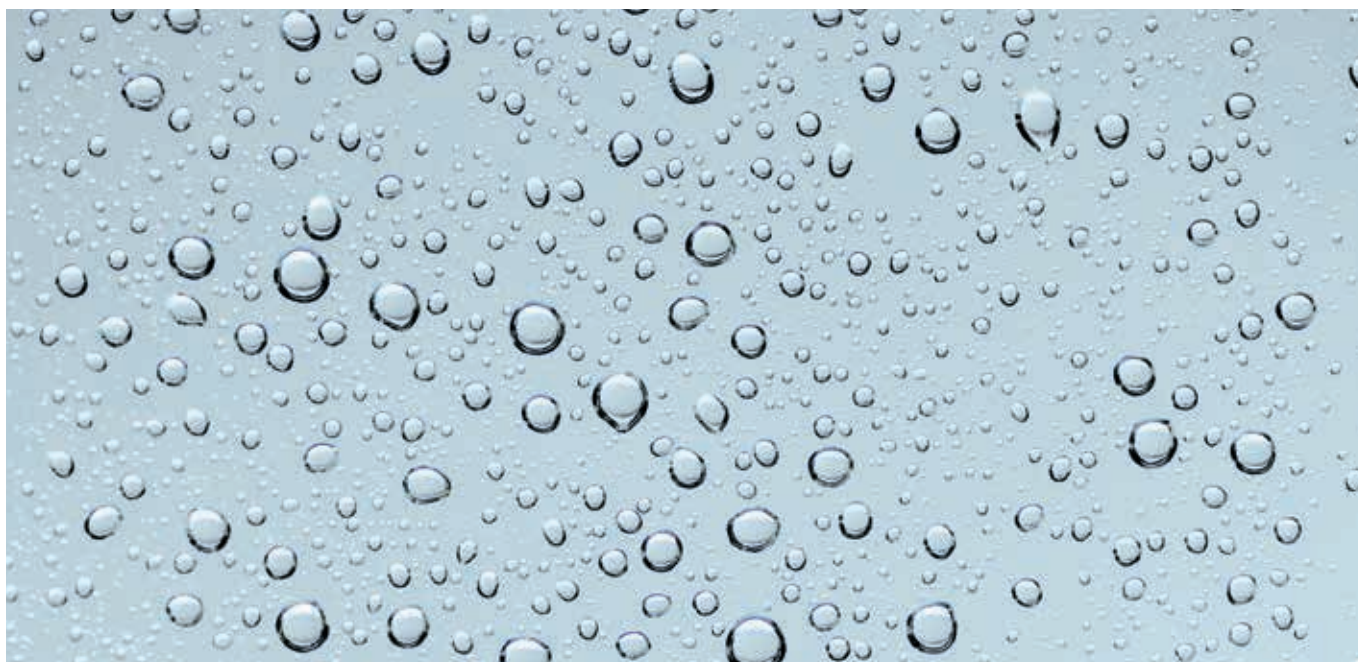
## Greases

| Product name                     | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosity<br>at 40 °C<br>[mm <sup>2</sup> /s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations                                                                                                                    | Main application area                                                                                                                                                                                                         |
|----------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|-----------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automotive Applications          |                                           |                        |                          |               |                                                           |                                        |                                                                                                                                                              |                                                                                                                                                                                                                               |
| <b>RENOLIT<br/>DURAPLEX EP 3</b> | –                                         | Li-X<br>Mineral oil    | –                        | 3             | 105                                                       | -20 /<br>+160                          | –                                                                                                                                                            | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles                                                 |
| <b>RENOLIT<br/>FLM 0</b>         | –                                         | Lithium<br>Mineral oil | •                        | 0             | 100                                                       | -30 /<br>+120                          | –                                                                                                                                                            | For mechanically loaded lubricating points, grease with MoS <sub>2</sub> , and additives to improve corrosion protection, EP and AW                                                                                           |
| <b>RENOLIT<br/>FLM 2</b>         | KPF2N-30<br>ISO-L-X-<br>CDEB 2            | Lithium<br>Mineral oil | •                        | 2             | 100                                                       | -30 /<br>+140                          | MAN 285<br>LI-PF 2                                                                                                                                           | For mechanically loaded lubricating points, grease with MoS <sub>2</sub> , agricultural machines, commercial vehicles, construction industry, quarries and mining, rubber and concrete factory                                |
| <b>RENOLIT<br/>LZR 000</b>       | GP00-<br>000G-40                          | Li/Ca<br>Mineral oil   | –                        | 00-000        | 43                                                        | -40 /<br>+110                          | MB-Sheet<br>264.0<br>MAN 283<br>LI-P 00/000                                                                                                                  | Semi-fluid grease for central lubricating systems of commercial vehicles                                                                                                                                                      |
| <b>RENOLIT<br/>LZR 2 H</b>       | KP2N-30<br>ISO-L-X-<br>CDIB 2             | Lithium<br>Mineral oil | –                        | 2             | 230                                                       | -30 /<br>+140                          | Baier &<br>Köppel                                                                                                                                            | Premium multipurpose grease, long-term rust prevention, sealing grease, central lubricating systems, sugar refineries, roof tile factories, paper industry, prevent standstill corrosion, hytrel compatible                   |
| <b>RENOLIT<br/>LX-OTP 2</b>      | –                                         | Li-X<br>Polyglycol     | •                        | 1-2           | 360                                                       | -40 /<br>+160                          | MAN                                                                                                                                                          | Lubrication of MAN knuckle pins                                                                                                                                                                                               |
| <b>RENOLIT<br/>LX-PEP 3</b>      | KP3N-30<br>ISO-L-X-<br>CDEB 3             | Li-X<br>Mineral oil    | –                        | 3             | 170                                                       | -30 /<br>+150                          | Interprecise<br>(IDC-Bea-<br>rings)                                                                                                                          | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, plain and roller bearings, ventilator grease                                                                                              |
| <b>RENOLIT<br/>LX-PEP 2</b>      | KP2N-30<br>ISO-L-X-<br>CDEB 2             | Li-X<br>Mineral oil    | –                        | 2             | 170                                                       | -30 /<br>+150                          | MAN 284<br>Li-H2,<br>MB 265.1,<br>ZF TE-ML<br>12,<br>Schaeffler<br>Gruppe,<br>VW TL 52<br>147 X,<br>Interprecise<br>(IDC-Bea-<br>rings),<br>Deutsche<br>Bahn | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, needle bearings of cardan shafts, plain and roller bearings, ventilator grease                                                            |
| <b>RENOLIT<br/>MP</b>            | KP2K-40<br>ISO-L-X-<br>DCEB 2             | Lithium<br>Mineral oil | –                        | 2             | 35                                                        | -40 /<br>+120                          | DBL<br>6804.00<br>MB-Sheet<br>267.0                                                                                                                          | Multipurpose grease for lubricating points in passenger cars, commercial vehicles, engines, where constant temperature does not exceed 100 °C, sliding speeds are very low and which are not exposed to high mechanical loads |
| <b>RENOLIT<br/>MP PLUS</b>       | KP2K-30<br>ISO-L-X-<br>CCEB 2             | Lithium<br>Mineral oil | –                        | 2             | 100                                                       | -30 /<br>+120                          | –                                                                                                                                                            | High quality EP multipurpose grease with high adhesiveness for the lubrication of plain and roller bearings. Only available in SR cartridges.                                                                                 |

# RENOLIT

| Product name                   | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosity<br>at<br>40 °C<br>[mm <sup>2</sup> /s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations               | Main application area                                                                                                                                                                               |
|--------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|--------------------------------------------------------------|----------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Automotive Applications</b> |                                           |                        |                          |               |                                                              |                                        |                                                         |                                                                                                                                                                                                     |
| <b>RENOLIT<br/>MP 150</b>      | KP2K-40<br>ISO-L-X-<br>DCEB 2             | Lithium<br>Mineral oil | –                        | 2             | 150                                                          | -40 /<br>+120                          | DBL<br>6804.50<br>MB sheet<br>267.1                     | Multipurpose grease for commercial<br>vehicles. Daimler wheel bearing grease<br>for the workshop area.                                                                                              |
| <b>RENOLIT<br/>MP 735</b>      | KP2K-40<br>ISO-L-X-<br>DCEB 2             | Lithium<br>Mineral oil | –                        | 2             | 105                                                          | -40 /<br>+120                          | VW TL 735<br>MAN 283<br>Li-P 2<br>Stabilus<br>100 15883 | Multipurpose grease                                                                                                                                                                                 |
| <b>RENOLIT<br/>POLAR BLACK</b> | –                                         | Lithium<br>PAO         | •                        | 1-2           | 84                                                           | -50 /<br>+140                          | –                                                       | Fully synthetic heavy duty all-season<br>grease with solid lubricants for plain<br>and roller bearings of construction<br>machines and mining vehicles exposed<br>to changing ambient temperatures. |

## Cleaner



| Product name                     | Function                                                                                                        | Ma-<br>terials                 | Comments                                                                                                                                                                                      | Corrosion<br>protecti-<br>on, chip/<br>filter<br>test 0/0 at<br>x% in _ | pH (2%),<br>if appli-<br>cable | Concen-<br>tration<br>range in<br>% | Tem-<br>pera-<br>ture<br>range | Injection<br>pressure<br>in bar<br>to app. | Density<br>at 15 °C<br>in kg/m³ |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------|-------------------------------------|--------------------------------|--------------------------------------------|---------------------------------|
| <b>Cleaner</b>                   |                                                                                                                 |                                |                                                                                                                                                                                               |                                                                         |                                |                                     |                                |                                            |                                 |
| <b>RENOCLEAN<br/>MSA 3011</b>    | Neutral cleaner<br>for spray, pres-<br>sure flood,<br>high-pressure<br>cleaning and<br>deburring, salt-<br>free | Fe, Al,<br>Brass,<br>Cu,<br>Mg | Contains hydroxi-<br>des, suitable for<br>high pressure. PSA<br>approval worldwi-<br>de: MABEC-code<br>Z 000 533 700.<br>Foam-free from<br>20 °C, depending<br>on pressure and<br>temperature | Temporary,<br>'2.5 % /<br>10 °dH                                        | 9.8 ± 0.3                      | 1 - 5                               | 60<br>(20 - 80)                | 500<br>(above<br>50 °C)                    | 1046 ± 10                       |
| <b>RENOCLEAN<br/>VR 1021 CXV</b> | Neutral cleaner<br>for spray, flood<br>and high-pres-<br>sure cleaning                                          | Fe, Al,<br>Brass,<br>Cu,<br>Mg | Contains hydroxi-<br>des, suitable for<br>high-pressure. VW<br>approval A29 0976.<br>High-pressure clea-<br>ning (200 bar, 300<br>short term), nearly<br>foam-free from 30<br>°C upwards      | Temporary,<br>'2% / 10<br>°dH                                           | 9.8 ± 0.3                      | 1 - 5                               | 65<br>(30 - 80)                | 200<br>(300<br>short<br>term)              | 1053 ± 10                       |
| <b>RENOCLEAN<br/>C 20 K 1427</b> | Neutral cleaner<br>for spray appli-<br>cation, salt-free                                                        | Fe,<br>(Mg)¹                   | Very good corrosion<br>protection, low resi-<br>due formation, salt-<br>free. VW approval<br>A29 2863. E. g.:<br>can be used before<br>heat treatment                                         | Temporary,<br>'1.5% /<br>10 °dH                                         | 10.2 ± 0.3                     | 1 - 5                               | 65<br>(40 - 80)                | ~ 15                                       | 1044 ± 10                       |

# RENOCLEAN

| Product name                      | Function                                                                                                                                                         | Ma-<br>terials      | Comments                                                                                                                                                          | Corrosion<br>protecti-<br>on, chip/<br>filter<br>test 0/0 at<br>x% in _ | pH (2%),<br>if appli-<br>cable | Concen-<br>tration<br>range in<br>% | Tem-<br>pera-<br>ture<br>range | Injection<br>pressure<br>in bar<br>to app. | Density<br>at 15 °C<br>in kg/m³ |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------|-------------------------------------|--------------------------------|--------------------------------------------|---------------------------------|
| <b>Cleaner</b>                    |                                                                                                                                                                  |                     |                                                                                                                                                                   |                                                                         |                                |                                     |                                |                                            |                                 |
| <b>RENOCLEAN<br/>SPEZIAL 2000</b> | Emulsifying uni-<br>versal cleaner<br>for immersion,<br>ultrasonic and<br>manual cleaning<br>of commercial<br>vehicles, tarpau-<br>lins, halls and<br>workshops. | All mate-<br>rials¹ | Contains phosphates<br>Specs<br>• FORD 800 51<br>007.<br>Suitable for all<br>manual cleaning,<br>for immersion,<br>steam jet and floor<br>cleaning equip-<br>ment | –                                                                       | 10.9 ± 0.4<br>at 3%            | 2 - 20                              | 35<br>(20 - 80)                | –                                          | 1045 ± 10                       |

| Product name             | Function                                           | Flash<br>point | Boiling range | Density at<br>15 °C in kg/m³ | Ma-<br>terials                   | Comments                                                                                                                                              |
|--------------------------|----------------------------------------------------|----------------|---------------|------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cleaner</b>           |                                                    |                |               |                              |                                  |                                                                                                                                                       |
| <b>RENOCLEAN<br/>KLV</b> | Hydrocarbon cleaner,<br>VOC- and aromatic-<br>free | ≥ 90 °C        | 217 - 255 °C  | 810 ± 15 kg/m³               | All ma-<br>terials,<br>plastics¹ | VOC-compliant, universal application,<br>slow evaporation. VW approval<br>A29 2819. Simple application, e. g. for<br>removal of car wax preservation. |



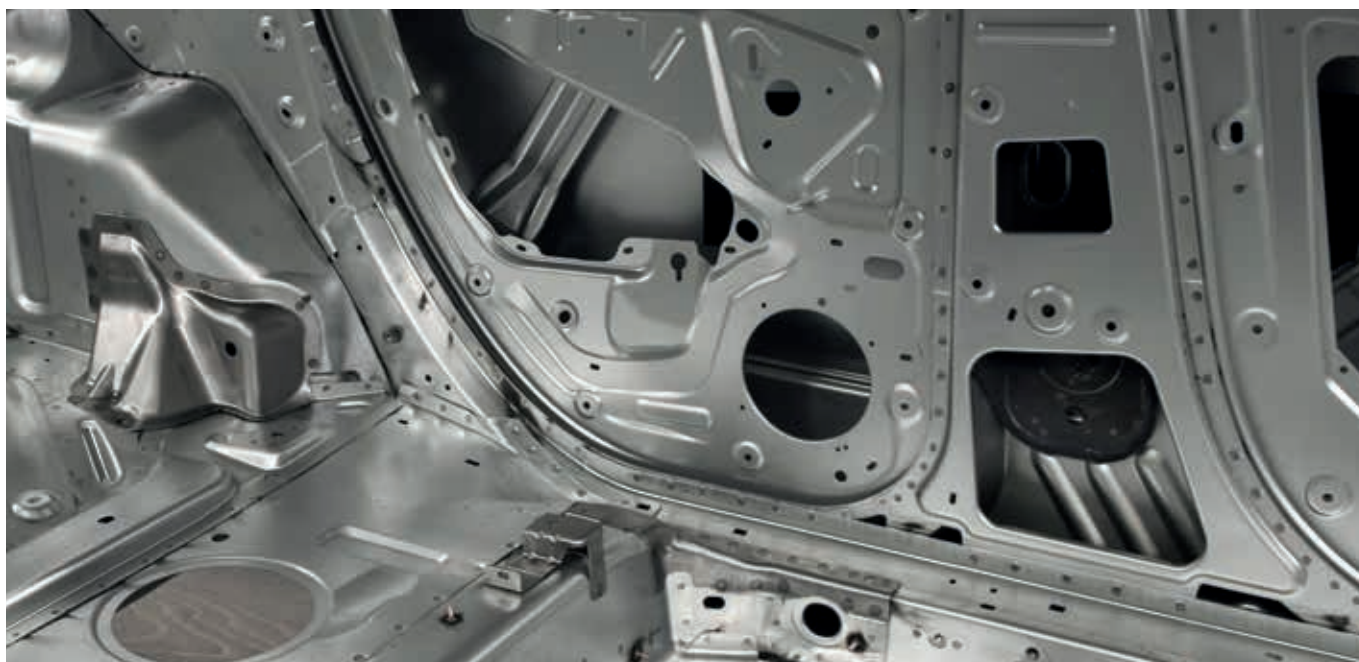
## Cleaner

## RENOCLEAN

| Product name             | Function                                                   | Ma-<br>terials | Comments                                                                                                                                 | Corrosion<br>protecti-<br>on, chip/<br>filter<br>test 0/0 at<br>x% in _ | pH (2%),<br>if appli-<br>cable | Concen-<br>tration<br>range in<br>% | Tem-<br>pera-<br>ture<br>range | Injection<br>pressure<br>in bar<br>to app. | Density<br>at 15 °C<br>in kg/m³ |
|--------------------------|------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------|-------------------------------------|--------------------------------|--------------------------------------------|---------------------------------|
| Fitting Product          |                                                            |                |                                                                                                                                          |                                                                         |                                |                                     |                                |                                            |                                 |
| <b>RENOCLEAN<br/>431</b> | Industrial<br>assembly aid<br>for rubber and<br>elastomers | –              | Lubricant, e. g. for<br>fitting window seals<br>made of rubber,<br>hoses etc. Parts are<br>fixed after drying, no<br>more sliding effect | –                                                                       | 7 ± 1<br>(100%)                | 10 - 30                             | 15 - 30                        | –                                          | 1017 ± 10                       |

## Corrosion Preventives

## ANTICORIT



| Product name               | Description                                                                | Kin. visc. at 40 °C<br>[mm²/s]<br>DIN 51562 | Density<br>at 15 °C<br>[KG/m³] | Consumption<br>[l/m²] | Film weight<br>[g/m²] | Shed storage<br>[Mon.] | Hall storage<br>[Mon.] |
|----------------------------|----------------------------------------------------------------------------|---------------------------------------------|--------------------------------|-----------------------|-----------------------|------------------------|------------------------|
| <b>Spray Cans</b>          |                                                                            |                                             |                                |                       |                       |                        |                        |
| <b>ANTICORIT 5F</b>        | Rust preventative spray forming a thin film with active water displacement | 3.7<br>at 20 °C                             | 813                            | –                     | 2.5                   | 6-12                   | 12-24                  |
| <b>ANTICORIT BW 366</b>    | Solvent-based and durable high performance corrosion protection wax        | FT 4mm nozzle = 60s                         | 885                            | –                     | 50                    | 12-36                  | 12-36                  |
| <b>ANTICORIT DFG</b>       | Classic anti-corrosive oil and contact spray, multipurpose                 | 84                                          | 887                            | –                     | 5                     | 6-12                   | 12-24                  |
| <b>ANTICORIT RPC</b>       | Rust preventative spray, after evaporation a highly viscous film is formed | 84                                          | 887                            | –                     | 5                     | 6-12                   | 6-24                   |
| <b>ANTICORIT CPX 3373</b>  | Solvent-free and durable high performance corrosion protection wax         | Dyn. visc. at 300<br>1/min = 350m*Pas       | 1005                           | –                     | 50                    | >36                    | >36                    |
| <b>ANTICORIT SYNTH</b>     | Synthetic multipurpose oil                                                 | 102                                         | 834                            | –                     | 15                    | 3-6                    | 6-12                   |
| <b>RENOCLEAN E</b>         | Highly effective degreaser for multipurpose use                            | 1.7<br>at 20 °C                             | 800                            | –                     | 0                     | –                      | –                      |
| <b>ANTICORIT RP 4107 S</b> | Thixotropic corrosion protection oil, meets VDA 230-213                    | 35                                          | 887                            | –                     | 11                    | 6-12                   | 12-20                  |

\*) Value of pure product

# INDUSTRIAL OILS

Many processes in the industry work perfectly only with specially tailored lubricant solutions.

For example, in the transmission of energy by pressure media (hydraulic fluids), in the gearing of driving forces (gear oils), in the power generation in power plants (turbine oils), at refrigeration (refrigeration oils) or compressed air production (air compressor oils) the respective industrial oils have a significant task.

In addition, FUCHS industrial lubricants can make a significant contribution to a improved productivity in many other applications. They can increase efficiency significantly and reduce energy consumption and associated CO<sub>2</sub> emissions.

Low Varnish turbine oils e.g. ensure trouble-free operation of power plants. Refrigeration oils adjusted to environmentally neutral refrigerants improve the environmental balance in the cold chain. Rapidly biodegradable lubricants are a powerful alternative to hydrocarbon-based lubricants.





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## Industrial Oils

|                                                                                                                |       |
|----------------------------------------------------------------------------------------------------------------|-------|
| Hydraulic Oils                                                                                                 | 68-76 |
| Gear and Circulating Oils                                                                                      | 77-82 |
| Slideway Oils                                                                                                  | 83    |
| Paper Machine Oils                                                                                             | 84-85 |
| Turbine Oils                                                                                                   | 86    |
| Oils for Transformers                                                                                          | 87    |
| Compressor Oils                                                                                                | 88-90 |
| Refrigeration Oils                                                                                             | 91-94 |
| Environmentally Friendly Industrial Oils                                                                       | 95-97 |
| Cylinder Oils, Tacky Oils, Heat Transfer Oils,<br>Special Sealing Oils for Gasometers,<br>IRM Reference Fluids | 98-99 |

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## Industrial Oils



| Product name            | Description                                                                                                                                         | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI | Pour-point<br>°C | Main application area                                                                                                                                                                                                               |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Machine Oils: AR</b> |                                                                                                                                                     |                                       |                         |                                           |                                            |    |                  |                                                                                                                                                                                                                                     |
| <b>RENOLIN AR 19</b>    | <b>Range RENOLIN AR</b><br>General lubricating oils based on mineral oil. Exceeds the requirements of L-AN lubricating oils according to DIN 51501. | 883                                   | 260                     | 100                                       | 11.0                                       | 94 | -15              | For lubrication systems without special requirements regarding ageing resistance, cold temperature behaviour, etc. Oil temperature should not exceed 70 °C. Lowest inlet temperature of the oil should be 5 °C above the pourpoint. |
| <b>RENOLIN AR 22</b>    |                                                                                                                                                     | 888                                   | 240                     | 150                                       | 14.6                                       | 96 | -12              |                                                                                                                                                                                                                                     |
|                         | AR 19: AN 100<br>AR 22: AN 150                                                                                                                      |                                       |                         |                                           |                                            |    |                  |                                                                                                                                                                                                                                     |



# RENOLIN

| Product name | Description | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI | Pour-point<br>°C | Main application area |
|--------------|-------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|----|------------------|-----------------------|
|--------------|-------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|----|------------------|-----------------------|

## Demulsifying Circulating, Spindle and Hydraulic Oils: HL / CL

|                        |                                                                                                                                                                    |     |     |     |      |     |     |                                                                                                                                             |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RENOLIN DTA 2</b>   | <b>Range RENOLIN DTA</b><br>Hydraulic and lubrication oils based on selected base oils with additives to improve ageing stability and corrosion protection.        | 805 | 100 | 2.2 | –    | –   | -27 | For thermally-stressed bearings, gears and hydraulic systems with peak temperatures up to 120 °C. Lubrication oils without AW/EP additives. |
| <b>RENOLIN DTA 5</b>   |                                                                                                                                                                    | 837 | 120 | 4.6 | 1.6  | 106 | -40 |                                                                                                                                             |
| <b>RENOLIN DTA 7</b>   | All RENOLIN DTA products are DIN 51524-1: HL hydraulic oils and DIN 51517-2: CL circulating oils based on mineral oil, demulsifying (water-separation), zinc-free. | 839 | 155 | 7.4 | 2.2  | 103 | -27 | Also suitable for hydrodynamic drives if HL or CL lubrication fluids are required.                                                          |
| <b>RENOLIN DTA 10</b>  |                                                                                                                                                                    | 851 | 174 | 10  | 2.6  | 92  | -27 |                                                                                                                                             |
| <b>RENOLIN DTA 15</b>  | ISO 6743-4: HL,<br>ISO 6743-6 and<br>ISO 12925-1: CKB.                                                                                                             | 856 | 195 | 15  | 3.4  | 98  | -27 | VOITH Turbo couplings type T and S.                                                                                                         |
| <b>RENOLIN DTA 22</b>  |                                                                                                                                                                    | 865 | 210 | 22  | 4.2  | 94  | -27 |                                                                                                                                             |
| <b>RENOLIN DTA 32</b>  |                                                                                                                                                                    | 874 | 222 | 32  | 5.4  | 102 | -24 | Suitable for Landis Lund machine tool spindles (without AW/EP).                                                                             |
| <b>RENOLIN DTA 46</b>  |                                                                                                                                                                    | 874 | 228 | 46  | 6.8  | 101 | -24 |                                                                                                                                             |
| <b>RENOLIN DTA 68</b>  |                                                                                                                                                                    | 882 | 250 | 68  | 8.7  | 99  | -18 | Demulsifying type                                                                                                                           |
| <b>RENOLIN DTA 100</b> |                                                                                                                                                                    | 881 | 248 | 100 | 11.2 | 97  | -18 |                                                                                                                                             |
| <b>RENOLIN DTA 150</b> |                                                                                                                                                                    | 889 | 266 | 150 | 15.5 | 94  | -15 |                                                                                                                                             |
| <b>RENOLIN DTA 220</b> |                                                                                                                                                                    | 893 | 280 | 220 | 18.8 | 95  | -12 |                                                                                                                                             |
| <b>RENOLIN DTA 320</b> |                                                                                                                                                                    | 898 | 280 | 320 | 24.0 | 95  | -12 |                                                                                                                                             |
| <b>RENOLIN DTA 460</b> |                                                                                                                                                                    | 904 | 315 | 460 | 30.4 | 95  | -12 |                                                                                                                                             |

## Zinc-containing Hydraulic Oils: HLP

|                            |                                                                                                                                                                                                                                                                  |     |     |     |      |     |     |                                                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|-----|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RENOLIN B 3 VG 10</b>   | <b>Range RENOLIN B</b><br>Lubrication and hydraulic oils with additives to improve the ageing and oxidation stability. Good wear protection, demulsifying (good water separation), good air release properties, zinc-containing AW/EP additive system.           | 850 | 178 | 10  | 2.6  | 95  | -42 | Universal applicable hydraulic fluids if good ageing resistance, good wear protection and demulsifying properties are required.                                                     |
| <b>RENOLIN B 5 VG 22</b>   |                                                                                                                                                                                                                                                                  | 863 | 200 | 22  | 4.4  | 107 | -27 |                                                                                                                                                                                     |
| <b>RENOLIN B 10 VG 32</b>  | The RENOLIN B range meets and surpasses the minimum requirements of HLP hydraulic oils acc. to DIN 51524-2.<br>ISO 6743-4: HM<br>ISO 6743-6: CKC<br>ISO 11158: HM<br>B 3: HLP 10<br>B 5: HLP 22<br>B 10: HLP 32<br>B 15: HLP 46<br>B 20: HLP 68<br>B 30: HLP 100 | 876 | 205 | 32  | 5.5  | 109 | -24 | Universal hydraulic fluids; synergistic acting and robust additives ensure good wear protection in stationary and mobile hydraulic systems, even at high load and high temperature. |
| <b>RENOLIN B 15 VG 46</b>  |                                                                                                                                                                                                                                                                  | 875 | 210 | 46  | 6.9  | 105 | -24 |                                                                                                                                                                                     |
| <b>RENOLIN B 20 VG 68</b>  |                                                                                                                                                                                                                                                                  | 881 | 224 | 68  | 8.8  | 100 | -24 | DENISON HF0 approval<br>Bosch Rexroth                                                                                                                                               |
| <b>RENOLIN B 30 VG 100</b> |                                                                                                                                                                                                                                                                  | 883 | 232 | 100 | 11.1 | 96  | -18 |                                                                                                                                                                                     |

## Industrial Oils

| Product name                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zinc-containing Hydraulic Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 10 PLUS</b>              | <b>Range RENOLIN B PLUS</b><br>Hydraulic oils, based on high-quality, hydrated base oils group II. Contains additives for excellent ageing and oxidation stability, the zinc-containing AW/EP additive system protects against wear at high pressure and load. Extended oil drain intervals are possible.<br><br>Hydraulic oils according to DIN 51524-2: HLP and ISO 6743-4: HM.                                                                            | 840                                   | 170                     | 10                                        | 2.68                                       | 104 | -54              | Suitable for all hydraulics especially if an approval according to BOSCH Rexroth RDE 90235/ RDE 90245 is required. Group II base oil (Hydrogenated base oil), for HP-high-pressure application. Demulsifying type<br><br>Approvals:<br>Bosch Rexroth RD 90235, RDE 90245                                                                                |
| <b>RENOLIN B 15 PLUS</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 840                                   | 195                     | 15                                        | 3.47                                       | 108 | -48              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 22 PLUS</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 845                                   | 220                     | 22                                        | 4.39                                       | 108 | -45              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 32 PLUS</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 860                                   | 220                     | 32                                        | 5.5                                        | 108 | -39              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 46 PLUS</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 860                                   | 230                     | 46                                        | 6.94                                       | 107 | -36              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 68 PLUS</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 870                                   | 230                     | 68                                        | 9.05                                       | 108 | -33              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 100 PLUS</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 870                                   | 270                     | 100                                       | 11.6                                       | 104 | -27              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 32 HP</b>                | <b>Range RENOLIN B HP</b><br>Hydraulic oils with additives to improve ageing and oxidation stability, excellent AW/EP wear protection even at high loads and temperature; demulsifying. Surpass HLP requirements.<br>HLP hydraulic oils according to DIN 51524-2 and ISO 6743-4: HM.                                                                                                                                                                         | 880                                   | 205                     | 32                                        | 5.48                                       | 107 | -24              | Suitable for all hydraulics especially if an approval according to BOSCH Rexroth RDE 90245 is required. Mineral oils for HP - high-pressure application. Demulsifying type<br><br>Approvals:<br>Bosch Rexroth RD 90235, RDE 90245                                                                                                                       |
| <b>RENOLIN B 46 HP</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 880                                   | 210                     | 46                                        | 6.93                                       | 106 | -24              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 68 HP</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 880                                   | 225                     | 68                                        | 8.8                                        | 102 | -24              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 15 HVI</b>               | <b>Range RENOLIN B HVI</b><br>Hydraulic and lubricating oils (machine oils) with a high viscosity index and additives to improve ageing stability, corrosion protection and wear protection. The products of the RENOLIN B HVI range are HVLP hydraulic and circulating oils according to DIN 51524-3, mineral oil based, demulsifying and zinc-containing AW/EP additives.<br>DIN 51524-3: HVLP<br>ISO 6743-4: HV<br>ISO 11158: HF<br>Denison HF0, HF1, HF2 | 859                                   | 180                     | 15                                        | 3.8                                        | 151 | -45              | RENOLIN B HVI oils are suitable for all hydraulic systems, especially when a high viscosity index is required, reduced viscosity during cold start-up, high viscosity at operating temperature. High VI provides multigrade characteristics. Energy saving through high volumetric efficiency. Demulsifying type<br><br>Approval: Denison HF0, HF1, HF2 |
| <b>RENOLIN B 22 HVI</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 866                                   | 178                     | 22                                        | 4.9                                        | 151 | -45              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 32 HVI</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 871                                   | 178                     | 32                                        | 6.3                                        | 152 | -48              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 46 HVI</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 879                                   | 186                     | 46                                        | 8.1                                        | 150 | -45              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN B 68 HVI</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 868                                   | 240                     | 68                                        | 11.0                                       | 153 | -36              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN D 2 VG 7</b>               | <b>Range RENOLIN D</b><br>Detergent lubrication and hydraulic oils with additives to improve ageing resistance, corrosion protection and wear protection.<br>Good viscosity temperature behaviour. Zinc-containing AW/EP additives system. The RENOLIN D range meets and surpasses the minimum requirements of HLPD hydraulic oils.<br>HLPD according to DIN 51524-2. ISO 6743-4: HM with DD-properties.                                                     | 844                                   | 155                     | 7,2                                       | 2.2                                        | 99  | -27              | RENOLIN D oils are used as lubricating and hydraulic oils when good ageing resistance, good wear protection, detergent and dispersant properties are required. Universal hydraulic oils for all hydraulic systems, even if thermally stressed.<br><br>DD-properties                                                                                     |
| <b>RENOLIN D 3 VG 10</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 852                                   | 178                     | 10                                        | 2.8                                        | 96  | -30              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN D 5 VG 12</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 871                                   | 200                     | 22                                        | 4.3                                        | 96  | -27              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN D 10 VG 32</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 875                                   | 210                     | 32                                        | 5.3                                        | 99  | -24              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN D 15 VG 46</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 879                                   | 224                     | 46                                        | 6.8                                        | 100 | -27              |                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN D 20 VG 68</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 883                                   | 232                     | 68                                        | 8.7                                        | 99  | -24              |                                                                                                                                                                                                                                                                                                                                                         |

# RENOLIN

| Product name                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zinc-containing Hydraulic Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN D 46 HVI VG 100</b>        | As RENOLIN D with additional additives for improved viscosity-temperature behaviour. HVLDP 46.<br>DIN 51524-3: HVLDP-D<br>ISO 6743-4: HV                                                                                                                                                                                                                                                                                    | 876                                   | 186                     | 46                                        | 8.2                                        | 151 | -45              | Multigrade fluid for general hydraulic systems working at a wide temperature window in addition to the requirements above.                                                                                                                                                                                                                                                |
| <b>RENOLIN XtremeTemp 32</b>          | <b>Range RENOLIN XtremeTemp</b><br>Universal, high-performance hydraulic oils with high viscosity index and excellent shear stability (VI 180). Based on special hydro-generated base oils, very good ageing behaviour, long lifetime, excellent corrosion protection and very good wear protection, fulfils and surpasses<br>DIN 51524-3: HVLP<br>ISO 6743-4: HV<br>ISO 11158: HV<br>zinc-containing AW/EP additive system | 845                                   | 216                     | 32                                        | 6.9                                        | 180 | -33              | Universal high-performance multigrade hydraulic oil for stationary and mobile hydraulic systems, improved efficiency, increasing oil change intervals. Multigrade characteristics through high, shear-stable viscosity index. Energy and fuel saving through high volumetric efficiency.<br><br>Approvals:<br>Denison HF0, HF1, HF2<br>Bosch Rexroth RD90235 and RDE90245 |
| <b>RENOLIN XtremeTemp 46</b>          | Denison HF0, HF1, HF2.<br>RENOLIN XtremeTemp Plus with additional Anti Stick-Slip additives                                                                                                                                                                                                                                                                                                                                 | 853                                   | 230                     | 48                                        | 9.3                                        | 180 | -34              |                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN XtremeTemp 32 Plus</b>     | <b>Range RENOLIN XtremeTemp Plus</b><br>As RENOLIN XtremeTemp, but with additives which helps to avoid stick-slip phenomena. For high-pressure applications; reduce friction especially in mixed friction conditions<br><br>DIN 51524-3: HVLP(D)<br>ISO 6743-4: HV<br>According Denison and Bosch Rexroth requirements                                                                                                      | 861                                   | 216                     | 32                                        | 6.9                                        | 183 | -33              | Slightly detergent, HVLP (D) high performance multigrade hydraulic oil for stationary and mobile hydraulic systems surpass HVLPD acc. to DIN 51524-3, wide temperature window, excellent shear stability. Helps to avoid stick-slip problems, especially at low speed and high load. Energy and fuel saving through high volumetric efficiency.                           |
| <b>RENOLIN XtremeTemp 46 Plus</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                             | 855                                   | 234                     | 48                                        | 9.3                                        | 181 | -34              |                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN LIFT 22</b>                | <b>Range RENOLIN LIFT</b><br>Special detergent type of hydraulic oils for elevators and hydraulic conveyors, fork lifters. Reliably prevents stick-slip, especially at high loads and low speeds.                                                                                                                                                                                                                           | 869                                   | 210                     | 22                                        | 4.3                                        | 100 | -30              | Fork lifters, elevators, hydraulic transport mechanisms, stationary and mobile hydraulics. Protection against stick-slip.                                                                                                                                                                                                                                                 |
| <b>RENOLIN LIFT 32</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                             | 877                                   | 210                     | 32                                        | 5.3                                        | 96  | -30              |                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN LIFT 46</b>                | HLPD hydraulic oils according to DIN 51524-2; ISO 11158: HM; ISO 6743-4: HM                                                                                                                                                                                                                                                                                                                                                 | 881                                   | 210                     | 46                                        | 6.8                                        | 101 | -27              |                                                                                                                                                                                                                                                                                                                                                                           |

## Industrial Oils

| Product name                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point<br>Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zinc-containing Hydraulic Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |                            |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 0 VG 2</b>              | <b>Range RENOLIN MR</b><br>RENOLIN MR products are special HLPD lubricating and hydraulic fluids according to DIN 51502 with outstanding corrosion protection and powerful cleaning and dirt carrying capacity. Zinc-containing, detergent and dispersant. RENOLIN MR oils are used in many hydraulic systems as problem solvers, especially when standard oils cannot fulfil all requirements. RENOLIN MR oils fulfil and surpass the requirements of HLPD hydraulic oils according to DIN 51524-2. ISO 6743-4: HM with high DD-performance. | 807                                   | 75                         | 2,2                                       | –                                          | –   | -42              | <u>RENOLIN MR 3:</u><br>For machine tool spindles and roller bearing spindles in the textile industry.                                                                                                                                                                                                                                                            |
| <b>RENOLIN MR 1 VG 5</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 837                                   | 85                         | 5                                         | 1.7                                        | 83  | -36              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 3 VG 10</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 852                                   | 166                        | 10                                        | 2.6                                        | 91  | -30              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 5 VG 22</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 868                                   | 165                        | 22                                        | 4.3                                        | 100 | -30              | <u>RENOLIN MR 5, 10, 15 and 20:</u><br>Universal hydraulic oils with outstanding corrosion protection up to continuous temperatures of 100 °C. For smaller gear boxes, in particular with electrical multi-plate clutches.<br><br>High DD performance                                                                                                             |
| <b>RENOLIN MR 10 VG 32</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 875                                   | 208                        | 32                                        | 5.6                                        | 114 | -30              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 15 VG 46</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 877                                   | 220                        | 46                                        | 6.9                                        | 105 | -27              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 20 VG 68</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 881                                   | 225                        | 68                                        | 8.9                                        | 105 | -24              | <u>RENOLIN MR 30, 40:</u><br>For larger gear boxes. As running-in and anticorrosion oil. Allows oil changes to be extended.                                                                                                                                                                                                                                       |
| <b>RENOLIN MR 30 VG 100</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 883                                   | 248                        | 100                                       | 11.4                                       | 100 | -18              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 40 VG 150</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 889                                   | 250                        | 150                                       | 14.8                                       | 98  | -18              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 310</b>                 | Hydraulic and lubricating oils with extremely high viscosity index as well as outstanding cleaning properties and sludge carrying capacity.<br>HVLPD according to DIN 51502 together with DIN 51524-3. ISO 6743-4: HV                                                                                                                                                                                                                                                                                                                         | 855                                   | 118                        | 15                                        | 5.4                                        | 360 | -48              | <u>MR 310, 520 and 1030:</u><br>For all hydraulic systems which are subject to a wide temperature range or which are operated outdoors, e.g. in flood gates, machines or for low application temperatures.                                                                                                                                                        |
| <b>RENOLIN MR 520</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 886                                   | 154                        | 32                                        | 8.0                                        | 270 | -60              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 1030</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 873                                   | 214                        | 68                                        | 11.0                                       | 154 | -36              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 22 MC</b>               | <b>Range RENOLIN MR MC</b><br>Universal lubricating and hydraulic oils based on MC base oils with high viscosity index (shear-stable). Excellent oxidation stability and outstanding cleaning properties and sludge carrying capacity. HVLP according to DIN 51524-3<br>MR 22 MC: HVLPD 22<br>MR 32 MC: HVLPD 32<br>MR 46 MC: HVLPD 46<br>MR 68 MC: HVLPD 68                                                                                                                                                                                  | 856                                   | 200                        | 22                                        | 4.9                                        | 153 | -54              | Same application as for RENOLIN MR in addition to those which require oils with high viscosity index. Allow oil change intervals to be extended, grades to be rationalized. Multigrade characteristics. Very wide operating temperature window. Energy saving through high volumetric efficiency.<br><br><b>MC base oils = hydrotreated base oils (group III)</b> |
| <b>RENOLIN MR 32 MC</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 858                                   | 220                        | 32                                        | 6.4                                        | 152 | -48              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 46 MC</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 864                                   | 234                        | 46                                        | 8.3                                        | 154 | -48              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MR 68 MC</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 870                                   | 253                        | 68                                        | 11.2                                       | 157 | -42              |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MRX 32</b>                 | <b>Range RENOLIN MRX</b><br>Selected, and high quality special refined oil with additives to maximize ageing protection, reduce wear and friction. High detergent and sludge carrying capacity; excellent protection against corrosion:<br>DIN 51524: HLPD<br>MRX 32: HLPD 32<br>MRX 46: HLPD 46                                                                                                                                                                                                                                              | 878                                   | 228                        | 32                                        | 5.5                                        | 108 | -27              | The RENOLIN MRX hydraulic and lubricating oils are especially recommended for systems which are exposed to a high risk of dust/dirt or water contamination, e.g. for mobile hydraulic systems, for running-in procedures or in agriculture and forestry applications.                                                                                             |
| <b>RENOLIN MRX 46</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 884                                   | 232                        | 46                                        | 6.9                                        | 103 | -24              |                                                                                                                                                                                                                                                                                                                                                                   |

# RENOLIN

| Product name                                   | Description                                                                                                                                                                                                                                                                                                                                                   | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                  |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zinc- and Ash-free Hydraulic Oils (ZAF)</b> |                                                                                                                                                                                                                                                                                                                                                               |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN MWB 46</b>                          | <b>Range RENOLIN MWB</b><br>Selected solvent base oils with additives to improve oxidation and ageing resistance. Excellent corrosion and wear protection, good load carrying capacity and low friction. High performance reserves. Zinc-free AW/EP additive system<br><br>HLPD according to DIN 51524-2<br>MWB 46: HLPD 46<br>MWB 68: HLPD 68                | 882                                   | 218                     | 46                                        | 6.9                                        | 105 | -24              | Heavy-duty HLPD hydraulic and circulating oils (CLP) for all highly stressed hydraulics. Excellent wear protection. High load carrying capacity. High load capacity according to Bruggen of ≥50 N/mm <sup>2</sup> , e.g. hydraulic presses in the automotive industry. |
| <b>RENOLIN MWB 68</b>                          |                                                                                                                                                                                                                                                                                                                                                               | 879                                   | 224                     | 68                                        | 8.7                                        | 99  | -18              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF B 5 HT</b>                      | <b>Range RENOLIN ZAF B HT</b><br>Zinc- and ash-free, demulsifying hydraulic and gear oils with good ageing stability and oxidation resistance. Excellent wear protection for gears (FLS > 12) and roller bearings. High corrosion protection, even in the presence of water, excellent non-ferrous metal compatibility.                                       | 824                                   | 130                     | 4,6                                       | 1.6                                        | 105 | <-54             | Demulsifying, zinc- and ash-free HLP hydraulic and CLP lubricating oils with good ageing resistance for all hydraulic systems, hydraulic presses or machine tools. Bruggen ≥ 30N/mm <sup>2</sup>                                                                       |
| <b>RENOLIN ZAF B 10 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 848                                   | 170                     | 10                                        | 2.7                                        | 100 | <-54             |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF B 22 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 863                                   | 210                     | 22                                        | 4.4                                        | 106 | -33              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF B 32 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 875                                   | 220                     | 32                                        | 5.4                                        | 96  | -33              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF B 46 HT</b>                     | HLP according to DIN 51524-2<br>HM acc. to ISO 6743-4<br>HM acc. to ISO 11158<br>HM acc. to 6743-6<br>CLP acc. to DIN 51517-3<br>CKC acc. to ISO 6743-4 (DBL 6713-13: HLP, Daimler)                                                                                                                                                                           | 876                                   | 230                     | 46                                        | 6.8                                        | 101 | -27              | Demulsifying type                                                                                                                                                                                                                                                      |
| <b>RENOLIN ZAF B 68 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 882                                   | 242                     | 68                                        | 8.8                                        | 100 | -21              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF B 100 HT</b>                    |                                                                                                                                                                                                                                                                                                                                                               | 882                                   | 240                     | 100                                       | 11.3                                       | 99  | -18              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF 150 BB</b>                      |                                                                                                                                                                                                                                                                                                                                                               | 893                                   | 225                     | 150                                       | 14.6                                       | 94  | -21              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF 220 BB</b>                      | Zinc- and ash-free, demulsifying lubrication and hydraulic oils with high ageing resistance. Contains additives to improve corrosion and anti-wear properties. Fulfills and surpasses requirements according to DIN 51524-2: HLP; HM acc. to ISO 6743-4                                                                                                       | 894                                   | 240                     | 220                                       | 13.6                                       | 94  | -9               |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF D 22 HT</b>                     | <b>Range RENOLIN ZAF D HT</b><br>Zinc- and ash-free lubricating and hydraulic oils with detergent and dispersant properties. Good ageing resistance, excellent wear protection and oxidation stability, good air release properties. Fulfills and surpasses requirements acc. to DIN 51524-2: HLP-D<br>ISO 6743-4: HM<br>DIN 51517-3: CLPD<br>ISO 6745-6: CKC | 860                                   | 206                     | 22                                        | 4.3                                        | 103 | -33              | Detergent, zinc- and ash-free hydraulic HLPD and lubrication oils CLP for all hydraulic drives even if thermally stressed. Also suitable for use as CLP lubricating oil. Bruggen ≥ 30N/mm <sup>2</sup>                                                                 |
| <b>RENOLIN ZAF D 32 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 870                                   | 220                     | 32                                        | 5.3                                        | 97  | -33              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF D 46 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 880                                   | 230                     | 46                                        | 6.8                                        | 100 | -27              |                                                                                                                                                                                                                                                                        |
| <b>RENOLIN ZAF D 68 HT</b>                     |                                                                                                                                                                                                                                                                                                                                                               | 880                                   | >230                    | 68                                        | 8.8                                        | 100 | -27              |                                                                                                                                                                                                                                                                        |



## Industrial Oils

| Product name                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zinc- and Ash-free Hydraulic Oils (ZAF)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF D 46 HT PLUS</b>                | Universal zinc- and ash-free hydraulic fluid and lubricating oil, excellent ageing stability and high wear protection. Provides high deterging and dispersing properties. Passes and surpasses the requirements according to DIN 51524-2: HLPD ISO 6743-4: HM DIN 51517-3: CLP ISO 6743-6: CKC.                                                                                                                             | 866                                   | 230                     | 46                                        | 6.9                                        | 106 | -39              | Detergent zinc- and ash-free hydraulic oils <b>based on hydro-treated group II base oils</b> with improved oxidation stability at high thermal stresses, for hydraulic presses.<br><br>Brugger $\geq 30$ N/mm <sup>2</sup><br><br>Extended lifetime, excellent air release, detergent/dispersant type                                                                                                                   |
| <b>RENOLIN ZAF 46 D-White</b>                  | Universal zinc- and ash-free detergent type of hydraulic fluid and industrial gear oil, excellent ageing stability, very high wear protection, latest base oil generation, hydrotreated base oils and low sulphur content. Passes and surpasses the requirements according to DIN 51524-2: HLP, HLPD ISO 6743-4: HM                                                                                                         | 865                                   | >230                    | 46                                        | 6.9                                        | 106 | -39              | Excellent for all applications in mobile and stationary hydraulic systems, recommended according to DIN 51524-2 (HLP).<br><br>Based on hydrotreated group II base oils, <b>"non-discoloration oil"</b> .<br><br>Detergent type                                                                                                                                                                                          |
| <b>RENOLIN ZAF 5 DT</b>                        | <b>Range RENOLIN ZAF DT</b><br>Selected solvent extracts with special additives to improve corrosion protection and wear protection. High load carrying capacity acc. to Brugger. Detergent and dispersant.<br>Fulfil and surpass DIN 51524-2: HLPD (except detergent / dispersant).<br>ISO 11158: HM<br>CLP acc. to DIN 51517-3 (detergent / dispersant)<br>CKC acc. to ISO 6743-6                                         | 847                                   | 116                     | 5                                         | 1.7                                        | 99  | -40              | Heavy-duty hydraulic and circulating oils with outstanding detergent and dispersant properties. Very good ageing resistance, good corrosion protection and excellent load carrying capacity. Daimler DBL 6721 for machine tools<br>Brugger value $\geq 50$ N/mm <sup>2</sup><br><br>Detergent type                                                                                                                      |
| <b>RENOLIN ZAF 10 DT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 848                                   | 154                     | 10                                        | 2.7                                        | 108 | -30              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 15 DT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 865                                   | 190                     | 15                                        | 3.3                                        | 86  | -27              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 22 DT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 866                                   | 198                     | 22                                        | 4.4                                        | 109 | -27              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 32 DT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 876                                   | 210                     | 32                                        | 5.4                                        | 102 | -24              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 46 DT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 876                                   | 218                     | 46                                        | 6.8                                        | 101 | -24              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 68 DT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 879                                   | 224                     | 68                                        | 8.9                                        | 104 | -18              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 100 DT</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                             | 882                                   | 220                     | 100                                       | 11.3                                       | 99  | -18              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 150 DT</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                             | 887                                   | 222                     | 150                                       | 14.6                                       | 96  | -15              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 32 MC</b>                       | <b>Range RENOLIN ZAF MC</b><br>Lubricating and hydraulic oils based on group III base oils and selected additives. Very good oxidation and ageing stability, very good corrosion protection and high wear protection. High viscosity index (shear stable).<br>Fulfil and surpass<br>DIN 51524-2: HLP<br>DIN 51524-3: HVLP<br>ISO 6743-4: HM<br>ISO 6743-4: HV<br>DIN 51517-3: CLP<br>ISO 6743-6: CKC<br>DBL 6713: HLP, HVLP | 840                                   | 246                     | 35                                        | 6.7                                        | 149 | -45              | Shear stable, zinc- and ash-free hydraulic and circulating oils with high viscosity index. <b>Based on MC hydrotreated group III base oils</b> . Oil drain intervals might be extended and grades can be rationalized (multigrade characteristics). Energy saving through high efficiency.<br>Denison HFO approval<br>Bosch Rexroth approval<br>RDE 90245 and RD 90235<br><br>Brugger value $\geq 50$ N/mm <sup>2</sup> |
| <b>RENOLIN ZAF 46 MC</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 843                                   | 238                     | 46                                        | 8.0                                        | 148 | -45              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENOLIN ZAF 68 MC</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                             | 854                                   | 238                     | 68                                        | 10.6                                       | 146 | -42              |                                                                                                                                                                                                                                                                                                                                                                                                                         |

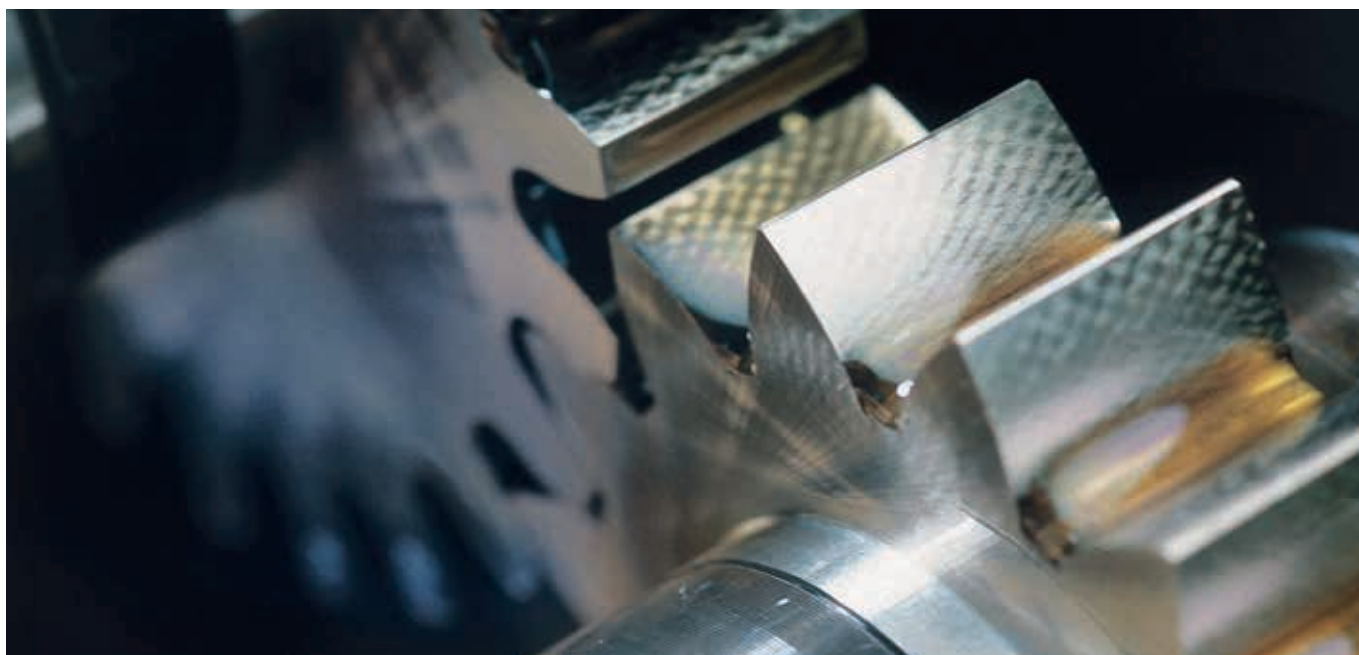
# RENOLIN

| Product name                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zinc- and Ash-free Hydraulic Oils (ZAF)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                  |
| <b>RENOLIN ZAF 520</b>                         | Zinc- and ash-free special hydraulic and lubricating oil with extreme high viscosity index. Thus very good viscosity-temperature behaviour. Fulfills and surpasses DIN 51524-3: HVLP; ISO 6743-4: HV (detergent)                                                                                                                                                                                                           | 868                                   | 160                     | 34                                        | 9.2                                        | 267 | -30              | For all hydraulic systems with high temperature variations also for low-temperature applications.                                                                                                                                                                                                                                |
| <b>RENOLIN ZAF 15 LT</b>                       | <b>Range RENOLIN ZAF LT</b><br>Zinc- and ash-free hydraulic oils with very high viscosity index for low-temperature applications. Demulsifying with additives to improve ageing stability and corrosion protection. Surpass the requirements on DIN 51524-3: HVLP; ISO 6743-4: HV                                                                                                                                          | 873                                   | >90                     | 14                                        | 5.3                                        | 387 | <-60             | Developed for the use in applications with very low ambient temperatures in mobile and stationary equipment; latest additive technology. (ZAF)<br>Demulsifying type.<br>Kinematic viscosity at -40 °C:<br>- RENOLIN ZAF 15 LT = 2380 mm <sup>2</sup> /s<br>- RENOLIN ZAF 32 LT = 4850 mm <sup>2</sup> /s                         |
| <b>RENOLIN ZAF 32 LT</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                            | 869                                   | 155                     | 31                                        | 8.7                                        | 281 | <-60             |                                                                                                                                                                                                                                                                                                                                  |
| <b>RENOLIN ZAF 32 HXV</b>                      | Newly designed zinc- and ash-free hydraulic oil with very high shear stable viscosity index, which allows outstanding low-temperature properties. Demulsifying, with additives for an excellent compatibility with non-ferrous metals and a high wear protection. Fulfills the requirements according to DIN 51524-3: HVLP and ISO 6743-4: HV (with exception of the flashpoint).                                          | 853                                   | 135                     | 32                                        | 9.5                                        | 300 | ≤-51             | Developed for applications which require a very good flow behavior also at low temperatures.<br><br>Kinematic viscosity at -40 °C = 2150 mm <sup>2</sup> /s                                                                                                                                                                      |
| <b>RENOLIN HighPress 46 DLC</b>                | <b>Range RENOLIN HighPress DLC</b><br>Zinc- and ash-free high performance EP hydraulic oil for Ortlinghaus lamellar clutch systems (hydraulic presses). Excellent detergent and dispersant properties, very good wear protection (FZG failure load stage 12 / Bruggen value 50 N/mm <sup>2</sup> ). Fulfills and surpasses the requirements on hydraulic oils HLPD acc. to DIN 51524-2 and ISO 11158: HM.                  | 877                                   | 212                     | 46                                        | 6.8                                        | 100 | –                | Especially suitable for the use in systems with Ortlinghaus lamellar clutches. Defined friction coefficients are proved in use (static and dynamic).<br><br>Müller Weingarten DT 55005 Ortlinghaus lamellar clutches ON 9.2.19<br><br>Also suitable for the use in circulation and bearing lubrication in all hydraulic presses. |
| <b>RENOLIN PG 32</b>                           | <b>Range RENOLIN PG</b><br>Fully-synthetic hydraulic and lubricating oils based on polyglycols for highest requirements regarding thermal stability, high viscosity index. Not miscible or compatible with mineral oils, water-soluble. Classification acc. to VDMA 24 569<br>PG 32: HEPG 32<br>PG 46: HEPG 46<br>Exceed ISO 15380 HEPG. Fulfills and surpass the requirements on hydraulic oils HVLP acc. to DIN 51524-3. | 1022                                  | 220                     | 32                                        | 7.1                                        | 194 | -54              | For highly loaded hydraulic and lubricating systems with extreme thermal load. Please consider change-over guidelines. Water-soluble PAG hydraulic oil, not miscible or compatible with mineral oils or PAO oils.                                                                                                                |
| <b>RENOLIN PG 46</b>                           |                                                                                                                                                                                                                                                                                                                                                                                                                            | 1029                                  | 240                     | 46                                        | 9.7                                        | 203 | -48              |                                                                                                                                                                                                                                                                                                                                  |

## Industrial Oils

| Product name                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fire-resistant Hydraulic Fluids           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>HYDROTHERM 46 M</b>                    | Based on water-glycol; tested and approved acc. to 6th and 7th Luxemburg report. Good wear protection, very good corrosion protection, extreme ageing resistance. HFC hydraulic oil acc. to DIN 51502 and VDMA 24 317, ISO 12922: HFC 46.                                                                                                                                                                                                                             | 1084                                  | –                       | 46                                        | 9.5                                        | 195 | -42              | For all hydraulic systems in fire hazard areas (mining, steel industry, aluminium industry, foundry, forging, glass industry). Suitable for all materials, paintings and elastomers which are resistant to water-glycol. Mono-ethylene-free and amine-free.                                                                                                                             |
| <b>RENOSAFE DU 46</b>                     | Water-free fire-resistant fluid based on special esters. Voith-Turbo Approval HFUD acc. to ISO 12922                                                                                                                                                                                                                                                                                                                                                                  | 922                                   | >250                    | 48                                        | 9.7                                        | 188 | -45              | Fire-resistant hydraulic fluid based on special organic esters - HFUD. Optimized for turbo couplings. Compatible with mineral oils. Compatibility with sealings, tubes and paintings has to be checked.                                                                                                                                                                                 |
| <b>RENOSAFE TURBO 46 HF</b><br><b>NEW</b> | Water-free, fire-resistant, special, thermally stable phosphoric acid esters. Good demulsibility (water separation), low foaming tendency, high oxidation stability. ISO 12922: HFDR46                                                                                                                                                                                                                                                                                | 1150                                  | >250                    | 44                                        | 5.0                                        | -35 | -24              | Hydraulic fluid in fire hazard areas. For electro hydraulic control circulations in steam turbines, bearing lubrication for steam- and gas turbines, phosphoric ester. New HFDR technology.                                                                                                                                                                                             |
| <b>RENOSAFE FireProtect 46</b>            | <b>Range RENOSAFE FireProtect</b><br>Water-free, fire-resistant hydraulic fluids based on latest ester and additive technology, type HFUD. Highest oxidation and thermal stability, excellent non-ferrous metal compatibility, hydrolytic stability and very robust and reliable wear protection. Multigrade characteristics by high, shear stable viscosity index. Biodegradable acc. to OECD 301 B >60%. Surpasses the requirements on HFUD oils acc. to ISO 12922. | 920                                   | 270                     | 50                                        | 10.4                                       | 203 | -42              | For the use as fire-resistant hydraulic oils based on organic esters. Type HFUD for all hydraulic applications in fire hazard areas or glowing metal surfaces such as in die-casting machines, steel mills, continuous casting machines, hot rolling mills, coking plants and other mobile and stationary hydraulic systems, excellent life-time, excellent yellow metal compatibility. |
| <b>RENOSAFE FireProtect 68</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 919                                   | 280                     | 68                                        | 12.6                                       | 188 | -45              |                                                                                                                                                                                                                                                                                                                                                                                         |

# RENOLIN



| Product name                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                 |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gear and Circulating Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                         |                                           |                                            |    |                  |                                                                                                                                                                                                                                                                                                       |
| <b>RENOLIN CLP 68</b>            | <b>Range RENOLIN CLP</b><br>High-performance gear and circulating oils with good ageing stability and additives to improve corrosion protection (also combat steel and non-ferrous metal corrosion caused by moisture). Outstanding antiwear characteristics – good EP / AW performance, excellent scuffing load carrying capacity and protection against micropitting, excellent FE8 roller bearing wear protection, good demulsifying properties, very good foaming behaviour, zinc-free and silicone oil-free.<br>RENOLIN CLP oils fulfil and exceed the minimum requirements of CLP lubricating oils according to DIN 51517-3, ISO 6743-6 and ISO 12925-1: CKC,CKD.<br>US Steel 224, David Brown S1.53.10. | 886                                   | 236                     | 68                                        | 8.7                                        | 99 | -24              | Universally useable gear oils for industrial applications such as in bearings, joints, spur gears, bevel gears and worm gears and whenever the manufacturer recommends an mineral oil of type CLP.<br><br>Approved by leading gear box manufacturers.<br><br><b>Mineral oil based</b><br>Demulsifying |
| <b>RENOLIN CLP 100</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 890                                   | 240                     | 100                                       | 11.2                                       | 98 | -21              |                                                                                                                                                                                                                                                                                                       |
| <b>RENOLIN CLP 150</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 894                                   | 250                     | 150                                       | 14.5                                       | 96 | -24              |                                                                                                                                                                                                                                                                                                       |
| <b>RENOLIN CLP 220</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 896                                   | 260                     | 220                                       | 18.9                                       | 96 | -24              |                                                                                                                                                                                                                                                                                                       |
| <b>RENOLIN CLP 320</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 900                                   | 255                     | 320                                       | 24.0                                       | 95 | -12              |                                                                                                                                                                                                                                                                                                       |
| <b>RENOLIN CLP 460</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 901                                   | 270                     | 460                                       | 30.4                                       | 95 | -12              |                                                                                                                                                                                                                                                                                                       |
| <b>RENOLIN CLP 680</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 918                                   | 270                     | 680                                       | 36.8                                       | 88 | -10              |                                                                                                                                                                                                                                                                                                       |

## Industrial Oils

| Product name                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gear and Circulating Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 46 PLUS</b>       | <b>Range RENOLIN CLP PLUS</b><br>High-performance gear and circulating oils offering excellent wear protection, good EP performance and excellent corrosion protection. Carefully selected antioxidants guarantee good ageing stability. Special detergent/dispersant additives offer very good cleaning properties and dirt carrying capacity.<br>RENOLIN CLP PLUS oils fulfil and surpass the minimum requirements on lubricating oils acc. to DIN 51517-3, ISO 6743-6 and ISO 12925-1: CKC, CKD.<br>CLP PLUS oils were developed especially for the extreme conditions, e.g. "raw material" industry, mining industry conveyors operate.                   | 885                                   | 200                     | 46                                        | 6.8                                        | 102 | -27              | Special gear oils for highly stressed mechanical industrial, spur gears, double-spur gears, bevel gears and worm gears. Long-life oils (tested and approved for 30,000 hours in brown coal open pit mining conveyors/gears). Especially for use in severe conditions where dirt, dust and water contamination prevail.<br><br>Increased oxidation stability.<br><br><b>Mineral oil based</b> |
| <b>RENOLIN CLP 68 PLUS</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 888                                   | 236                     | 68                                        | 8.7                                        | 100 | -27              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 100 PLUS</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 891                                   | 240                     | 100                                       | 11.2                                       | 97  | -24              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 150 PLUS</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 895                                   | 250                     | 150                                       | 14.8                                       | 97  | -24              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 220 PLUS</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 899                                   | 260                     | 220                                       | 18.9                                       | 96  | -24              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 320 PLUS</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 899                                   | 255                     | 320                                       | 24.0                                       | 95  | -18              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 460 PLUS</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 904                                   | 270                     | 460                                       | 30.2                                       | 94  | -14              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN CLP 680 PLUS</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 908                                   | 270                     | 680                                       | 39.6                                       | 95  | -17              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN AWD 68</b>            | <b>Range RENOLIN AWD</b><br>Special gear and circulating oils for highest requirements on wear protection. Special additives reduce friction and form reaction layers which offer excellent wear protection in extreme mixed friction and load conditions.<br>Bruggen value >75 N/mm <sup>2</sup> , excellent FE8 roller bearing wear protection, good dirt carrying capacity (detergent / dispersant), zinc- and silicone oil-free, high additive reserves.<br>The RENOLIN AWD series surpasses the minimum requirements on industrial gear oils CLPD acc. to DIN 51517-3, ISO 6743-6 and ISO 12925-1: CKC, CKD.<br>Approved by leading press manufacturers. | 882                                   | 221                     | 68                                        | 8.9                                        | 105 | -24              | For highly-stressed industrial gear boxes and circulating systems, especially when good load carrying capacity in extreme mixed friction is required, e.g. press lines in the automotive industry. High Bruggen value of >75 N/mm <sup>2</sup> .<br><br><b>Mineral oil based</b>                                                                                                             |
| <b>RENOLIN AWD 100</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 886                                   | 222                     | 100                                       | 11.2                                       | 97  | -24              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN AWD 150</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 894                                   | 208                     | 150                                       | 14.6                                       | 96  | -12              |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIN AWD 220</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 896                                   | 210                     | 220                                       | 18.7                                       | 95  | -12              |                                                                                                                                                                                                                                                                                                                                                                                              |



# RENOLIN

| Product name                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fully Synthetic Gear and Circulating Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 32</b>                             | <b>Range RENOLIN PG</b><br>Fully synthetic gear and lubricating oils based on special polyalkylene glycols (PAG) for applications with extreme thermal loads. High oxidation and ageing stability, high viscosity index (shear stable), good viscosity-temperature behaviour, excellent load carrying capacity, low coefficients of friction, high FZG, very good pitting and micropitting resistance, excellent FE8 performance.<br>The oils of the RENOLIN PG series surpass the minimum requirements of CLP-PG lubricating oils according to DIN 51517-3, ISO 6743-6 and ISO 12925-1: CKC, CKD, CKE, (CKS), CKT. Approved by leading gear box manufacturers. | 1022                                  | 220                     | 32                                        | 7.1                                        | 194 | -54              | For gear boxes operating in extreme thermal and mechanical conditions, such as worm gears and calander lubrication. Can also be used as compressor oils for process gases such as methane, ethane, propane, etc. due to low hydrocarbon gas solubility. Particularly suitable for steel / bronze sliding pairs in worm gears. Not miscible or compatible with mineral oils, ester oils and PAO-based oils.<br>Change-over guidelines must be observed. |
| <b>RENOLIN PG 46</b>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1029                                  | 240                     | 46                                        | 9.7                                        | 203 | -48              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 68</b>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1035                                  | 240                     | 68                                        | 13.8                                       | 212 | -51              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 100</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1043                                  | 260                     | 100                                       | 19.6                                       | 220 | -48              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 150</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1051                                  | 240                     | 145                                       | 27.0                                       | 224 | -51              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 220</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1075                                  | 240                     | 220                                       | 36.8                                       | 218 | -33              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 320</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1075                                  | 240                     | 320                                       | 54.4                                       | 237 | -36              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 460</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1075                                  | 280                     | 460                                       | 75.1                                       | 245 | -36              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 680</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1075                                  | 280                     | 680                                       | 110.3                                      | 261 | -33              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN PG 1000</b>                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1075                                  | 280                     | 1000                                      | 162.0                                      | 281 | -36              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 68</b>                     | <b>Range RENOLIN UNISYN CLP</b><br>Fully-synthetic gear and circulating oils with excellent thermal and ageing stability, very high viscosity index (shear stable), outstanding low-temperature behaviour, very good cold-flow-properties, excellent air release and low foaming tendency, good micropitting resistance, excellent FE8 performance, good demulsibility, zinc-free and silicone oil-free.<br>The oils of the RENOLIN UNISYN CLP series surpass the minimum requirements on gear oils CLP-HC acc. to DIN 51517-3, ISO 6743-6 and ISO 12925-1: CKC, CKD, CKE, AIST 224, David Brown S1.53.101. Approved by leading gear box manufacturers.         | 848                                   | 240                     | 68                                        | 10.7                                       | 147 | -56              | For the lubrication of bearings and gear boxes with high thermal loads. RENOLIN UNISYN CLP oils are also suitable for lubricated-for-life applications and for the use in gear boxes with extended oil change intervals. Excellent low-temperature characteristics, high, shear stable viscosity index.                                                                                                                                                |
| <b>RENOLIN UNISYN CLP 100</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 851                                   | 250                     | 100                                       | 14.5                                       | 150 | -53              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 150</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 853                                   | 250                     | 150                                       | 19.6                                       | 150 | -45              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 220</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 854                                   | 260                     | 220                                       | 26.7                                       | 155 | -42              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 320</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 860                                   | 260                     | 320                                       | 35.0                                       | 155 | -42              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 460</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 861                                   | 300                     | 460                                       | 45.6                                       | 155 | -39              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 680</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 862                                   | 300                     | 680                                       | 62.2                                       | 160 | -33              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENOLIN UNISYN CLP 1000</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 864                                   | 300                     | 1000                                      | 84.0                                       | 165 | -27              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Based on Polyglycol, water soluble, PAG**

**Based on PAO (Polyalphaolefins)**

\*Further ISO VG grades available on request.

# RENOLIN

| Product name                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Density at 15 °C kg/m <sup>3</sup> | Flash point Clev. °C | Kin. visc. at 40 °C mm <sup>2</sup> /s | Kin. visc. at 100 °C mm <sup>2</sup> /s | VI  | Pour-point °C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------|----------------------------------------|-----------------------------------------|-----|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Special Gear and Circulating Oils</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                      |                                        |                                         |     |               |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RENOLIN HighGear Synth 150</b>            | <b>Range RENOLIN HighGear Synth*</b><br>RENOLIN HighGear Synth is based on synthetic polyalphaolefins (PAO). Special synergistic additives provide outstanding wear protection of these new high-tech gear oils. Highly effective tribo-protection layers reliably protect wetted machine components against wear. RENOLIN HighGear Synth oils have a high, natural and shear stable viscosity index and are suitable for both high and low temperature applications. High thermal and oxidation stability allow oil change intervals to be extended.<br>DIN 51517-3: CLP-HC;<br>ISO 6743-6 and<br>ISO 12925-1: CKC, CKD, CKE. | 871                                | 220                  | 150                                    | 18.0                                    | 133 | -36           | RENOLIN HighGear Synth can be used both in pre-damaged gear boxes and machine components to increase service life as well as in new gear boxes (spur, bevel, planetary and worm gears) to reduce friction, wear and noise in extreme conditions. Synthetic PAO components help reduce friction, lower operating temperatures and can increase efficiency. Excellent low-temperature characteristics, high, shear stable viscosity index. |
| <b>RENOLIN HighGear Synth 320</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 876                                | 220                  | 320                                    | 31.2                                    | 135 | -34           |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RENOLIN HighGear Synth 460</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 878                                | 220                  | 460                                    | 41.6                                    | 140 | -27           |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RENOLIN HighGear Synth 680</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 880                                | 220                  | 680                                    | 57.9                                    | 149 | -27           |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| *Further ISO VG grades available on request. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                      |                                        |                                         |     |               |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                      |                                        |                                         |     |               | <b>Based on PAO (Polyalphaolefins)</b>                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>RENOLIN MORGear 100</b>                   | <b>Range RENOLIN MORGear</b><br>High-performance circulating oils based on mineral oil, for the lubrication of MORGear bearings. Mild EP/AW additives provide good wear protection, synergistically acting additives ensure good ageing stability and excellent demulsibility (very good water separation).<br>ISO 6743-6 and<br>ISO 12925-1: CKB.                                                                                                                                                                                                                                                                             | 888                                | 248                  | 100                                    | 11.1                                    | 96  | -19           | For the lubrication of MORGear bearings. RENOLIN MORGear oils fulfil and surpass the requirements of DANIELI (Italy) and SMS.                                                                                                                                                                                                                                                                                                            |
| <b>RENOLIN MORGear 220</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 895                                | 255                  | 226                                    | 19.2                                    | 96  | -10           |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RENOLIN MORGear 320</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 903                                | >260                 | 320                                    | 24.0                                    | 95  | -12           |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RENOLIN MORGear 460</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 904                                | >270                 | 470                                    | 31.1                                    | 96  | -9            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RENOLIN MORGear 680</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 915                                | 252                  | 682                                    | 39.2                                    | 95  | -7            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                      |                                        |                                         |     |               | <b>Mineral oil based</b>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIN SynGear 220 HT</b>                | Fully-synthetic high-temperature EP industrial gear oil and calender oil based on selected polyglycols (PAG). Excellent wear protection and ageing stability.<br>DIN 51517-3: CLP-PG<br>ISO 6743-6: CKC/CKD/CKT                                                                                                                                                                                                                                                                                                                                                                                                                | 1078                               | 240                  | 240                                    | 39.0                                    | 216 | -36           | For mechanically and thermally highly loaded wheel and worm gears / rolling and plain bearings. Especially for calenders in the paper and foil industry. Peak temperatures of 250 °C are allowed for a short time. Miscibility and compatibility properties with polyglycols of others manufacturers have to be checked.                                                                                                                 |
|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                      |                                        |                                         |     |               | <b>Based on PAG (Polyglycol)</b>                                                                                                                                                                                                                                                                                                                                                                                                         |

## Industrial Oils

| Product name                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Special Gear and Circulating Oils</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN CLP 220 VCI</b>                   | <b>Range RENOLIN CLP VCI*</b><br>Special industrial gear oils based on mineral oil with excellent corrosion protection properties. Reliable long-term corrosion protection in the oil phase as well as in the vapour phase due to VCI inhibitors. Excellent wear protection, high scuffing protection, good compatibility with industrial gear oils. Fulfil and surpass the requirements on CLP industrial gear oils acc. to DIN 51517-3: CLP; ISO 6743-6 and ISO 12925-1: CKC / CKD as well as AGMA 9005/E02: EP.      | 898                                   | 254                     | 220                                       | 19.0                                       | 97  | -24              | Recommended for applications with highly loaded spur gears, bevel gears, and worm gears. Also suitable in highly loaded bearings, joint bearings and pressure spindles. Especially for gears and components which are not used for a longer period of time or are stored before they are used and therefore a conservation must be applied. Contain VCI-components (Vapor Corrosion Inhibitors).<br><br><b>Mineral oil based</b><br>(VCI type) |
| <b>RENOLIN CLP 320 VCI</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 900                                   | 254                     | 320                                       | 23.0                                       | 92  | -14              |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| *Further ISO VG grades available on request. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN UNISYN GEAR 220 VCI</b>           | <b>RENOLIN UNISYN GEAR 220 VCI*</b><br>Fully-synthetic industrial gear oil based on PAO with excellent corrosion protection properties. Reliable long-term corrosion protection in the oil phase as well as in the vapour phase due to VCI inhibitors. Excellent wear protection, high scuffing protection, good compatibility with industrial gear oils. Fulfil and surpass the requirements on CLP industrial gear oils acc. to DIN 51517-3: CLP; ISO 6743-6 and ISO 12925-1: CKC / CKD as well as AGMA 9005/E02: EP. | 855                                   | 260                     | 220                                       | 26.0                                       | 160 | -42              | For the use in heavily loaded spur gears, bevel gears and worm gears with circulation oil system or oil injecting system. Especially for high operating temperatures. Contains VCI components (Vapor Corrosion Inhibitors).<br><br><b>Based on PAO</b><br>(VCI type)                                                                                                                                                                           |
| *Further ISO VG grades available on request. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOFLUID TF 1500</b>                     | EP-hydraulic- and gear oil based on high-performance base oils. With high ageing stability. FZG-Test A/8,3/90 Failure load stage > 12. DIN 51524-2: HLP ISO 6743-4: HM                                                                                                                                                                                                                                                                                                                                                  | 870                                   | 224                     | 32                                        | 5.4                                        | 102 | -30              | Power transmission oil for VOITH-turbo gears, hydraulic oils for VOITH-turbo couplings. Also suitable as low viscosity, high-pressure gear oil especially with hydraulic controls and combined oil system.<br><br><b>Mineral oil based</b>                                                                                                                                                                                                     |

## RENOLIN, RENEP



| Product name          | Description                                                                                                                                                                                                                                                                                                                                                                                   | Density at 15 °C kg/m³ | Flash point Clev. °C | Kin. visc. at 40 °C mm²/s | Kin. visc. at 100 °C mm²/s | VI  | Pour-point °C | Main application area                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|---------------------------|----------------------------|-----|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Slideway Oils</b>  |                                                                                                                                                                                                                                                                                                                                                                                               |                        |                      |                           |                            |     |               |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENEP CGLP 68</b>  | <b>Range RENEP CGLP</b><br>Mineral oil based slideway oils with lubricity improvers and friction-reducing additives. Good EP performance. Protect against corrosion and prevent stick-slip. CGLP slideway oils according to DIN 51502. Demulsifying.<br>RENEP CGLP 68: CGLP 68<br>RENEP CGLP 150: CGLP 150<br>RENEP CGLP 220: CGLP 220                                                        | 879                    | 220                  | 68                        | 8.6                        | 99  | -24           | Advanced formulation. Excellent chemical compability with water-miscible metal working fluids. Slideway oils with very good demulsifying power, very low friction coefficient. HELLER approval. These slideway oils are especially suitable for the use with ECOCOL cutting fluids. Proven good compatibility with many water-miscible cutting fluids. Approved by leading machine tool manufacturers. |
| <b>RENEP CGLP 150</b> |                                                                                                                                                                                                                                                                                                                                                                                               | 892                    | 230                  | 150                       | 14.8                       | 98  | -18           |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENEP CGLP 220</b> |                                                                                                                                                                                                                                                                                                                                                                                               | 895                    | 240                  | 220                       | 19.0                       | 96  | -15           |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENEP 2 K</b>      | <b>Range RENEP K</b><br>Slideway oils with special additives to reduce stick-slip especially for machine tools. Good detergent. Emulsifying. Detergent/dispersant type<br>RENEP 2 K: CGLP 68<br>RENEP 4 K: CGLP 100<br>RENEP 5 K: CGLP 220                                                                                                                                                    | 882                    | 230                  | 68                        | 9.2                        | 112 | -27           | Suitable for all slideway applications. RENEP K series products display good compatibility with slide materials, very good ageing and oxidation stability and reliably combat stick-slip.                                                                                                                                                                                                              |
| <b>RENEP 4 K</b>      |                                                                                                                                                                                                                                                                                                                                                                                               | 885                    | 240                  | 100                       | 11.8                       | 107 | -24           |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENEP 5 K</b>      |                                                                                                                                                                                                                                                                                                                                                                                               | 900                    | 248                  | 220                       | 19.9                       | 104 | -12           |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>RENEP KN 68</b>    | <b>Range RENEP KN</b><br>Excellent adhesion provided by special additives which increase the adhesion to metal and plastic surfaces - "tacky" effect. Good EP performance. Protect against corrosion and prevent stick-slip. Advanced formulation. CGLP slideway oils according to DIN 51502. Demulsifying.<br>RENEP CGLP 68: CGLP 68<br>RENEP CGLP 150: CGLP 150<br>RENEP CGLP 220: CGLP 220 | 882                    | 220                  | 67                        | 9.1                        | 110 | -29           | Excellent chemical compability with water-miscible metal working fluids. Slideway oils with very good demulsifying properties, low friction coefficient. Containing tackyfier.<br><br>Approved by leading machine tool manufacturers.<br><br>Especially suitable for the use with ECOCOL cutting fluids.                                                                                               |
| <b>RENEP KN 220</b>   |                                                                                                                                                                                                                                                                                                                                                                                               | 895                    | 238                  | 224                       | 19.5                       | 100 | -17           |                                                                                                                                                                                                                                                                                                                                                                                                        |



## Industrial Oils



| Product name                | Description                                                                                                                                                                                                                                                                                                                                                                                           | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|-----|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Paper Machine Oils</b>   |                                                                                                                                                                                                                                                                                                                                                                                                       |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIN PA 150</b>       | <b>Range RENOLIN PA</b><br>Mineral oil based paper machine oils based on specially selected base oils in combination with zinc-containing EP-additives which provide an excellent wear protection. RENOLIN PA oils fulfil and exceed the minimum requirements on CLP gear oils acc. to DIN 51517-3 and the requirements of paper machine oils for the wet end and dryer section acc. to Voith VN 108. | 878                       | >230                    | 150                          | 15.0                          | 100 | -30              | Recommended for the use in wet end and dryer sections in paper machines, also in gear boxes, bearings in central lubricating systems as well as in applications where a lubricating oil with high thermal stability and very good ageing stability is needed, demulsifying type.<br><br><b>Mineral oil base</b> |
| <b>RENOLIN PA 220</b>       |                                                                                                                                                                                                                                                                                                                                                                                                       | 886                       | >230                    | 220                          | 19.3                          | 99  | -18              |                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIN NF PRESS 100</b> | Mineral oil based hydraulic oil based on hydrogenated mineral oils in combination with specially selected, zinc- and ash-free additive technology. Specially developed for the use in hydraulic presses in paper machines. Exceeds the requirements on hydraulic oils acc. to Voith VN 108.                                                                                                           | 867                       | 260                     | 100                          | 11.5                          | 103 | -36              | For the use in hydraulic presses in paper machines, e.g. Voith shoe presses. Hydrogenated base oils.<br><br><b>Mineral oil base</b>                                                                                                                                                                             |

# RENOLIN

| Product name                     | Description                                                                                                                                                                                                                                                                                                                                                                                         | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Paper Machine Oils</b>        |                                                                                                                                                                                                                                                                                                                                                                                                     |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                      |
| <b>RENOLIN UNISYN CLP 150 PA</b> | <b>Range RENOLIN UNISYN CLP PA</b><br>Fully-synthetic, high performance paper machine oils based on polyalphaolefins. Excellent demulsibility (excellent water separation), high ageing stability, excellent wear protection and very good corrosion protection. High natural, shear stable viscosity index.<br>Fulfil and exceed the minimum requirements of gear oils CLP-HC acc. to DIN 51517-3. | 857                                   | >200                    | 150                                       | 19.8                                       | 152 | -39              | For the use in circulating lubrication of the wet end and dryer section in paper machines, also in gear boxes and central lubricating systems. Especially for higher operating temperatures (>80 °C) |
| <b>RENOLIN UNISYN CLP 220 PA</b> |                                                                                                                                                                                                                                                                                                                                                                                                     | 859                                   | 230                     | 220                                       | 26.5                                       | 154 | -36              |                                                                                                                                                                                                      |
| <b>RENOLIN UNISYN CLP 320 PA</b> |                                                                                                                                                                                                                                                                                                                                                                                                     | 964                                   | >240                    | 320                                       | 34.2                                       | 151 | -32              | <b>RENOLIN UNISYN CLP 220 PA</b><br>Fulfil and exceed the minimum requirements of the companies SKF, FAG, Voith 108 and Metso RAU4L00659,06EN<br><br><b>Based on PAO</b>                             |
| <b>RENOLIN UNISYN CLP 460 PA</b> |                                                                                                                                                                                                                                                                                                                                                                                                     | 866                                   | >240                    | 460                                       | 46.0                                       | 156 | -27              |                                                                                                                                                                                                      |

## Industrial Oils



| Product name                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Turbine Oils</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN ETERNA 32</b>     | <b>Range RENOLIN ETERNA</b><br>Turbine oils of the latest generation for lubrication of gas and steam turbines and turbo compressors (also with gear boxes, FZG ≥ 10). Based on high-quality, hydrocracked base oils. High ageing resistance, excellent protection against sludge formation. Turbine oils according to DIN 51515-1: L-TDP and DIN 51515-2: L-TGP. Approved by SIEMENS, MAN and many other turbine manufacturers and power station operators | 842                       | 220                     | 32                           | 5.8                           | 126 | -15              | For the lubrication of steam and gas turbines and generators, turbo compressors, pumps and transmissions. Furthermore used as lubricating and barrier oil in water-cooled generators. Surpass TDP and TGP according to DIN 51515-1/2. AW/EP turbine oils: FZG≥10.                         |
| <b>RENOLIN ETERNA 46</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 846                       | 220                     | 46                           | 7.6                           | 132 | -15              |                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN ETERNA 68</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 851                       | 230                     | 68                           | 9.9                           | 120 | -15              |                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN ETERNA 32 SGV</b> | <b>Range RENOLIN ETERNA SGV</b><br>Turbine oils of the latest generation for lubricants of gas and steam turbine as well as for turbo compressor without gear boxes. Exceeds the requirements of DIN 51515-1: TD; DIN 51515-2: TG. Approved by SIEMENS, MAN and many other turbine manufacturers and power station operators, EP/AW-free                                                                                                                    | 838                       | 220                     | 32                           | 5.8                           | 126 | -15              | For the use in gas and steam turbines as well as in turbo compressors. Especially suitable for the compression of synthesis gases and ammonia. EP/AW-free, highest thermal stability. Surpass TD and TG according to DIN 51515-1/2.                                                       |
| <b>RENOLIN ETERNA 46 SGV</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 846                       | 220                     | 46                           | 7.6                           | 132 | -15              |                                                                                                                                                                                                                                                                                           |
| <b>RENOLIN ETERNA Clean</b>  | Polar cleaning fluid for turbine oil circuits. Compatible with all common turbine oils. Free from detergents: No deterioration of the air and water separation behaviour and other negative impacts which occur with conventional cleaners. RENOLIN ETERNA Clean contains a complete additive system. Therefore, a "weakening" of the turbine oil filling - arising by addition of other cleaners - will be prevented.                                      | 910                       | 220                     | 29                           | 4.84                          | –   | -42              | With RENOLIN ETERNA Clean old deposits, varnish and other oil degradation products can effectively be removed from the turbine oil system before an intended oil change. There will be no impairment of the new filling. Addition of approx. 5 – 10% to the existing turbine oil filling. |

# RENOLIN



| Product name                 | Description                                                                                                                                                                                                                                                                                                                                             | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI | Pour-point<br>°C | Main application area                                                                                                                                                                                                |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Oils for Transformers</b> |                                                                                                                                                                                                                                                                                                                                                         |                                       |                         |                                           |                                            |    |                  |                                                                                                                                                                                                                      |
| <b>RENOLIN E 10</b>          | High quality, inhibited insulating oil based on naphthenic base oils which can be used in transformers, switches, choking coils, condensers and converters. Excellent dielectric properties and high oxidation stability. Fulfills and surpasses the requirements for insulating oils according to EN 60296 as well as RWE Power Specification class I. | 872                                   | 152*                    | 10.0                                      | —                                          | —  | -48              | RENOLIN E 10 is used as insulating oil in transformers, switches, choking coils, condensers, converters and similar aggregates, also at low outdoor temperatures (e.g. in outdoor units).                            |
| <b>RENOLIN ELTEC</b>         | Mineral oil-based insulating oil which can be used in transformers, converters and switch gears. Fulfills the requirements on insulating oils acc. to EN 60296.                                                                                                                                                                                         | 869                                   | 149*                    | 9.9                                       | 2.4                                        | 59 | -48              | RENOLIN ELTEC is used as insulating oil in transformers, switch gears, inductance coils, capacitors, instrument transformers, and similar devices, even at low ambient temperatures (e.g. in outdoor installations). |
| <b>RENOLIN E 3</b>           | Inhibited switchgear oil based on naphthenic base oils. Especially for the use in outdoor units. Fulfills the requirements according to EN 60296.                                                                                                                                                                                                       | 861                                   | 100*                    | 3.2                                       | —                                          | —  | <-70             | RENOLIN E 3 is primarily used in power switches in outdoor units. Even at low ambient temperatures RENOLIN E 3 ensures an excellent flowability. Hence any additional electric heating is not necessary.             |

\* Acc. to Pensky Martens (P.M.)



## Industrial Oils



| Product name           | Description                                                                                                                                                                                                                                                                                                                                                                                               | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI | Pour-point<br>°C | Main application area                                                                                                                                                                              |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Compressor Oils</b> |                                                                                                                                                                                                                                                                                                                                                                                                           |                           |                         |                              |                               |    |                  |                                                                                                                                                                                                    |
| <b>RENOLIN 208</b>     | <b>Range RENOLIN 200</b><br>Ageing-resistant lubricating oils with good viscosity-temperature behaviour for normally stressed compressors, drive units as well as plain and rolling bearings. C lubricating oils according to DIN 51517 and VB lubricating oils according to DIN 51506.<br><br>208: C 100, VB 100<br>210: C 150, VB 150<br>212: C 220, VB 220<br>213: C 320, VB 320<br>215: C 460, VB 460 | 883                       | 260                     | 100                          | 11.0                          | 94 | -15              | Oils for all air compressors which require a DIN 51506 VB lubricant. Also suitable as a type C circulating oil according to VDI-guideline 2202.<br><br>VB => up to 140 °C compression temperature. |
| <b>RENOLIN 210</b>     |                                                                                                                                                                                                                                                                                                                                                                                                           | 886                       | 274                     | 150                          | 14.2                          | 91 | -9               |                                                                                                                                                                                                    |
| <b>RENOLIN 212</b>     |                                                                                                                                                                                                                                                                                                                                                                                                           | 880                       | 290                     | 220                          | 18.1                          | 90 | -9               |                                                                                                                                                                                                    |
| <b>RENOLIN 213</b>     |                                                                                                                                                                                                                                                                                                                                                                                                           | 900                       | 275                     | 320                          | 24.0                          | 95 | -7               |                                                                                                                                                                                                    |
| <b>RENOLIN 215</b>     |                                                                                                                                                                                                                                                                                                                                                                                                           | 904                       | 310                     | 510                          | 32.5                          | 96 | -10              |                                                                                                                                                                                                    |



# RENOLIN

| Product name              | Description                                                                                                                                                                                                                                                                                                                           | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Compressor Oils</b>    |                                                                                                                                                                                                                                                                                                                                       |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                  |
| <b>RENOLIN 503</b>        | <b>Range RENOLIN 500</b><br>Special ageing-resistant lubricating oils offering minimal coking. Contain additives to improve corrosion protection and ageing stability. VDL lubricating oils according to DIN 51506. For compressor outlet temperatures up to +220 °C.<br>503: VDL 68<br>504: VDL 100<br>505: VDL 150<br>506: VDL 220  | 861                                   | 250                     | 68                                        | 9.1                                        | 109 | -18              | Compressor oils with excellent anti-ageing behaviour and extremely low coking tendency. For air compressors with end temperatures up to 220 °C. Also for other thermally loaded circulation lubrication systems. |
| <b>RENOLIN 504</b>        |                                                                                                                                                                                                                                                                                                                                       | 866                                   | 280                     | 100                                       | 11.9                                       | 109 | -21              |                                                                                                                                                                                                                  |
| <b>RENOLIN 505</b>        |                                                                                                                                                                                                                                                                                                                                       | 875                                   | 275                     | 150                                       | 15.0                                       | 100 | -15              |                                                                                                                                                                                                                  |
| <b>RENOLIN 506</b>        |                                                                                                                                                                                                                                                                                                                                       | 890                                   | 280                     | 230                                       | 18.7                                       | 90  | -12              |                                                                                                                                                                                                                  |
| <b>RENOLIN VDL 100 DD</b> | <b>Range RENOLIN VDL-DD</b><br>Lubricating oils for air compressors. Contain additives to increase corrosion protection and ageing resistance and reduce deposits (detergent/dispersant (DD) additives). VDL lubricating oils according to DIN 51506. Surpasses intensified ageing test<br>VDL 100 DD: VDL 100<br>VDL 150 DD: VDL 150 | 882                                   | 250                     | 98                                        | 11.0                                       | 110 | -24              | Oils for all highly-stressed air compressors which require a VDL oil with DD additives, good dirt carrying capacity. Self-cleaning performance                                                                   |
| <b>RENOLIN VDL 150 DD</b> |                                                                                                                                                                                                                                                                                                                                       | 880                                   | 260                     | 152                                       | 15.0                                       | 100 | -12              |                                                                                                                                                                                                                  |
| <b>RENOLIN SC 32</b>      | <b>Range RENOLIN SC</b><br>Premium-quality, oxidation- and ageing-resistant special cuts with corrosion protection and Anti-Wear additives. Screw compressor fluids                                                                                                                                                                   | 871                                   | 218                     | 32                                        | 5.4                                        | 100 | -15              | Mineral oil-based screw compressor oils for normal oil change intervals. For maximum discharge temperatures up to 110 °C.                                                                                        |
| <b>RENOLIN SC 46</b>      |                                                                                                                                                                                                                                                                                                                                       | 875                                   | 236                     | 46                                        | 6.7                                        | 100 | -12              |                                                                                                                                                                                                                  |
| <b>RENOLIN SC 68</b>      |                                                                                                                                                                                                                                                                                                                                       | 879                                   | 251                     | 68                                        | 8.7                                        | 99  | -9               |                                                                                                                                                                                                                  |
| <b>RENOLIN SC 46 MC</b>   | <b>Range RENOLIN SC MC</b><br>Screw compressor oils based on MC oils with a high, natural viscosity index for extended oil change intervals.                                                                                                                                                                                          | 858                                   | 230                     | 46                                        | 6.7                                        | 100 | -18              | Based on hydrogenated base oils (MC). Screw compressor oils for extended oil change intervals. For maximum discharge temperatures up to 110 °C.                                                                  |
| <b>RENOLIN SC 68 MC</b>   |                                                                                                                                                                                                                                                                                                                                       | 852                                   | 240                     | 71                                        | 11.8                                       | 160 | -24              |                                                                                                                                                                                                                  |
| <b>RENOLIN COOL +</b>     | Semi-synthetic screw compressor oil. Group III base oils combined with highly-efficient additive technology.                                                                                                                                                                                                                          | 854                                   | 206                     | 50                                        | 8.0                                        | 130 | -18              | High performance screw compressor oil. Extended oil change intervals even when subject to high thermal loads and/or extreme working conditions.                                                                  |
| <b>RENOLIN VAC 100 F</b>  | Special vacuum pump lubricant based on highly refined mineral oils. Does not contain any additives. Extremely low evaporation losses. Suitable for high vacuum.                                                                                                                                                                       | 887                                   | 270                     | 102                                       | 12.1                                       | 109 | -15              | Can be used in minimum final pressure range from 10-3 up to 10-4 mbar. Suitable for different compressor types for example piston and rotary compressors.                                                        |

## Industrial Oils

| Product name                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              | Density at 15 °C kg/m <sup>3</sup> | Flash point Clev. °C | Kin. visc. at 40 °C mm <sup>2</sup> /s | Kin. visc. at 100 °C mm <sup>2</sup> /s | VI  | Pour-point °C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------|----------------------------------------|-----------------------------------------|-----|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Compressor Oils</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                    |                      |                                        |                                         |     |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN UNISYN OL 32</b>  | <b>Range RENOLIN UNISYN OL</b><br>Fully-synthetic cooling oils for piston and screw compressors based on polyalphaolefins with excellent oxidation stability, outstanding wear protection, good demulsification and excellent viscosity-temperature behaviour. High viscosity index. Excellent air release. Allow service intervals to be extended. Lubricating oils VDL according to DIN 51506 and synthetic hydraulic oils according to DIN 51524-2/3. | 838                                | 240                  | 32                                     | 6.1                                     | 142 | <-60          | Fully-synthetic screw compressor oils based on PAO for extended oil change intervals even when subject to high thermal loads. Also suitable for highly loaded hydraulic systems. Excellent air release properties. Extended oil drain intervals.                                                                                                                                                                                                               |
| <b>RENOLIN UNISYN OL 46</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 843                                | 260                  | 46                                     | 7.9                                     | 146 | <-60          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN UNISYN OL 68</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 845                                | 260                  | 68                                     | 10.6                                    | 144 | -54           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN UNISYN OL 100</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 849                                | 260                  | 100                                    | 14.2                                    | 146 | -54           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN UNISYN OL 150</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 849                                | 250                  | 150                                    | 19.4                                    | 148 | -47           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN SE 68</b>         | <b>Range RENOLIN SE</b><br>Fully-synthetic air compressor oils based on advanced synthetic ester technology.<br><br>Fulfils the requirements according to VDL DIN 51506                                                                                                                                                                                                                                                                                  | 927                                | 264                  | 68                                     | 9.2                                     | 111 | -36           | High temperature stable ester oil for use in vane type and reciprocating compressors, even under severe conditions e.g. high temperatures. Especially suited for compressors where the use of a mineral oil can lead to coking and varnish.                                                                                                                                                                                                                    |
| <b>RENOLIN SE 100</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 971                                | 268                  | 100                                    | 11.1                                    | 97  | -36           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN LPG 100</b>       | <b>Range RENOLIN LPG</b><br>Synthetic gas compressor oils based on polyalkylene glycols (PAG). Suitable for process gases, refinery gases (petroleum gases) and other hydrocarbon-based gases (propane, propylene, butane, etc.) and their blends.<br>Attention: For RENOLIN LPG 100 and LPG 185 a drying process has to be applied prior to using them as refrigeration oils.                                                                           | 1002                               | 270                  | 100                                    | 16.2                                    | 175 | -39           | RENOLIN LPG 100 and LPG 185 are characterized by a low solubility of hydrocarbon gases in the oil. Due to the use of special PAG base oils, the dilution of the lubricant in operation (drop in viscosity) is minimized. Thus, reliable wear protection and excellent lubricating properties are guaranteed. Selected additives provide additional security in terms of thermal-oxidative stability and wear protection of the lubricant under gas atmosphere. |
| <b>RENOLIN LPG 185</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1012                               | 280                  | 185                                    | 29.0                                    | 197 | -36           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>RENOLIN SynAir</b>        | High performance synthetic air compressor fluid, excellent biodegradability according to OECD 301C > 60%. Excellent thermal and oxidation stability.                                                                                                                                                                                                                                                                                                     | 992                                | 271                  | 48                                     | 8.7                                     | 161 | -50           | For use in flooded or oil-injected screw air compressors. For applications at high temperatures to reduce oil-related residues, varnish and sludge. Extended oil drain intervals. Biodegradable acc. to OECD 301 C >60%.                                                                                                                                                                                                                                       |

## RENOLIN, RENISO



| Product name              | Description                                                                                                                                                                                                                                                                                                                                   | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Refrigeration Oils</b> |                                                                                                                                                                                                                                                                                                                                               |                                       |                         |                                           |                                            |    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO WF 5 A</b>      | <b>Range RENISO WF</b><br>Special refrigeration oils for use with the refrigerant isobutane (R600a) – highly refined, low flocculation point with R600a, containing additives to improve wear protection and ageing stability. High energy efficiency. DIN 51503: KC, KE.                                                                     | 827                                   | 134                     | 5.0                                       | 1.7                                        | 95 | -45              | RENISO WF refrigeration oils are recommended for the lubrication of hermetic refrigerator compressors with the refrigerant isobutane (R600a). Due to special additive systems, the RENISO WF refrigeration oils ensure the formation of a wear-protecting lubricating film at all operating temperatures. RENISO WF refrigeration oils are fully miscible with R600a and also with all other hydrocarbon refrigerants like R290. |
| <b>RENISO WF 7 A</b>      |                                                                                                                                                                                                                                                                                                                                               | 832                                   | 158                     | 7.2                                       | 2.2                                        | 97 | -42              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO WF 10 A</b>     |                                                                                                                                                                                                                                                                                                                                               | 835                                   | 172                     | 9.6                                       | 2.6                                        | 97 | -42              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO WF 15 A</b>     |                                                                                                                                                                                                                                                                                                                                               | 883                                   | 164                     | 15                                        | 3.1                                        | –  | -51              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO KM 32</b>       | <b>Range RENISO K</b><br>Highly refined, naphthenic mineral oils with high ageing stability, low pourpoint, excellent low-temperature behaviour and particularly good compatibility with the following refrigerants: ammonia (NH <sub>3</sub> ), HCFCs (e.g. R22), hydrocarbons (e.g. propane R290, propylene R1270). DIN 51503: KAA, KC, KE. | 881                                   | 202                     | 32                                        | 4.9                                        | 63 | -45              | For all refrigeration systems using ammonia (NH <sub>3</sub> ) or HCFC refrigerants. RENISO KES 100 is suitable for applications with high evaporation and condensation temperatures, such as air conditioning applications, heat pumps - especially recommended for turbo compressors.                                                                                                                                          |
| <b>RENISO KS 46</b>       |                                                                                                                                                                                                                                                                                                                                               | 894                                   | 204                     | 46                                        | 5.8                                        | 47 | -42              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO KC 68</b>       |                                                                                                                                                                                                                                                                                                                                               | 894                                   | 223                     | 68                                        | 7.4                                        | 58 | -39              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO KES 100</b>     |                                                                                                                                                                                                                                                                                                                                               | 912                                   | 218                     | 100                                       | 8.4                                        | 20 | -33              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Industrial Oils

| Product name                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Density at 15 °C kg/m <sup>3</sup> | Flash point Clev. °C | Kin. visc. at 40 °C mm <sup>2</sup> /s | Kin. visc. at 100 °C mm <sup>2</sup> /s | VI  | Pour-point °C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------|----------------------------------------|-----------------------------------------|-----|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refrigeration Oils             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                    |                      |                                        |                                         |     |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO SP 32</b>            | <b>Range RENISO S/SP</b><br>Fully synthetic refrigeration oils based on chemically and thermally stable alkyl benzenes. RENISO SP 32, 46, 100 and 220 contain highly effective AW additives ( <b>not suitable for NH<sub>3</sub> applications</b> ). Excellent miscibility and excellent stability with HCFC refrigerants (e.g. R22). DIN 51503: KC, KE.                                                                                                         | 881                                | 172                  | 32                                     | 4.6                                     | 31  | -39           | Particularly good miscibility with HCFC refrigerants, such as R22. Suitable for very low evaporation temperatures down to -80 °C. RENISO SP products are also recommended for use with Drop-In refrigerants (R402A/B, R401A/B, etc.). Due to their excellent stability RENISO S/SP – products are suitable for the lubrication of highly stressed refrigerant compressors. RENISO SP 220 is especially designed for the lubrication of screw compressors.                                                        |
| <b>RENISO SP 46</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 875                                | 199                  | 46                                     | 5.6                                     | 26  | -42           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO SP 100</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 871                                | 190                  | 100                                    | 7.9                                     | 11  | -24           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO SP 220</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 872                                | 192                  | 220                                    | 13.2                                    | 13  | -27           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO S 3246</b>           | RENISO S 3246 and RENISO S 68 <b>do not contain AW additives</b> and are suitable for use with HCFC refrigerants, hydrocarbons and NH <sub>3</sub> . DIN 51503: KAA, KC, KE.                                                                                                                                                                                                                                                                                     | 877                                | 180                  | 40                                     | 5.1                                     | 17  | -39           | RENISO S 3246 and RENISO S68 – suitable for R22, hydrocarbons as well as NH <sub>3</sub> applications.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENISO S 68</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 869                                | 188                  | 68                                     | 6.2                                     | -30 | -33           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SEZ 22</b>    | <b>Range RENISO TRITON SE/SEZ</b><br>Fully synthetic refrigeration oils based on synthetic polyol esters - especially suitable for non-ozone depleting FC/HFC refrigerants, such as R134a, R404A, R507, R410A, R407C. Also suitable for hydrocarbon refrigerants. As polyol ester oils strongly tend to absorb water (hygroscopic behaviour), the contact of these lubricants with air (atmospheric humidity) has to be limited to a minimum. DIN 51503: KD, KE. | 1003                               | 248                  | 20                                     | 4.4                                     | 133 | -57           | The RENISO TRITON SE/SEZ products are perfectly suited for all refrigeration circuits in which chlorine-free refrigerants (HFCs / FCs), e.g. R134a are used. RENISO TRITON SE/SEZ-refrigeration oils are recommended for hermetic, semi-hermetic and open piston compressors, as well as for screw and turbo compressors (depending on viscosity). Comprehensive tests have been performed on the use of RENISO TRITON SE/SEZ products with new refrigerants designed to replace R22, such as R422A/D and R417A. |
| <b>RENISO TRITON SEZ 32</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1004                               | 250                  | 32                                     | 6.1                                     | 141 | -57           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SE 55</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1009                               | 286                  | 55                                     | 8.8                                     | 137 | -48           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SEZ 68</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 970                                | 258                  | 68                                     | 8.9                                     | 104 | -39           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SEZ 80</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 992                                | 251                  | 82                                     | 10.4                                    | 115 | -39           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SEZ 100</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 970                                | 266                  | 100                                    | 11.4                                    | 100 | -30           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SE 170</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 972                                | 260                  | 173                                    | 17.1                                    | 106 | -27           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SE 220</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 976                                | 294                  | 220                                    | 19.0                                    | 98  | -27           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO TRITON SEZ 320</b>   | RENISO TRITON SEZ 320 was developed especially for application with R22. DIN 51503: KC, KD.                                                                                                                                                                                                                                                                                                                                                                      | 1016                               | 278                  | 310                                    | 33.0                                    | 148 | -42           | RENISO TRITON SEZ 320 is used for the lubrication of screw compressors combined with mainly R22 (also suitable for HFC).                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>RENISO TRITON SEZ 35 SC</b> | For HFC/FC refrigerants. Specially developed for scroll compressors. DIN 51503: KD.                                                                                                                                                                                                                                                                                                                                                                              | 1015                               | 256                  | 34                                     | 6.3                                     | 138 | -51           | RENISO TRITON SEZ 35 SC has a specific performance specification which is aligned on the use in scroll compressors. Suitable for all HFC/FC and HFO refrigerants.                                                                                                                                                                                                                                                                                                                                                |

## RENISO

| Product name               | Description                                                                                                                                                                                                                                                                                                                                                | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refrigeration Oils         |                                                                                                                                                                                                                                                                                                                                                            |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENISO SYNTH 68</b>     | Synthetic refrigeration oil based on polyalphaolefins (PAO). For NH <sub>3</sub> applications and hydrocarbon refrigerants. Also suitable for CO <sub>2</sub> (not miscible with CO <sub>2</sub> ).<br>DIN 51503: KAA, KB, KE.<br><br>NSF-H1-approved acceptable as a lubricant with incidental food contact, for use in and around food processing areas. | 835                                   | 260                     | 68                                        | 10.5                                       | 142 | -57              | RENISO SYNTH 68 has been developed especially for the lubrication of highly stressed NH <sub>3</sub> compressors. Excellent stability with NH <sub>3</sub> . Excellent low temperature flowability, suitable for evaporation temperatures below -50 °C. Very good thermal stability. Very good lubricity also in hydrocarbon (propane R290, propylene R1270, etc.) and CO <sub>2</sub> applications (not miscible with CO <sub>2</sub> ). |
| <b>RENISO UltraCool 68</b> | Refrigeration oil based on synthetic hydrocarbons. Particularly developed for ammonia applications. DIN 51503: KAA.                                                                                                                                                                                                                                        | 854                                   | 250                     | 62                                        | 9.1                                        | 124 | -48              | RENISO UltraCool 68 combines high thermal stability (no varnish, no sludge) and low evaporation rate (low oil carry-over/ low oil loss) with good elastomer compatibility (CR, HNBR, NBR).                                                                                                                                                                                                                                                |
| <b>RENISO GL 68</b>        | Fully synthetic refrigeration oil based on polyalkylene glycols (PAG), miscibility gap 10% oil / 90% NH <sub>3</sub> : -22°C. NH <sub>3</sub> – partly miscible refrigeration oil (Linde), also suitable for hydrocarbon applications. DIN 51503: KAB, KE.                                                                                                 | 1010                                  | 270                     | 68                                        | 10.5                                       | 140 | -42              | RENISO PG 68 and GL 68 are ultra-dried, synthetic refrigeration oils based on PAG for NH <sub>3</sub> systems which operate on the principle of direct expansion. They differ in their miscibility with NH <sub>3</sub> . Suitable for screw and reciprocating piston compressors. RENISO PG 68 and GL 68 are also recommended for the use with hydrocarbon refrigerants.                                                                 |
| <b>RENISO PG 68</b>        | Fully synthetic refrigeration oil based on polyalkylene glycols (PAG), miscibility gap 10% oil / 90% NH <sub>3</sub> : -35 °C. NH <sub>3</sub> – partly miscible refrigeration oil, also suitable for hydrocarbon applications. DIN 51503: KAB, KE.                                                                                                        | 1044                                  | 250                     | 70                                        | 14.0                                       | 210 | -52              | <b>Warning:</b><br>PAG oils are not compatible / miscible with mineral oil.<br>PAG oils are hygroscopic. Avoid any contamination with water.<br>Please contact our FUCHS application engineers.                                                                                                                                                                                                                                           |
| <b>RENISO PAG 46</b>       | Synthetic refrigeration oils based on special polyalkylene glycols (PAG) for automotive air conditioning units with R134a. Also suitable for hydrocarbon applications.<br>DIN 51503: KAB, KD, KE.                                                                                                                                                          | 992                                   | 240                     | 55                                        | 10.6                                       | 187 | -45              | Refrigeration oils based on polyalkylene glycols for application with the refrigerant R134a used in car and truck air conditioning systems (a/c systems). RENISO PAG 100 is especially suitable for vane compressors.                                                                                                                                                                                                                     |
| <b>RENISO PAG 100</b>      |                                                                                                                                                                                                                                                                                                                                                            | 996                                   | 240                     | 120                                       | 21.0                                       | 202 | -45              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>RENISO PAG 1234</b>     | Synthetic refrigeration oil on the basis of double end-capped polyalkylene glycols (PAG). For vehicle a/c systems with R1234yf. Also suitable for R134a. DIN 51503: KD.                                                                                                                                                                                    | 993                                   | 224                     | 44                                        | 9.8                                        | 218 | -45              | RENISO PAG 1234 has been newly developed for car air conditioning systems with R1234yf. The product combines both good miscibility properties and high thermo-chemical stability in contact with the refrigerant. Basic fluid and additivation of RENISO PAG 1234 guarantee best lubrication properties and wear protection.                                                                                                              |



## Industrial Oils

| Product name                           | Description                                                                                                                                                                                                                                                             | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refrigeration Oils                     |                                                                                                                                                                                                                                                                         |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO PAG 220 C</b><br>"Ultra dry" | Synthetic refrigeration oil based on special, double-end capped PAGs for transcritical CO <sub>2</sub> applications (industrial and commercial applications).<br>DIN 51503: KB.                                                                                         | 1077                                  | 250                     | 226                                       | 39.1                                       | 226 | -39              | Refrigeration oil based on thermally very stable, double end-capped PAGs for industrial transcritical CO <sub>2</sub> applications (particularly for air conditioning and heat pump applications). Contains special additives to improve wear protection and ageing stability.                                                                   |
| <b>RENISO ACC 68</b>                   | <b>Range RENISO ACC</b><br>Synthetic refrigeration oil based on special, double-end capped PAGs for transcritical CO <sub>2</sub> applications (industrial and commercial applications).<br>DIN 51503: KB.                                                              | 992                                   | >220                    | 68                                        | 14.1                                       | 215 | -42              | Refrigeration oil based on thermally very stable, double end-capped PAGs for industrial transcritical CO <sub>2</sub> applications (particularly for air conditioning and heat pump applications). Contains special additives to improve wear protection and ageing stability.                                                                   |
| <b>RENISO ACC HV</b>                   | <b>Based in special PAG's</b>                                                                                                                                                                                                                                           | 991                                   | 229                     | 65                                        | 13.5                                       | 216 | -45              | RENISO ACC HV was developed in close collaboration with leading compressor manufacturers and OEMs specific for CO <sub>2</sub> air conditioning systems in vehicles. RENISO ACC HV is based on chemical and thermal extremely stable double end-capped PAG fluids with efficient additivation – especially with regard to wear protection.       |
| <b>RENISO C 55 E</b>                   | <b>Range RENISO C</b><br>Synthetic refrigeration oils based on special polyol esters with anti-wear additives for use with the refrigerant CO <sub>2</sub> (subcritical and transcritical applications). Also suitable for HFC / FC refrigerants.<br>DIN 51503: KB, KD. | 1009                                  | 286                     | 55                                        | 8.8                                        | 137 | -48              | The RENISO C products were especially developed for use in applications with the refrigerant CO <sub>2</sub> . Application fields: supermarket refrigeration equipment (subcritical deep-freeze stage of cascade systems and transcritical applications), ship cooling, as well as nearly all fields of industrial and commercial refrigeration. |
| <b>RENISO C 85 E</b>                   |                                                                                                                                                                                                                                                                         | 993                                   | 246                     | 80                                        | 10.6                                       | 118 | -42              |                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENISO C 170 E</b>                  |                                                                                                                                                                                                                                                                         | 976                                   | 286                     | 178                                       | 18.5                                       | 116 | -33              |                                                                                                                                                                                                                                                                                                                                                  |

## RENISO, PLANTO



| Product name                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                   | Density at 15 °C<br>kg/m <sup>3</sup> | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm <sup>2</sup> /s | Kin. visc. at 100 °C<br>mm <sup>2</sup> /s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                              |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------|--------------------------------------------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmentally Friendly Industrial and Hydraulic Oils – Ester</b> |                                                                                                                                                                                                                                                                                                                                                                                               |                                       |                         |                                           |                                            |     |                  |                                                                                                                                                                                    |
| <b>PLANTOHYD 15 S*</b>                                                | <b>Range PLANTOHYD S</b><br>Synthetic ester oils with additives to increase ageing stability. Rapidly biodegradable acc. OECD 301 B > 60%. High wear protection (FZG stage 12). Surpass the requirements acc. to ISO 15380: "HEES".<br>15 S: DE / 027 / 154<br>22 S: DE / 027 / 155<br>32 S: DE / 027 / 156<br>46 S: DE / 027 / 157<br>68 S: DE / 027 / 158<br>Awarded the EU Ecolabel (EEL). | 893                                   | 200                     | 15                                        | 4.1                                        | 191 | -33              | Universally useable. Especially recommended for hydraulic systems from -30 °C to +90 °C (oil sump temperature). The changeover guidelines according to ISO 15380 must be observed. |
| <b>PLANTOHYD 22 S*</b>                                                |                                                                                                                                                                                                                                                                                                                                                                                               | 901                                   | 200                     | 22                                        | 5.4                                        | 198 | -33              |                                                                                                                                                                                    |
| <b>PLANTOHYD 32 S*</b>                                                |                                                                                                                                                                                                                                                                                                                                                                                               | 910                                   | 206                     | 32                                        | 7.1                                        | 194 | -36              |                                                                                                                                                                                    |
| <b>PLANTOHYD 46 S*</b>                                                |                                                                                                                                                                                                                                                                                                                                                                                               | 920                                   | 300                     | 46                                        | 9.2                                        | 187 | -45              |                                                                                                                                                                                    |
| <b>PLANTOHYD 68 S*</b>                                                |                                                                                                                                                                                                                                                                                                                                                                                               | 924                                   | 300                     | 68                                        | 12.3                                       | 181 | -36              |                                                                                                                                                                                    |

## Industrial Oils

| Product name                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|-----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmentally Friendly Industrial and Hydraulic Oils       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| PLANTOSYN 32 HVI*                                            | <b>Range PLANTOSYN HVI</b><br>Environmentally friendly hydraulic and circulating oils based on synthetic <b>saturated esters</b> . Rapidly biodegradable acc. to OECD 301 B > 60%. High wear protection, good seal and non-ferrous metal compatibility, excellent oxidation stability. Fulfils the requirements of HEES hydraulic oils according to DIN ISO 15380 and HVLP according to DIN 51524-3. Awarded the EU Ecolabel (EEL).<br>32 HVI: DE / 027 / 104<br>46 HVI: DE / 027 / 105<br>68 HVI: DE / 027 / 106 | 915                       | 220                     | 32                           | 6.2                           | 148 | -46              | Suitable for all mobile and stationary hydraulic systems for which the use of a rapidly biodegradable HEES hydraulic oil according to DIN ISO 15380 is recommended (e.g. in agriculture and forestry). Can be used where unsaturated, synthetic esters have failed. Extension of oil changing intervals possible. Oil sump temperature: -30°C to 100 °C or higher. Observe DIN ISO 15380 changing-over to PLANTOSYN HVI products.<br>Approvals:<br>MANNESMANN<br>REXROTH<br>Sauer SUNDSTRAND |
| PLANTOSYN 46 HVI*                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 913                       | 280                     | 46                           | 8.2                           | 150 | -36              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| PLANTOSYN 68 HVI*                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 916                       | 280                     | 68                           | 10.6                          | 143 | -27              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| PLANTOLUBE POLAR 15 S                                        | <b>Range PLANTOLUBE POLAR S</b><br>PLANTOLUBE POLAR S oils are environmentally friendly, rapidly biodegradable fluids with extremely low pourpoint. Thanks to their very high VI they can be used in a wide temperature range. PLANTOLUBE POLAR S oils offer outstanding protection against corrosion and wear. Highly ageing resistant. Surpass the requirements of DIN 51524-3: HVLP<br>ISO 15380: HEES.                                                                                                        | 899                       | 156                     | 15                           | 4.1                           | 199 | <-48             | Gears, bearings, actuators used at extremely low temperatures (e.g. polar regions). Hydraulic systems operated under low temperatures can also be run with oils from the POLAR S range. The changeover guidelines according to DIN ISO 15380 must be observed.                                                                                                                                                                                                                               |
| PLANTOLUBE POLAR 22 S                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 908                       | 166                     | 22                           | 5.7                           | 200 | <-51             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Environmentally Friendly Synthetic Circulating and Gear Oils |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| PLANTOGEAR 100 HVI*                                          | <b>Range PLANTOGEAR HVI</b><br>Environmentally friendly circulating and EP gear oils based on special saturated synthetic ester with high ageing stability, good load carrying capacity and excellent wear protection. The products PLANTOGEAR 100 HVI and 150 HVI meet and exceed the requirements according to DIN 51517-3: CLP and AGMA 9005 / E02: EP<br>Awarded the EU Ecolabel (EEL):<br>100 HVI: DE / 027/177<br>150 HVI: DE / 027/178                                                                     | 927                       | >270                    | 100                          | –                             | 138 | -33              | Universal CLP gear oils. The products are used in spur, bevel, planetary and worm gears specially in environmentally sensitive areas as well as for lubrication of drives in water protection areas, where by oil leaks groundwater and surface water could be endangered.                                                                                                                                                                                                                   |
| PLANTOGEAR 150 HVI*                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 928                       | >270                    | 150                          | –                             | 145 | -30              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

# PLANTO

| Product name                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmentally Friendly Synthetic Circulating and Gear Oils |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                           |
| PLANTOGEAR 220 S*                                            | <b>Range PLANTOGEAR S</b><br>Rapidly biodegradable high-performance gear oils based on special, saturated esters. Extremely high thermal and ageing stability, high viscosity index, good viscosity-temperature behaviour. For low-temperature applications. Excellent self- cleaning power due to polar ester structures, reduced friction, excellent wear protection. Good FZG scuffing load carrying capacity, good protection against micropitting, outstanding FE8 performance. The PLANTOGEAR S series surpass the requirements of CLP-E lubricating oils according to DIN 51517-3 together with DIN 51502; AGMA 9005/E02: EP; ISO 6743-6 and ISO 12925-1: CKC, CKD, CKE. The PLANTOGEAR HVI range and PLANTOGEAR S range have been awarded the EU Ecolabel.<br>100 HVI: DE / 027 / 177<br>150 HVI: DE / 027 / 178<br>220 S : DE / 027 / 102<br>320 S : DE / 027 / 103<br>460 S : DE / 027 / 107<br>680 S : DE / 027 / 108 | 938                       | 280                     | 220                          | 26.2                          | 152 | -30              | For highly stressed spur, bevel, planetary and worm gears - above all in areas where leakages could present a hazard to soil and to ground or surface water. For both high and low application temperatures. High, shear-stable viscosity index. Can be used as a self-cleaning gear oil. |
| PLANTOGEAR 320 S*                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 943                       | 280                     | 320                          | 35.1                          | 155 | -30              |                                                                                                                                                                                                                                                                                           |
| PLANTOGEAR 460 S*                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 951                       | 280                     | 460                          | 48.0                          | 163 | -30              |                                                                                                                                                                                                                                                                                           |
| PLANTOGEAR 680 S*                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 958                       | 280                     | 680                          | 66.0                          | 170 | -30              |                                                                                                                                                                                                                                                                                           |
| Environmentally Friendly Slideway Oils / Lubrication Oils    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                           |
| PLANTOLUBE CGLP 68 S                                         | <b>Range PLANTOLUBE CGLP</b><br>Slideway oil based on synthetic esters with very good biodegradability. Prevents stick-slip. Load carrying capacity and wear protection are outstanding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 916                       | 280                     | 68                           | 12.1                          | 170 | -33              | PLANTOLUBE CGLP 68 / 220 S are designed for the use in combination with PLANTOCOOL and PLANTOCUT.                                                                                                                                                                                         |
| PLANTOLUBE CGLP 220 S                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 938                       | 280                     | 220                          | 26.2                          | 152 | -33              |                                                                                                                                                                                                                                                                                           |
| PLANTOTAC HV 220 N                                           | <b>Range PLANTOTAC HV</b><br>High-quality adhesive oils based on vegetable oil, environmentally friendly and rapidly biodegradable. Adhesive oils from the PLANTOTAC HV range offer very good VT behaviour and adhesive properties and excellent wear protection.<br>220 N: CG 220<br>320 N: CG 320<br>460 N: CG 460                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 955                       | >250                    | 249                          | 31.5                          | 169 | -36              | Predominantly for so-called loss lubrication, such as on non-oiltight bearings, saw frames, guide ways, joints, bolts, etc.                                                                                                                                                               |
| PLANTOTAC HV 320 N                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 958                       | 264                     | 381                          | 42.4                          | 166 | -27              |                                                                                                                                                                                                                                                                                           |
| PLANTOTAC HV 460 N                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 977                       | 260                     | 460                          | 43.3                          | 146 | -30              |                                                                                                                                                                                                                                                                                           |
| PLANTOTAC HV 100 S                                           | PLANTOTAC HV-N oils are based on ageing-stable synthetic esters.<br>100 S: CG 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 924                       | 300                     | 100                          | 17.5                          | 193 | -36              |                                                                                                                                                                                                                                                                                           |
| PLANTO SCHALUNGSÖL N*                                        | Mould release oil based on vegetable oil. Rapidly biodegradable. With additives to increase ageing stability. Awarded the EU Ecolabel (EEL): DE / 027 / 150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 904                       | 194                     | 12.04                        | –                             | –   | -15              | Primarily used for steel shutterings in the concrete and plastics industry. Flattening the cement surface. Special attention must be paid to compatibility with paintings and elastomers.                                                                                                 |
| PLANTOLUBE SCHALUNGSÖL S                                     | Mould relase oil based on synthetic esters with additives to increase ageing stability.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 886                       | 180                     | 4.9                          | –                             | –   | -18              |                                                                                                                                                                                                                                                                                           |

## Industrial Oils



| Product name   | Description                                                                                                                                                                                                                                                                                                                                  | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI  | Pour-point<br>°C | Main application area                                                                                                                |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Cylinder Oils  |                                                                                                                                                                                                                                                                                                                                              |                           |                         |                              |                               |     |                  |                                                                                                                                      |
| RENOLIN CH 500 | Range RENOLIN CH<br>High-quality, mineral oil-based cylinder oils. Good thermal stability and low coking. Exceed the requirements of Z lubricating oils according to DIN 51510.                                                                                                                                                              | 929                       | 318                     | 965                          | 44.0                          | 84  | -6               | For steam temperatures up to 340 °C in stationary equipments, for steam machines up to 325 °C.                                       |
| RENOLIN CH 700 |                                                                                                                                                                                                                                                                                                                                              | 927                       | 290                     | 2020                         | 81.0                          | 98  | -15              | For highest steam temperatures up to 380 °C, intermittent working steam machines above 325 °C. Specially for old steam locomotives.  |
| Tacky Oils     |                                                                                                                                                                                                                                                                                                                                              |                           |                         |                              |                               |     |                  |                                                                                                                                      |
| RENOTAC 343    | Range RENOTAC<br>High-quality tacky and lubricating oils based on mineral oils with lubricity improvers and anti-wear agents. Good EP and adhesive performance (tackiness). Lubricants for all total-loss applications (plain bearings, slideways, guides etc.).<br><br>343: CG(L) 100<br>344: CG(L) 150<br>345: CG(L) 220<br>347: CG(L) 320 | 881                       | 230                     | 100                          | 11.3                          | 93  | -21              | Lubricants for point of loss lubrication, for example slideways, guide ways, slide bearings at wood, packaging and textile machines. |
| RENOTAC 344    |                                                                                                                                                                                                                                                                                                                                              | 886                       | 245                     | 150                          | 15.0                          | 100 | -21              |                                                                                                                                      |
| RENOTAC 345    |                                                                                                                                                                                                                                                                                                                                              | 890                       | 250                     | 220                          | 19.7                          | 100 | -15              |                                                                                                                                      |
| RENOTAC 347    |                                                                                                                                                                                                                                                                                                                                              | 899                       | 260                     | 321                          | 24.5                          | 98  | -15              |                                                                                                                                      |



# RENOLIN

| Product name                        | Description                                                                                                                                                                                                                                                                                                                                                  | Density at 15 °C<br>kg/m³ | Flash point Clev.<br>°C | Kin. visc. at 40 °C<br>mm²/s | Kin. visc. at 100 °C<br>mm²/s | VI  | Pour-point<br>°C | Main application area                                                                                                                                                                                                                                                                               |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|------------------------------|-------------------------------|-----|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heat Transfer Oils                  |                                                                                                                                                                                                                                                                                                                                                              |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                                     |
| RENOLIN THERM 250                   | Range RENOLIN THERM<br>Heat transfer oils based on mineral oils with high thermal stability. High heat transfer coefficients.                                                                                                                                                                                                                                | 892                       | 154                     | 10                           | 2.4                           | 50  | -42              | Application range: -20 °C to 250 °C (film temperature)                                                                                                                                                                                                                                              |
| RENOLIN THERM 320                   |                                                                                                                                                                                                                                                                                                                                                              | 870                       | 225                     | 44                           | 6.5                           | 98  | -12              | Application range: -10 °C to 320 °C (film temperature)                                                                                                                                                                                                                                              |
| RENOLIN THERM 330 S                 | Synthetic heat transfer oil with very high thermal stability. Mixture of low volatile alkylbenzenes.                                                                                                                                                                                                                                                         | 864                       | 225                     | 21                           | 4.1                           | 87  | -55              | Application range: until 320 °C (film temperature)                                                                                                                                                                                                                                                  |
| RENOLIN THERM 380 S                 | Synthetic heat transfer oil. Extremely high thermal stability. Minimum coking tendency.                                                                                                                                                                                                                                                                      | 1043                      | 200                     | 17                           | –                             | –   | -34              | Application range: until 380 °C (film temperature)                                                                                                                                                                                                                                                  |
| Special Sealing Oils for Gasometers |                                                                                                                                                                                                                                                                                                                                                              |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                                     |
| RENOLIN GAS 68                      | Range RENOLIN GAS<br>RENOLIN GAS are special sealing oils for gasometers. They are based on carefully chosen base oils and contain efficient additives to protect the oils against oxidation and to guarantee a reliable corrosion protection. RENOLIN GAS oils show high compatibility with various gases and contain efficient anti stick-slip components. | 898                       | 232                     | 68                           | 7.9                           | 78  | -36              | RENOLIN GAS oils can be used in various applications. They have a high pumpability and good cold flow behaviour (low pourpoints). Moreover they display very good anti stick-slip characteristics and show very good demulsibility. Especially developed for the use as sealing oils in gasometers. |
| RENOLIN GAS 70                      |                                                                                                                                                                                                                                                                                                                                                              | 867                       | 245                     | 68                           | 9.1                           | 113 | -39              |                                                                                                                                                                                                                                                                                                     |
| RENOLIN GAS 150                     |                                                                                                                                                                                                                                                                                                                                                              | 880                       | 266                     | 150                          | 15.4                          | 104 | -33              |                                                                                                                                                                                                                                                                                                     |
| IRM Reference Fluids                |                                                                                                                                                                                                                                                                                                                                                              |                           |                         |                              |                               |     |                  |                                                                                                                                                                                                                                                                                                     |
| Reference Oil IRM 901               | Reference oils for laboratories                                                                                                                                                                                                                                                                                                                              | 882                       | 243                     | 231                          | 19,1                          | 93  | -12              | For laboratory tests; principally for elastomer compatibility tests. In exchange for old ASTM test oils.                                                                                                                                                                                            |
| Reference Oil IRM 902               |                                                                                                                                                                                                                                                                                                                                                              | 935                       | 243                     | 441                          | 18,8                          | –   | –                |                                                                                                                                                                                                                                                                                                     |
| Reference Oil IRM 903               |                                                                                                                                                                                                                                                                                                                                                              | 920                       | 171                     | 29,5                         | 15,4                          | 104 | -33              |                                                                                                                                                                                                                                                                                                     |

# GREASES

Greases are viscous, tough to solid lubricants. By selecting suitable oils, thickeners and additives, the properties of the lubricating greases can be optimally adjusted for the most diverse applications with the corresponding experience and know-how.

For example, there are greases for high or very low temperatures, for applications in vacuum, particularly water-resistant and weatherproof, particularly pressure-resistant or capable of creep, rapidly biodegradable or particularly adhesive greases.

With the RENOLIT and PLANTO lubricating greases from FUCHS, you have one of the largest grease ranges on the market - for almost all applications and requirements and for the best possible technical and economical solutions.



## Greases

|                                         |         |
|-----------------------------------------|---------|
| Multipurpose / Longlife Greases         | 102-104 |
| Greases for Plain and Roller Bearings   | 105-110 |
| Greases for Gear Boxes                  | 111-112 |
| Rapidly Biodegradable Greases           | 113     |
| Greases for Machine Tools               | 114-115 |
| Greases for Rail Vehicles               | 116     |
| Greases for Extreme High Temperatures   | 117-118 |
| Greases for Extreme Low Temperatures    | 119     |
| Greases for Central Lubricating Systems | 120-121 |
| Greases with Solid Lubricants           | 122-123 |
| Perfluorinated Pastes                   | 124     |
| Greases in Spray Cans or Rattle Cans    | 125-126 |
| Assembly Pastes                         | 127-128 |
| Greases for Special Applications        | 129     |

## Greases



| Product name                                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations                                                                           | Main application area                                                                                                                                                                                                                                      |
|--------------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Multipurpose / Longlife Greases</b>                       |                                           |                       |                  |            |                                        |                           |                                                                                                      |                                                                                                                                                                                                                                                            |
| <b>PLANTOGEL ECO 2 FS</b>                                    | —                                         | Li/Ca synth. ester    | •                | 2          | 200                                    | -30 / +120                | —                                                                                                    | Rapidly biodegradable EP multipurpose grease with solid lubrications for lubrication of plain and roller bearings, e.g. commercial vehicles and construction machinery.                                                                                    |
| <b>PLANTOGEL ECO 2 S</b><br>(Spray can: PLANTO MULTISPRAY S) | —                                         | Li/Ca synth. ester    | —                | 2          | 105                                    | -40 / +120                | EU Ecolabel<br> | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                                                |
| <b>PLANTOGEL ECO 402 S</b>                                   | —                                         | Ca synth. ester       | —                | 2          | 390                                    | -40 / +120                | EU Ecolabel<br> | High performance bio-grease, water (salt water) resistant.                                                                                                                                                                                                 |
| <b>RENOLIT CA-LZ</b><br>(Spray can: RENOLIT CA-LZ SPRAY)     | KP2K-30<br>ISO-L-X-CCHB2                  | Calcium Mineral oil   | —                | 2          | 700                                    | -30 / +120                | —                                                                                                    | Strongly adhesive, protects from wear even under extreme conditions, very resistant to water wash-out from metallic surfaces, long-term lubrication of passenger cars and commercial vehicles, construction industry, industrial and agricultural machines |
| <b>RENOLIT DURAPLEX EP 1</b>                                 | —                                         | Li-X Mineral oil      | —                | 1          | 105                                    | -30 / +160                | —                                                                                                    | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO                                                                                                                     |



# PLANTO, RENOLIT

| Product name                    | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations                                                                                          | Main application area                                                                                                                                                                          |
|---------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multipurpose / Longlife Greases |                                           |                       |                  |            |                                        |                           |                                                                                                                     |                                                                                                                                                                                                |
| <b>RENOLIT DURAPLEX EP 2</b>    | –                                         | Li-X Mineral oil      | –                | 2          | 105                                    | -30 / +160                | –                                                                                                                   | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles, machine tools   |
| <b>RENOLIT DURAPLEX EP 3</b>    | –                                         | Li-X Mineral oil      | –                | 3          | 105                                    | -20 / +160                | –                                                                                                                   | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles                  |
| <b>RENOLIT FEP 1</b>            | KP1N-20 ISO-L-X-BDEB 1                    | Lithium Mineral oil   | –                | 1          | 200                                    | -20 / +140                | –                                                                                                                   | Steel mills, quarries, construction equipment and forging presses                                                                                                                              |
| <b>RENOLIT FEP 2</b>            | KP2N-20 ISO-L-X-BDEB 2                    | Lithium Mineral oil   | –                | 2          | 200                                    | -20 / +140                | –                                                                                                                   | Steel mills, quarries, construction equipment and forging presses, machine tools                                                                                                               |
| <b>RENOLIT FEP 25</b>           | KP2-3N-20 ISO-L-X-BDEB 2-3                | Lithium Mineral oil   | –                | 2-3        | 200                                    | -20 / +140                | –                                                                                                                   | Steel mills, quarries, construction equipment and forging presses                                                                                                                              |
| <b>RENOLIT FLM 2</b>            | KPF2N-30 ISO-L-X-CDEB 2                   | Lithium Mineral oil   | •                | 2          | 100                                    | -30 / +140                | MAN 285 LI-PF 2                                                                                                     | For mechanically loaded lubricating points, grease with MoS <sub>2</sub> , agricultural machines, commercial vehicles, construction industry, quarries and mining, rubber and concrete factory |
| <b>RENOLIT GP 1</b>             | K1K-30 ISO-L-X-CCEA 1                     | Lithium Mineral oil   | –                | 1          | 110                                    | -30 / +120                | –                                                                                                                   | Ageing resistant multipurpose grease with good corrosion protection properties for lubrication of plain and roller bearings, easily pumpable in central lubricating systems                    |
| <b>RENOLIT GP 2</b>             | K2K-30 ISO-L-X-CCEA 2                     | Lithium Mineral oil   | –                | 2          | 110                                    | -30 / +120                | –                                                                                                                   | Ageing resistant multipurpose grease with good corrosion protection properties for lubrication of plain and roller bearings, easily pumpable in central lubricating systems                    |
| <b>RENOLIT GP 3</b>             | K3K-30 ISO-L-X-CCEA 3                     | Lithium Mineral oil   | –                | 3          | 110                                    | -30 / +120                | –                                                                                                                   | Ageing resistant multipurpose grease with good corrosion protection properties for lubrication of plain and roller bearings, easily pumpable in central lubricating systems                    |
| <b>RENOLIT LX-PEP 2</b>         | KP2N-30 ISO-L-X-CDEB 2                    | Li-X Mineral oil      | –                | 2          | 170                                    | -30 / +150                | MAN 284 Li-H2, MB 265.1, ZF TE-ML 12, Schaeffler Gruppe, VW TL 52 147 X, Interprecise (IDC-Bearings), Deutsche Bahn | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, needle bearings of cardan shafts, plain and roller bearings, ventilator grease                             |



## Greases

| Product name                    | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Approvals, re-<br>commendations | Main application area                                                                                                                                                                                                                                  |
|---------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multipurpose / Longlife Greases |                                           |                        |                          |               |                                                   |                                        |                                 |                                                                                                                                                                                                                                                        |
| <b>RENOLIT<br/>LX-PEP 3</b>     | KP3N-30<br>ISO-L-X-<br>CDEB 3             | Li-X<br>Mineral oil    | –                        | 3             | 170                                               | -30 /<br>+150                          | Interprecise<br>(IDC-Bearings)  | Multipurpose grease, wheel<br>bearings of motor vehicles, rol-<br>ler bearings of e-motors, plain<br>and roller bearings, ventilator<br>grease                                                                                                         |
| <b>RENOLIT<br/>MP</b>           | KP2K-40<br>ISO-L-X-<br>DCEB 2             | Lithium<br>Mineral oil | –                        | 2             | 35                                                | -40 /<br>+120                          | DBL 6804.00<br>MB-Sheet 267.0   | Multipurpose grease for lubrica-<br>ting points in passenger cars,<br>commercial vehicles, engines,<br>where constant temperature<br>does not exceed 100 °C, sliding<br>speeds are very low and which<br>are not exposed to high mecha-<br>nical loads |
| <b>RENOLIT<br/>MP PLUS</b>      | KP2K-30<br>ISO-L-X-<br>CCEB 2             | Lithium<br>Mineral oil | –                        | 2             | 100                                               | -30 /<br>+120                          | –                               | High quality EP multipurpose<br>grease with high adhesiveness<br>for the lubrication of plain and<br>roller bearings. Only available in<br>SR cartridges.                                                                                              |

## RENOLIT, PLANTO



| Product name                                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations                                                                          | Main application area                                                                                                                                                                                                                                      |
|--------------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Plain and Roller Bearings</b>                 |                                           |                       |                  |            |                                        |                           |                                                                                                     |                                                                                                                                                                                                                                                            |
| <b>PLANTOGEL ECO 2 FS</b>                                    | —                                         | Li/Ca synth. ester    | •                | 2          | 200                                    | -30 / +120                | —                                                                                                   | Rapidly biodegradable EP multipurpose grease with solid lubrications for lubrication of plain and roller bearings, e.g. commercial vehicles and construction machinery.                                                                                    |
| <b>PLANTOGEL ECO 2 S</b><br>(Spray can: PLANTO MULTISPRAY S) | —                                         | Li/Ca synth. Ester    | —                | 2          | 105                                    | -40 / +120                | EU Ecolabel<br> | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                                                |
| <b>PLANTOGEL ECO 402 S</b>                                   | —                                         | Ca synth. ester       | —                | 2          | 390                                    | -40 / +120                | EU Ecolabel<br> | High performance bio-grease, water (salt water) resistant.                                                                                                                                                                                                 |
| <b>RENOLIT CA-LZ</b><br>(Spray can: RENOLIT CA-LZ SPRAY)     | KP2K-30<br>ISO-L-X-CCHB2                  | Calcium Mineral oil   | —                | 2          | 700                                    | -30 / +120                | —                                                                                                   | Strongly adhesive, protects from wear even under extreme conditions, very resistant to water wash-out from metallic surfaces, long-term lubrication of passenger cars and commercial vehicles, construction industry, industrial and agricultural machines |

## Greases

| Product name                                           | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil    | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|-------------------------------------------|--------------------------|------------------|------------|----------------------------------------|---------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Plain and Roller Bearings                  |                                           |                          |                  |            |                                        |                           |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIT CSX 15</b>                                  | –                                         | CaSX Mineral oil         | –                | 1-2        | 440                                    | -20 / +180                | A. Kahl Pelletpressen      | Lubrication of high loaded, low speed plain and roller bearings and can be applied when the grease has to meet high demands on corrosion protection and working stability.; is easily pumpable even in long tubes fed by centralised lubrication systems.<br>Typical applications are plain and roller bearings in steel mills, wood pellet presses, paper industry, mining, cement mills, quarries and construction equipment. |
| <b>RENOLIT CX-EP 1</b>                                 | KP1N-30<br>ISO-L-X-CDEB 1                 | Ca-X Mineral oil         | –                | 1          | 110                                    | -30 / +140                | –                          | In general suitable for high thermal and mechanical loads, especially in the chemical, rubber, tire, steel, quarry and excavation industry. Good water and salt water resistance, also resists to weak acids and caustic solutions. Easily pumpable in central lubricating systems.                                                                                                                                             |
| <b>RENOLIT CX-EP 2</b>                                 | KP2N-30<br>ISO-L-X-CDEB 2                 | Ca-X Mineral oil         | –                | 2          | 110                                    | -30 / +140                | Hoesch Rothe Erde          | In general suitable for high thermal and mechanical loads, especially in the chemical, rubber, tire, steel, quarry and excavation industry. Good water and salt water resistance, also resists to weak acids and caustic solutions. Easily pumpable in central lubricating systems.                                                                                                                                             |
| <b>RENOLIT CX-HT 0</b>                                 | –                                         | CaSX Mineral oil         | •                | 0          | 400                                    | -20 / +160                | –                          | Lubrication of high loaded, low speed plain and roller bearings, open gears and gear boxes, e.g. in construction machinery, steel mills, coal and ore mills; can be used in spray and dipping applications.                                                                                                                                                                                                                     |
| <b>RENOLIT CX-HT 2</b><br>(Spray can: RENOLIT UNILOAD) | –                                         | CaSX Mineral oil         | •                | 2          | 400                                    | -20 / +180                | –                          | Lubrication of high loaded, low speed plain and roller bearings, e.g. for kiln cars, construction machinery, steel mills, coal and ore mills.                                                                                                                                                                                                                                                                                   |
| <b>RENOLIT CX-TOM 15</b>                               | –                                         | CaSX semisynth. base oil | –                | 1-2        | 100                                    | -40 / +160                | SEW-Eurodrive              | Industrial gear bearings, belt conveyors, paper machines, machine tools, mining                                                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIT CXI 2</b>                                   | –                                         | CaSX Mineral oil         | –                | 2          | 400                                    | -20 / +160                | –                          | Lubrication of high loaded, low speed plain and roller bearings and can be applied when the grease has to meet high demands on corrosion protection and working stability.<br>Typical applications are plain and roller bearings in steel mills, paper industry, mining, concrete industry, quarries and construction equipment.                                                                                                |
| <b>RENOLIT DURAPLEX EP 1</b>                           | –                                         | Li-X Mineral oil         | –                | 1          | 105                                    | -30 / +160                | –                          | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO                                                                                                                                                                                                                                                                                          |

# RENOLIT

| Product name                          | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations | Main application area                                                                                                                                                                          |
|---------------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Plain and Roller Bearings |                                           |                        |                          |               |                                                   |                                        |                                           |                                                                                                                                                                                                |
| <b>RENOLIT<br/>DURAPLEX EP 2</b>      | —                                         | Li-X<br>Mineral oil    | —                        | 2             | 105                                               | -30 /<br>+160                          | —                                         | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles , machine tools  |
| <b>RENOLIT<br/>DURAPLEX EP 3</b>      | —                                         | Li-X<br>Mineral oil    | —                        | 3             | 105                                               | -20 /<br>+160                          | —                                         | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles                  |
| <b>RENOLIT<br/>FAP 502</b>            | KP2N-20<br>ISO-L-X-<br>BDEB 2             | Li/Ca<br>Mineral oil   | —                        | 2             | 500                                               | -20 /<br>+140                          | —                                         | For high loaded plain and roller bearings with slow sliding speeds.                                                                                                                            |
| <b>RENOLIT<br/>FEP 1</b>              | KP1N-20<br>ISO-L-X-<br>BDEB 1             | Lithium<br>Mineral oil | —                        | 1             | 200                                               | -20 /<br>+140                          | —                                         | Steel mills, quarries, construction equipment and forging presses                                                                                                                              |
| <b>RENOLIT<br/>FEP 2</b>              | KP2N-20<br>ISO-L-X-<br>BDEB 2             | Lithium<br>Mineral oil | —                        | 2             | 200                                               | -20 /<br>+140                          | —                                         | Steel mills, quarries, construction equipment and forging presses, machine tools                                                                                                               |
| <b>RENOLIT<br/>FEP 25</b>             | KP2-3N-20<br>ISO-L-X-<br>BDEB 2-3         | Lithium<br>Mineral oil | —                        | 2-3           | 200                                               | -20 /<br>+140                          | —                                         | Steel mills, quarries, construction equipment and forging presses                                                                                                                              |
| <b>RENOLIT<br/>FLM 0</b>              | —                                         | Lithium<br>Mineral oil | •                        | 0             | 100                                               | -30 /<br>+120                          | —                                         | For mechanically loaded lubricating points, grease with MoS <sub>2</sub> , and additives to improve corrosion protection, EP and AW                                                            |
| <b>RENOLIT<br/>FLM 2</b>              | KPF2N-30<br>ISO-L-X-<br>CDEB 2            | Lithium<br>Mineral oil | •                        | 2             | 100                                               | -30 /<br>+140                          | MAN 285<br>LI-PF 2                        | For mechanically loaded lubricating points, grease with MoS <sub>2</sub> , agricultural machines, commercial vehicles, construction industry, quarries and mining, rubber and concrete factory |
| <b>RENOLIT<br/>FLM 502</b>            | KPF2N-20<br>ISO-L-X-<br>BDEB 2            | Li/Ca<br>Mineral oil   | •                        | 2             | 500                                               | -20 /<br>+140                          | —                                         | For high and very high loaded roller and friction bearings, slow sliding speeds                                                                                                                |
| <b>RENOLIT<br/>GP 1</b>               | K1K-30<br>ISO-L-X-<br>CCEA 1              | Lithium<br>Mineral oil | —                        | 1             | 110                                               | -30 /<br>+120                          | —                                         | Ageing resistant multipurpose grease with good corrosion protection properties for lubrication of plain and roller bearings, easily pumpable in central lubricating systems                    |
| <b>RENOLIT<br/>GP 2</b>               | K2K-30<br>ISO-L-X-<br>CCEA 2              | Lithium<br>Mineral oil | —                        | 2             | 110                                               | -30 /<br>+120                          | —                                         | Ageing resistant multipurpose grease with good corrosion protection properties for lubrication of plain and roller bearings, easily pumpable in central lubricating systems                    |
| <b>RENOLIT<br/>GP 3</b>               | K3K-30<br>ISO-L-X-<br>CCEA 3              | Lithium<br>Mineral oil | —                        | 3             | 110                                               | -30 /<br>+120                          | —                                         | Ageing resistant multipurpose grease with good corrosion protection properties for lubrication of plain and roller bearings, easily pumpable in central lubricating systems                    |

## Greases

| Product name                          | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil   | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations                                 | Main application area                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------|-------------------------------------------|-------------------------|------------------|------------|----------------------------------------|---------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Plain and Roller Bearings |                                           |                         |                  |            |                                        |                           |                                                            |                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RENOLIT H 443-HD 88</b>            | –                                         | Lithium Mineral oil     | –                | 2-3        | 110                                    | -30 / +140                | RWE Rheinbraun<br>Flender<br>Siemens                       | Roller and friction bearings operating under specific high strain, in particular strain produced by shocks and vibrations e.g. in unbalanced motors, vibrating screens, vibrators, soil tampers and electrical machines. Lubrication of friction bearings via Stauffer grease cups, lubricating nipples or central lubricating systems. High loads within a wide speed range |
| <b>RENOLIT HI-SPEED 2</b>             | KHCE2K-40<br>ISO-L-X-DCEA 2               | Lithium synth. base oil | –                | 2          | 18                                     | -40 / +120                | –                                                          | For high-speed bearings, n x dm = 1,4 Mio, machine tools and textile spindles, electrical motor, linear guiding                                                                                                                                                                                                                                                              |
| <b>RENOLIT HI-TEMP 100</b>            | KPHC2N-50<br>ISO-L-X-ED-FB 2              | Li-X PAO                | –                | 2          | 100                                    | -50 / +140                | –                                                          | Used in a wide temperature range for lubrication of plain and roller bearings of, e.g., electric motors, traction motors, bearings and cardan shafts in polar regions.                                                                                                                                                                                                       |
| <b>RENOLIT HI-TEMP 220</b>            | KPHC2N-40<br>ISO-L-X-DDFB 2               | Li-X PAO                | –                | 2          | 220                                    | -40 / +140                | –                                                          | Used in a wide temperature range for lubrication of plain and roller bearings of, e.g. paper mills (wet sector), truck hub units, and cardan shafts.                                                                                                                                                                                                                         |
| <b>RENOLIT HI-TEMP 460</b>            | KPHC2N-40<br>ISO-L-X-DDFB 2               | Li-X PAO                | –                | 2          | 460                                    | -40 / +140                | –                                                          | Lubrication of plain and roller bearings of conveyor gears (e.g. in open cast mining), pellet presses, paper mills, and for lifetime lubrication in trucks and construction machines.                                                                                                                                                                                        |
| <b>RENOLIT HLT 2</b>                  | KPHC2N-40<br>ISO L-X-DDEB 2               | Lithium PAO             | –                | 2          | 105                                    | -40 / +140                | –                                                          | For lubricating points at changing ambient temperatures and high requirements, e. g. lifetime lubrication of pneumatic applications, centrifuges, plain and roller bearings                                                                                                                                                                                                  |
| <b>RENOLIT JP 1619</b>                | –                                         | Lithium synth. base oil | –                | 1          | 25                                     | -50 / +120                | DBL 6804.70<br>VW TL 52 168<br>Dana Spicer<br>Bosch<br>MAN | EP-grease with additive for improve corrosion protection, ageing resistance and adhesiveness, lubrication of friction points requiring very good sliding behaviour, low start-up resistance, also at low temperature, e.g. rack and pinion steerings, prop shafts, high-speed bearings                                                                                       |
| <b>RENOLIT LX-PEP 1/2</b>             | KP1-2N -30<br>ISO-L-X-CDEB 1-2            | Li-X Mineral oil        | –                | 1-2        | 170                                    | -30 / +150                | –                                                          | High speed gears for power tools, e.g. power drill, circular hand saw, jigsaw, etc., needle cups and length adjustments of cardan shafts, plain and roller bearings                                                                                                                                                                                                          |



# RENOLIT

| Product name                          | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil   | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C [mm²/s] | Temperature range [°C] | Approvals, recommendations                                                                                          | Main application area                                                                                                                                                                                                                                        |
|---------------------------------------|-------------------------------------------|-------------------------|------------------|------------|-------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Plain and Roller Bearings |                                           |                         |                  |            |                                     |                        |                                                                                                                     |                                                                                                                                                                                                                                                              |
| <b>RENOLIT LX-PEP 2</b>               | KP2N-30<br>ISO-L-X-CDEB 2                 | Li-X<br>Mineral oil     | –                | 2          | 170                                 | -30 / +150             | MAN 284 Li-H2, MB 265.1, ZF TE-ML 12, Schaeffler Gruppe, VW TL 52 147 X, Interprecise (IDC-Bearings), Deutsche Bahn | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, needle bearings of cardan shafts, plain and roller bearings, ventilator grease                                                                                           |
| <b>RENOLIT LX-PEP 3</b>               | KP3N-30<br>ISO-L-X-CDEB 3                 | Li-X<br>Mineral oil     | –                | 3          | 170                                 | -30 / +150             | Interprecise (IDC-Bearings)                                                                                         | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, plain and roller bearings, ventilator grease                                                                                                                             |
| <b>RENOLIT LZR 2 H</b>                | KP2N-30<br>ISO-L-X-CDIB 2                 | Lithium<br>Mineral oil  | –                | 2          | 230                                 | -30 / +140             | Baier & Köppel                                                                                                      | Premium multipurpose grease, long-term rust prevention, sealing grease, central lubricating systems, sugar refineries, roof tile factories, paper industry, prevent standstill corrosion, hytel compatible                                                   |
| <b>RENOLIT MP</b>                     | KP2K-40<br>ISO-L-X-DCEB 2                 | Lithium<br>Mineral oil  | –                | 2          | 35                                  | -40 / +120             | DBL 6804.00 MB-Blatt 267.0                                                                                          | Multipurpose grease for lubricating points in passenger cars, commercial vehicles, engines, where constant temperature does not exceed 100°C, sliding speeds are very low and which are not exposed to high mechanical loads                                 |
| <b>RENOLIT MP PLUS</b>                | KP2K-30<br>ISO-L-X-CCEB 2                 | Lithium<br>Mineral oil  | –                | 2          | 100                                 | -30 / +120             | –                                                                                                                   | High quality EP multipurpose grease with high adhesiveness for the lubrication of plain and roller bearings. Only available in SR cartridges.                                                                                                                |
| <b>RENOLIT POLAR BLACK</b>            | –                                         | Lithium<br>PAO          | •                | 1-2        | 84                                  | -50 / +140             | –                                                                                                                   | Fully synthetic heavy duty all-season grease with solid lubricants for plain and roller bearings of construction machines and mining vehicles exposed to changing ambient temperatures.                                                                      |
| <b>RENOLIT PU-FH 300</b>              | KP2R-20                                   | PU<br>Mineral oil       | –                | 2          | 500                                 | -20 / +180             | –                                                                                                                   | Lubricating points exposed to high thermal loads and bearings with slow sliding speeds (asphalt pavers)                                                                                                                                                      |
| <b>RENOLIT PU-MA 2</b>                | KPFH-C2R-40<br>ISO-L-X-DFEB 2             | PU<br>PAO               | •                | 2          | 100                                 | -40 / +180             | –                                                                                                                   | Lubrication of electric motors, hot-air blowers, tumble dryers, black-rubber mixers, paper industry dryers, calander bearings, etc.                                                                                                                          |
| <b>RENOLIT S 2</b>                    | KE1-2G-60<br>ISO-L-X-EBEA 1-2             | Lithium synth.<br>ester | –                | 1-2        | 14                                  | -60 / +100             | –                                                                                                                   | Low temperature e.g. electrical motors, instruments, air traffic control systems, refrigerators, air conditioners and transmitter equipment                                                                                                                  |
| <b>RENOLIT SI 400 L</b>               | KSI1R-30<br>ISO-L-X-EFEA 1-2              | Lithium<br>Silicone oil | –                | 1          | 80                                  | -30 / +180             | –                                                                                                                   | For slightly to normally loaded roller and friction bearings in electric motors, for joints, conveyor chains, ventilators, dryers, controlling equipment, and household appliances. RENOLIT SI 400 L guarantees a good lubrication to metal/plastic parings. |

## Greases

| Product name                          | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil   | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------|-------------------------------------------|-------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Plain and Roller Bearings |                                           |                         |                          |               |                                                   |                                        |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENOLIT<br/>SI 400 M</b>           | KS12R-30<br>ISO-L-X-<br>EFEA 2            | Lithium<br>Silicone oil | –                        | 2             | 80                                                | -30 /<br>+180                          | –                                         | For slightly to normally loaded roller and friction bearings in electric motors, for joints, conveyor chains, ventilators, dryers, controlling equipment, and household appliances. RENOLIT SI 400 M guarantees a good lubrication to metal/plastic pairings.                                                                                                                                                                                    |
| <b>RENOLIT<br/>SI 511 F</b>           | –                                         | PU<br>Silicone oil      | –                        | 0             | 80                                                | -40 /<br>+200                          | –                                         | Especially suitable for re-lubrication of RENOLIT SI 511 L and SI 511 M at very high temperature                                                                                                                                                                                                                                                                                                                                                 |
| <b>RENOLIT<br/>SI 511 L</b>           | –                                         | PU<br>Silicone oil      | –                        | 1             | 80                                                | -40 /<br>+200                          | –                                         | High temperature grease, plain and roller bearings, e.g. electric motors, conveyor chains, furnace carriages, drying equipment, bearing pairs: metal/metal, metal/plastic, plastic/plastic                                                                                                                                                                                                                                                       |
| <b>RENOLIT<br/>SI 511 M</b>           | –                                         | PU<br>Silicone oil      | –                        | 2             | 80                                                | -30 /<br>+220                          | –                                         | High temperature grease, plain and roller bearings, e.g. electric motors, conveyor chains, furnace carriages, drying equipment, bearing pairs: metal/metal, metal/plastic, plastic/plastic                                                                                                                                                                                                                                                       |
| <b>RENOLIT<br/>ST-FTM 0-1</b>         | –                                         | PTFE<br>PFPE            | –                        | 1             | 335                                               | -40 /<br>+250                          | –                                         | For the lubrication of plain and roller bearings and guidances at high temperatures. Also for the lubrication of ejectors of plastic injection moulding machines and tyre heating presses. Do not mix with mineral oil products or other lubricants. The surfaces to be lubricated shall be free of residual oil and grease.                                                                                                                     |
| <b>RENOLIT<br/>ST-FTM 2</b>           | –                                         | PTFE<br>PFPE            | –                        | 2             | 335                                               | -40 /<br>+250                          | –                                         | For the lubrication of plain and roller bearings and guidances at high temperatures. Also for the lubrication of ejectors of plastic injection moulding machines, tyre heating presses and paint finishing systems. Do not mix with mineral oil products or other lubricants. The surfaces to be lubricated shall be free of residual oil and grease.                                                                                            |
| <b>RENOLIT<br/>ST 8-081/2</b>         | –                                         | PTFE<br>PFPE            | –                        | 2             | 510                                               | -20 /<br>+260                          | –                                         | Do not mix with other lubricants! Surfaces must be free from residual oil and grease! Fully synthetic, thermally stable, resistant to solvents (exception: halocarbon refrigerants), oxidation stable, high load carrying abilities; plain and roller bearings of all industrial sectors, e.g. enamelling lines, drying stoves, machines in the packaging industries, calender bearings, bearings of hot air and smoke gas flaps in power plants |
| <b>RENOLIT<br/>UNITEMP 2</b>          | –                                         | Synt. NaX<br>PAO        | –                        | 2             | 180                                               | -50 /<br>+180                          | –                                         | Plain and roller bearings at high temperatures                                                                                                                                                                                                                                                                                                                                                                                                   |

## RENOLIT, PLANTO



| Product name                                           | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                                                               |
|--------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Gear Boxes</b>                          |                                           |                       |                  |            |                                        |                           |                            |                                                                                                                                                                                                                                                                                     |
| <b>PLANTOGEL ECO 000 S</b>                             | —                                         | Li/Ca synth. ester    | —                | 00-000     | 55                                     | -40 / +120                | —                          | Rapidly biodegradable semi-fluid grease for lubrication of plain and roller bearings in commercial vehicles and construction machinery with central lubrication systems. also for gear systems which are exposed to low to medium loads.                                            |
| <b>RENOLIT CX-EP 0</b>                                 | GPON-30                                   | Ca-X Mineral oil      | —                | 0          | 120                                    | -30 / +140                | —                          | In general suitable for high thermal and mechanical loads, especially in the chemical, rubber, tire, steel, quarry and excavation industry. Good water and salt water resistance, also resists to weak acids and caustic solutions. Easily pumpable in central lubricating systems. |
| <b>RENOLIT CX-HT 0</b>                                 | —                                         | CaSX Mineral oil      | •                | 0          | 400                                    | -20/ +160                 | —                          | Lubrication of high loaded, low speed plain and roller bearings, open gears and gear boxes, e.g. in construction machinery, steel mills, coal and ore mills; can be used in spray and dipping applications.                                                                         |
| <b>RENOLIT CX-HT 2</b><br>(Spray can: RENOLIT UNILOAD) | —                                         | CaSX Mineral oil      | •                | 2          | 400                                    | -20/ +180                 | —                          | Lubrication of high loaded, low speed plain and roller bearings, e.g. for kiln cars, construction machinery, steel mills, coal and ore mills.                                                                                                                                       |

## Greases

| Product name                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm <sup>2</sup> /s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations   | Main application area                                                                                                                             |
|------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|----------------------------------------------------------------|----------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Gear Boxes       |                                           |                        |                          |               |                                                                |                                        |                                             |                                                                                                                                                   |
| <b>RENOLIT<br/>EPLITH 00</b> | GP00K-10                                  | Lithium<br>Mineral oil | –                        | 00            | 420                                                            | -10 /<br>+120                          | Müller-<br>Weingar-<br>ten<br>Schuler       | Lubrication of worm gears, bevel gears,<br>spiral-toothed and straight-toothed<br>gears, e.g. forming presses, machine<br>tools, industrial gears |
| <b>RENOLIT<br/>FLM 0</b>     | –                                         | Lithium<br>Mineral oil | •                        | 0             | 100                                                            | -30 /<br>+120                          | –                                           | For mechanically loaded lubricating<br>points, grease with MoS <sub>2</sub> , and additives<br>to improve corrosion protection, EP<br>and AW      |
| <b>RENOLIT<br/>LZR 000</b>   | GP00-<br>000G-40                          | Li/Ca<br>Mineral oil   | –                        | 00-000        | 43                                                             | -40 /<br>+110                          | MB-Sheet<br>264.0<br>MAN 283<br>LI-P 00/000 | Semi-fluid grease for central lubricating<br>systems of commercial vehicles                                                                       |
| <b>RENOLIT<br/>SF 7-041</b>  | GP000K-30                                 | Lithium<br>Mineral oil | –                        | 000           | 110                                                            | -30 /<br>+120                          | –                                           | Machine tools, labelling and packaging<br>machines with central lubrication sys-<br>tems, industrial gears.                                       |
| <b>RENOLIT<br/>SO-GFB</b>    | GP00H-30                                  | Sodium<br>Mineral oil  | –                        | 00            | 250                                                            | -30 /<br>+100                          | –                                           | Fast rotating gears, gear motors, drum<br>motors                                                                                                  |
| <b>RENOLIT<br/>SO-GFO 35</b> | GP0H-30                                   | Sodium<br>Mineral oil  | –                        | 0             | 250                                                            | -30 /<br>+100                          | –                                           | Fast rotating gears, agricultural machi-<br>nes                                                                                                   |

## RENOLIT, PLANTO



| Product name                                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm <sup>2</sup> /s] | Temperature range<br>[°C] | Approvals, recommendations                                                                           | Main application area                                                                                                                                                                                                                    |
|--------------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|-----------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rapidly Biodegradable Greases</b>                         |                                           |                       |                  |            |                                                     |                           |                                                                                                      |                                                                                                                                                                                                                                          |
| <b>PLANTOGEL ECO 1 N</b>                                     | —                                         | Calcium Rape seed oil | —                | 1          | 36                                                  | -20 / +70                 | EU Ecolabel<br> | Rapidly biodegradable lubricating grease with Ecolabel, e.g. for lock gates or in agriculture and forestry.                                                                                                                              |
| <b>PLANTOGEL ECO 2 N</b>                                     | —                                         | Calcium Rape seed oil | —                | 2          | 36                                                  | -20 / +70                 | EU Ecolabel<br> |                                                                                                                                                                                                                                          |
| <b>PLANTOGEL ECO 000 S</b>                                   | —                                         | Li/Ca synth. ester    | —                | 00-000     | 55                                                  | -40 / +120                | —                                                                                                    | Rapidly biodegradable semi-fluid grease for lubrication of plain and roller bearings in commercial vehicles and construction machinery with central lubrication systems. also for gear systems which are exposed to low to medium loads. |
| <b>PLANTOGEL ECO 2 S</b><br>(Spray can: PLANTO MULTISPRAY S) | —                                         | Li/Ca synth. ester    | —                | 2          | 105                                                 | -40 / +120                | EU Ecolabel<br> | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                              |
| <b>PLANTOGEL ECO 2 FS</b>                                    | —                                         | Li/Ca synth. ester    | •                | 2          | 200                                                 | -30 / +120                | —                                                                                                    | Rapidly biodegradable EP multipurpose grease with solid lubrications for lubrication of plain and roller bearings, e.g. commercial vehicles and construction machinery.                                                                  |
| <b>PLANTOGEL ECO 402 S</b>                                   | —                                         | Ca synth. ester       | —                | 2          | 390                                                 | -40 / +120                | EU Ecolabel<br> | High performance bio-grease, water (salt water) resistant.                                                                                                                                                                               |



## Greases



| Product name                     | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil    | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations   | Main application area                                                                                                                                                                                                                                                               |
|----------------------------------|-------------------------------------------|--------------------------|------------------|------------|----------------------------------------|---------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Machine Tools</b> |                                           |                          |                  |            |                                        |                           |                              |                                                                                                                                                                                                                                                                                     |
| <b>RENOLIT CHUCK PASTE</b>       | –                                         | Li/Ca Mineral oil        | •                | 2-3        | 166                                    | -30 / +155                | –                            | Chucks for machine tools and as mounting aide for gears and electrical motors, etc., ejectors of plastic injection moulding machines (up to +100 °C), prevent corrosion and fretting corrosion                                                                                      |
| <b>RENOLIT CX-EP 2</b>           | KP2N-30<br>ISO-L-X-CDEB 2                 | Ca-X Mineral oil         | –                | 2          | 110                                    | -30 / +140                | Hoesch<br>Rothe Erde         | In general suitable for high thermal and mechanical loads, especially in the chemical, rubber, tire, steel, quarry and excavation industry. Good water and salt water resistance, also resists to weak acids and caustic solutions. Easily pumpable in central lubricating systems. |
| <b>RENOLIT CX-TOM 15</b>         | –                                         | CaSX semisynth. base oil | –                | 1-2        | 100                                    | -40 / +160                | SEW-Eurodrive                | Industrial gear bearings, belt conveyors, paper machines, machine tools, mining                                                                                                                                                                                                     |
| <b>RENOLIT DURAPLEX EP 2</b>     | –                                         | Li-X Mineral oil         | –                | 2          | 105                                    | -30 / +160                | –                            | Roller bearings, electric motor bearings, coupling bearings in the automotive sector, construction machines, forging presses by EUMUCO, wheel bearings of commercial vehicles , machine tools                                                                                       |
| <b>RENOLIT EPLITH 00</b>         | GP00K-10                                  | Lithium Mineral oil      | –                | 00         | 420                                    | -10 / +120                | Müller-Weingarten<br>Schuler | Lubrication of worm gears, bevel gears, spiral-toothed and straight-toothed gears, e.g. forming presses, machine tools, industrial gears                                                                                                                                            |
| <b>RENOLIT FEP 2</b>             | KP2N-20<br>ISO-L-X-BDEB 2                 | Lithium Mineral oil      | –                | 2          | 200                                    | -20 / +140                | –                            | Steel mills, quarries, construction equipment and forging presses, machine tools                                                                                                                                                                                                    |

# RENOLIT

| Product name                  | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil         | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations | Main application area                                                                                                                                                                                                               |
|-------------------------------|-------------------------------------------|-------------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Machine Tools     |                                           |                               |                          |               |                                                   |                                        |                                           |                                                                                                                                                                                                                                     |
| <b>RENOLIT<br/>HI-SPEED 2</b> | KHCE2K-40<br>ISO-L-X-<br>DCEA 2           | Lithium<br>synth.<br>base oil | –                        | 2             | 18                                                | -40 /<br>+120                          | –                                         | For high-speed bearings, n x dm =<br>1,4 Mio, machine tools and textile<br>spindles, electrical motor, linear guiding                                                                                                               |
| <b>RENOLIT<br/>PASTE PW</b>   | –                                         | CaSX<br>Mineral oil           | •                        | 2             | 350                                               | -20 /<br>+1,200                        | –                                         | Assembly paste for prevent fretting cor-<br>rosion , e.g. gears, electrical motors,<br>etc., chucks, superheated steam valves,<br>bearing seats on knuckle pins, or spline<br>connections in length adjusters of car-<br>dan shafts |
| <b>RENOLIT<br/>SF 7-041</b>   | GP000K-30                                 | Lithium<br>Mineral oil        | –                        | 000           | 110                                               | -30 /<br>+120                          | –                                         | Machine tools, labelling and packaging<br>machines with central lubrication sys-<br>tems, industrial gears.                                                                                                                         |

## Greases



| Product name                     | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations                                                                                                                  | Main application area                                                                                                                                                       |
|----------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Rail Vehicles</b> |                                           |                       |                  |            |                                        |                           |                                                                                                                                             |                                                                                                                                                                             |
| <b>RENOLIT HLT 2</b>             | KPHC2N-40<br>ISO L-X-<br>DDEB 2           | Lithium<br>PAO        | –                | 2          | 105                                    | -40 /<br>+140             | –                                                                                                                                           | For lubricating points at changing ambient temperatures and high requirements, e. g. lifetime lubrication of pneumatic applications, centrifuges, plain and roller bearings |
| <b>RENOLIT LX-PEP 1/2</b>        | KP1-2N -30<br>ISO-L-X-<br>CDEB 1-2        | Li-X<br>Mineral oil   | –                | 1-2        | 170                                    | -30 /<br>+150             | –                                                                                                                                           | High speed gears for power tools, e.g. power drill, circular hand saw, jigsaw, etc., needle cups and length adjustments of cardan shafts, plain and roller bearings         |
| <b>RENOLIT LX-PEP 2</b>          | KP2N-30<br>ISO-L-X-<br>CDEB 2             | Li-X<br>Mineral oil   | –                | 2          | 170                                    | -30 /<br>+150             | MAN 284 Li-H2,<br>MB 265.1,<br>ZF TE-ML 12,<br>Schaeffler<br>Gruppe,<br>VW TL 52 147 X,<br>Interprecise<br>(IDC-Bearings),<br>Deutsche Bahn | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, needle bearings of cardan shafts, plain and roller bearings, ventilator grease          |
| <b>RENOLIT LX-PEP 3</b>          | KP3N-30<br>ISO-L-X-<br>CDEB 3             | Li-X<br>Mineral oil   | –                | 3          | 170                                    | -30 /<br>+150             | Interprecise<br>(IDC-Bearings)                                                                                                              | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, plain and roller bearings, ventilator grease                                            |

# RENOLIT



| Product name                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil   | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                                        |
|----------------------------------------------|-------------------------------------------|-------------------------|------------------|------------|----------------------------------------|---------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Extreme High Temperatures</b> |                                           |                         |                  |            |                                        |                           |                            |                                                                                                                                                                                                                                                              |
| <b>RENOLIT PU-FH 300</b>                     | KP2R-20                                   | PU<br>Mineral oil       | –                | 2          | 500                                    | -20 / +180                | –                          | Lubricating points exposed to high thermal loads and bearings with slow sliding speeds (asphalt pavers)                                                                                                                                                      |
| <b>RENOLIT PU-MA 2</b>                       | KPFH-C2R-40<br>ISO-L-X-DFEB 2             | PU<br>PAO               | •                | 2          | 100                                    | -40 / +180                | –                          | Lubrication of electric motors, hot-air blowers, tumble dryers, black-rubber mixers, paper industry dryers, calender bearings, etc.                                                                                                                          |
| <b>RENOLIT SI 400 L</b>                      | KSI1R-30<br>ISO-L-X-EFEA 1-2              | Lithium<br>Silicone oil | –                | 1          | 80                                     | -30 / +180                | –                          | For slightly to normally loaded roller and friction bearings in electric motors, for joints, conveyor chains, ventilators, dryers, controlling equipment, and household appliances. RENOLIT SI 400 L guarantees a good lubrication to metal/plastic parings. |
| <b>RENOLIT SI 400 M</b>                      | KSI2R-30<br>ISO-L-X-EFEA 2                | Lithium<br>Silicone oil | –                | 2          | 80                                     | -30 / +180                | –                          | For slightly to normally loaded roller and friction bearings in electric motors, for joints, conveyor chains, ventilators, dryers, controlling equipment, and household appliances. RENOLIT SI 400 M guarantees a good lubrication to metal/plastic parings. |
| <b>RENOLIT SI 511 F</b>                      | –                                         | PU<br>Silicone oil      | –                | 0          | 80                                     | -40 / +200                | –                          | Especially suitable for re-lubrication of RENOLIT SI 511 L and SI 511 M at very high temperature                                                                                                                                                             |

## Greases

| Product name                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|----------------------------------------|---------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Extreme High Temperatures</b> |                                           |                       |                  |            |                                        |                           |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENOLIT SI 511 L</b>                      | –                                         | PU<br>Silicone oil    | –                | 1          | 80                                     | -40 / +200                | –                          | High temperature grease, plain and roller bearings, e.g. electric motors, conveyor chains, furnace carriages, drying equipment, bearing pairs: metal/metal, metal/plastic, plastic/plastic                                                                                                                                                                                                                                                       |
| <b>RENOLIT SI 511 M</b>                      | –                                         | PU<br>Silicone oil    | –                | 2          | 80                                     | -30 / +220                | –                          | High temperature grease, plain and roller bearings, e.g. electric motors, conveyor chains, furnace carriages, drying equipment, bearing pairs: metal/metal, metal/plastic, plastic/plastic                                                                                                                                                                                                                                                       |
| <b>RENOLIT ST-FTM 0-1</b>                    | –                                         | PTFE<br>PFPE          | –                | 1          | 335                                    | -40 / +250                | –                          | For the lubrication of plain and roller bearings and guidances at high temperatures. Also for the lubrication of ejectors of plastic injection moulding machines and tyre heating presses. Do not mix with mineral oil products or other lubricants. The surfaces to be lubricated shall be free of residual oil and grease.                                                                                                                     |
| <b>RENOLIT ST-FTM 2</b>                      | –                                         | PTFE<br>PFPE          | –                | 2          | 335                                    | -40 / +250                | –                          | For the lubrication of plain and roller bearings and guidances at high temperatures. Also for the lubrication of ejectors of plastic injection moulding machines, tyre heating presses and paint finishing systems. Do not mix with mineral oil products or other lubricants. The surfaces to be lubricated shall be free of residual oil and grease.                                                                                            |
| <b>RENOLIT ST 8-081/2</b>                    | –                                         | PTFE<br>PFPE          | –                | 2          | 510                                    | -20 / +260                | –                          | Do not mix with other lubricants! Surfaces must be free from residual oil and grease! Fully synthetic, thermally stable, resistant to solvents (exception: halocarbon refrigerants), oxidation stable, high load carrying abilities; plain and roller bearings of all industrial sectors, e.g. enamelling lines, drying stoves, machines in the packaging industries, calander bearings, bearings of hot air and smoke gas flaps in power plants |
| <b>RENOLIT UNITEMP 2</b>                     | –                                         | Synt. NaX<br>PAO      | –                | 2          | 180                                    | -50 / +180                | –                          | Plain and roller bearings at high temperatures                                                                                                                                                                                                                                                                                                                                                                                                   |



# RENOLIT

| Product name                                | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil      | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm <sup>2</sup> /s] | Temperature range<br>[°C] | Approvals, recommendations                                 | Main application area                                                                                                                                                                                                                                                                  |
|---------------------------------------------|-------------------------------------------|----------------------------|------------------|------------|-----------------------------------------------------|---------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Extreme Low Temperatures</b> |                                           |                            |                  |            |                                                     |                           |                                                            |                                                                                                                                                                                                                                                                                        |
| <b>RENOLIT HI-TEMP 100</b>                  | KPHC2N-50<br>ISO-L-X-ED-FB 2              | Li-X<br>PAO                | –                | 2          | 100                                                 | -50 / +140                | –                                                          | Used in a wide temperature range for lubrication of plain and roller bearings of, e.g., electric motors, traction motors, bearings and cardan shafts in polar regions.                                                                                                                 |
| <b>RENOLIT JP 1619</b>                      | –                                         | Lithium synth.<br>base oil | –                | 1          | 25                                                  | -50 / +120                | DBL 6804.70<br>VW TL 52 168<br>Dana Spicer<br>Bosch<br>MAN | EP-grease with additive for improve corrosion protection, ageing resistance and adhesiveness, lubrication of friction points requiring very good sliding behaviour, low start-up resistance, also at low temperature, e.g. rack and pinion steerings, prop shafts, high-speed bearings |
| <b>RENOLIT POLAR BLACK</b>                  | –                                         | Lithium<br>PAO             | •                | 1-2        | 84                                                  | -50 / +140                | –                                                          | Fully synthetic heavy duty all-season grease with solid lubricants for plain and roller bearings of construction machines and mining vehicles exposed to changing ambient temperatures.                                                                                                |
| <b>RENOLIT S 2</b>                          | KE1-2G-60<br>ISO-L-X-EBEA 1-2             | Lithium synth.<br>ester    | –                | 1-2        | 14                                                  | -60 / +100                | –                                                          | Low temperature e.g. electrical motors, instruments, air traffic control systems, refrigerators, air conditioners and transmitter equipment                                                                                                                                            |
| <b>RENOLIT SI 300 M</b>                     | MSI2P-70                                  | Lithium<br>Silicone oil    | –                | 2          | 75                                                  | -70 / +160                | DBL 6812.10<br>VW TL 767 X                                 | Low temperature grease for electric and electronic equipment, precision machines, sealing grease for radial waves sealing rings, groove rings, sealing rings; lubrication of sealing bellows                                                                                           |
| <b>RENOLIT SI 300 S</b>                     | MSI3P-70                                  | Lithium<br>Silicone oil    | –                | 3          | 75                                                  | -70 / +160                | –                                                          | Low temperature grease for electric and electronic equipment, precision machines, sealing grease for radial waves sealing rings, groove rings, sealing rings                                                                                                                           |
| <b>RENOLIT UNITEMP 2</b>                    | –                                         | Synt. NaX<br>PAO           | –                | 2          | 180                                                 | -50 / +180                | –                                                          | Plain and roller bearings at high temperatures                                                                                                                                                                                                                                         |

## Greases



| Product name                                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm <sup>2</sup> /s] | Temperature range<br>[°C] | Approvals, recommendations                                                                                          | Main application area                                                                                                                                                                                                                    |
|--------------------------------------------------------------|-------------------------------------------|-----------------------|------------------|------------|-----------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Central Lubricating Systems</b>               |                                           |                       |                  |            |                                                     |                           |                                                                                                                     |                                                                                                                                                                                                                                          |
| <b>PLANTOGEL ECO 000 S</b>                                   | –                                         | Li/Ca synth. ester    | –                | 00-000     | 55                                                  | -40 / +120                | –                                                                                                                   | Rapidly biodegradable semi-fluid grease for lubrication of plain and roller bearings in commercial vehicles and construction machinery with central lubrication systems. also for gear systems which are exposed to low to medium loads. |
| <b>PLANTOGEL ECO 2 S</b><br>(Spray can: PLANTO MULTISPRAY S) | –                                         | Li/Ca synth. ester    | –                | 2          | 105                                                 | -40 / +120                | EU Ecolabel<br>                | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                              |
| <b>RENOLIT LX-PEP 2</b>                                      | KP2N-30<br>ISO-L-X-CDEB 2                 | Li-X Mineral oil      | –                | 2          | 170                                                 | -30 / +150                | MAN 284 Li-H2, MB 265.1, ZF TE-ML 12, Schaeffler Gruppe, VW TL 52 147 X, Interprecise (IDC-Bearings), Deutsche Bahn | Multipurpose grease, wheel bearings of motor vehicles, roller bearings of e-motors, needle bearings of cardan shafts, plain and roller bearings, ventilator grease                                                                       |
| <b>RENOLIT LZR 000</b>                                       | GP00-000G-40                              | Li/Ca Mineral oil     | –                | 00-000     | 43                                                  | -40 / +110                | MB-Sheet 264.0<br>MAN 283 LI-P 00/000                                                                               | Semi-fluid grease for central lubricating systems of commercial vehicles                                                                                                                                                                 |

## PLANTO, RENOLIT

| Product name                                   | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm <sup>2</sup> /s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Approvals,<br>recommenda-<br>tions | Main application area                                                                                                                                                                                       |
|------------------------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|----------------------------------------------------------------|----------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases for Central Lubricating Systems</b> |                                           |                        |                          |               |                                                                |                                        |                                    |                                                                                                                                                                                                             |
| <b>RENOLIT<br/>LZR 2 H</b>                     | KP2N-30<br>ISO-L-X-<br>CDIB 2             | Lithium<br>Mineral oil | –                        | 2             | 230                                                            | -30 /<br>+160                          | Baier & Köppel                     | Premium multipurpose grease, long-term rust prevention, sealing grease, central lubricating systems, sugar refineries, roof tile factories, paper industry, prevent standstill corrosion, hytrel compatible |
| <b>RENOLIT<br/>POLAR BLACK</b>                 | –                                         | Lithium<br>PAO         | •                        | 1-2           | 84                                                             | -50 /<br>+140                          | –                                  | Fully synthetic heavy duty all-season grease with solid lubricants for plain and roller bearings of construction machines and mining vehicles exposed to changing ambient temperatures.                     |
| <b>RENOLIT<br/>SF 7-041</b>                    | GP000K-30                                 | Lithium<br>Mineral oil | –                        | 000           | 110                                                            | -30 /<br>+120                          | –                                  | Machine tools, labelling and packaging machines with central lubrication systems, industrial gears.                                                                                                         |

## Greases



| Product name                                                  | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil    | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Approvals,<br>recommen-<br>dations | Main application area                                                                                                                                                                                                      |
|---------------------------------------------------------------|-------------------------------------------|--------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases with Solid Lubricants</b>                          |                                           |                          |                          |               |                                                   |                                        |                                    |                                                                                                                                                                                                                            |
| <b>PLANTOGEL<br/>ECO 2 FS</b>                                 | –                                         | Li/Ca<br>synth.<br>ester | •                        | 2             | 200                                               | -30 /<br>+120                          | –                                  | Rapidly biodegradable EP multipur-<br>pose grease with solid lubrications for<br>lubrication of plain and roller bearings,<br>e.g. commercial vehicles and construc-<br>tion machinery.                                    |
| <b>RENOLIT<br/>CX-HT 0</b>                                    | –                                         | CaSX<br>Mineral oil      | •                        | 0             | 400                                               | -20 /<br>+160                          | –                                  | Lubrication of high loaded, low speed<br>plain and roller bearings, open gears<br>and gear boxes, e.g. in construction<br>machinery, steel mills, coal and ore<br>mills; can be used in spray and dipping<br>applications. |
| <b>RENOLIT<br/>CX-HT 2</b><br>(Spray can:<br>RENOLIT UNILoad) | –                                         | CaSX<br>Mineral oil      | •                        | 2             | 400                                               | -20 /<br>+180                          | –                                  | Lubrication of high loaded, low speed<br>plain and roller bearings, e.g. for kiln<br>cars, construction machinery, steel<br>mills, coal and ore mills.                                                                     |
| <b>RENOLIT<br/>EP X1</b>                                      | –                                         | Lithium<br>Mineral oil   | •                        | 1             | 1050                                              | -15 /<br>+120                          | Renk<br>CMD                        | Heavy duty gear coupling grease                                                                                                                                                                                            |
| <b>RENOLIT<br/>FLM 2</b>                                      | KPF2N-30<br>ISO-L-X-<br>CDEB 2            | Lithium<br>Mineral oil   | •                        | 2             | 100                                               | -30 /<br>+140                          | MAN 285<br>LI-PF 2                 | For mechanically loaded lubricating<br>points, grease with MoS <sub>2</sub> , agricultural<br>machines, commercial vehicles, const-<br>ruction industry, quarries and mining,<br>rubber and concrete factory               |
| <b>RENOLIT<br/>FLM 502</b>                                    | KPF2N-20<br>ISO-L-X-<br>BDEB 2            | Li/Ca<br>Mineral oil     | •                        | 2             | 500                                               | -20 /<br>+140                          | –                                  | For high and very high loaded roller<br>and friction bearings, slow sliding<br>speeds                                                                                                                                      |

## PLANTO, RENOLIT

| Product name                   | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations | Main application area                                                                                                                                                                               |
|--------------------------------|-------------------------------------------|-----------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases with Solid Lubricants  |                                           |                       |                          |               |                                                   |                                        |                                           |                                                                                                                                                                                                     |
| <b>RENOLIT<br/>FOL 2</b>       | —                                         | Lithium<br>PAO        | •                        | 2             | 110                                               | -10 /<br>+21                           | MPA<br>Stuttgart<br>approved              | Very ageing resistant, grease for sliding<br>films in engineering, low sliding speed                                                                                                                |
| <b>RENOLIT<br/>LX-OTP 2</b>    | —                                         | Li-X<br>Polyglycol    | •                        | 1-2           | 360                                               | -40 /<br>+160                          | MAN                                       | Lubrication of MAN knuckle pins                                                                                                                                                                     |
| <b>RENOLIT<br/>POLAR BLACK</b> | —                                         | Lithium<br>PAO        | •                        | 1-2           | 84                                                | -50 /<br>+140                          | —                                         | Fully synthetic heavy duty all-season<br>grease with solid lubricants for plain<br>and roller bearings of construction<br>machines and mining vehicles exposed<br>to changing ambient temperatures. |
| <b>RENOLIT<br/>PU-MA 2</b>     | KPFH-<br>C2R-40<br>ISO-L-X-<br>DFEB 2     | PU<br>PAO             | •                        | 2             | 100                                               | -40 /<br>+180                          | —                                         | Lubrication of electric motors, hot-air<br>blowers, tumble dryers, black-rubber<br>mixers, paper industry dryers, calander<br>bearings, etc.                                                        |
| <b>RENOLIT<br/>TFL 2</b>       | —                                         | Lithium<br>PAO        | •                        | 2             | 110                                               | -40 /<br>+140                          | —                                         | With PTFE, for slide-pairs with and<br>without plastic components                                                                                                                                   |



## Greases



| Product name                  | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|-------------------------------------------|-----------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Perfluorinated Pastes</b>  |                                           |                       |                          |               |                                                   |                                        |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>RENOLIT<br/>ST-FTM 0-1</b> | –                                         | PTFE<br>PFPE          | –                        | 1             | 335                                               | -40 /<br>+250                          | –                                         | For the lubrication of plain and roller bearings and guidances at high temperatures. Also for the lubrication of ejectors of plastic injection moulding machines and tyre heating presses. Do not mix with mineral oil products or other lubricants. The surfaces to be lubricated shall be free of residual oil and grease.                                                                                                                     |
| <b>RENOLIT<br/>ST-FTM 2</b>   | –                                         | PTFE<br>PFPE          | –                        | 2             | 335                                               | -40 /<br>+250                          | –                                         | For the lubrication of plain and roller bearings and guidances at high temperatures. Also for the lubrication of ejectors of plastic injection moulding machines, tyre heating presses and paint finishing systems. Do not mix with mineral oil products or other lubricants. The surfaces to be lubricated shall be free of residual oil and grease.                                                                                            |
| <b>RENOLIT<br/>ST 8-081/2</b> | –                                         | PTFE<br>PFPE          | –                        | 2             | 510                                               | -20 /<br>+260                          | –                                         | Do not mix with other lubricants! Surfaces must be free from residual oil and grease! Fully synthetic, thermally stable, resistant to solvents (exception: halocarbon refrigerants), oxidation stable, high load carrying abilities; plain and roller bearings of all industrial sectors, e.g. enamelling lines, drying stoves, machines in the packaging industries, calender bearings, bearings of hot air and smoke gas flaps in power plants |

## RENOLIT, PLANTO



| Product name                                              | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil        | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations                                                                          | Main application area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------|-------------------------------------------|------------------------------|------------------|------------|----------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Greases in Spray Cans or Rattle Cans</b>               |                                           |                              |                  |            |                                        |                           |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>DUOTAC ZAHNRADSPRAY</b>                                | —                                         | Wax<br>Mineral oil           | •                | —          | —                                      | -20 / +150                | —                                                                                                   | Dry, tenacious lubricating film. Open gears, gear rims, racks, chains, outer lubrication of wire ropes in crane installations, excavators, agricultural machines, rack and pinion railways; to be applied in cold condition, for open toothed-wheel gearing, transportation and conveying systems in the metallurgical industry and roller mills, lubrication/conservation of drag ropes and chains, e.g. in non-metallic mineral processing, solid lubricating film up to +300 °C; Bitumen-free special lubricant with graphite |
| <b>PLANTO MULTISPRAY S</b><br>(Grease: PLANTOGEL ECO 2 S) | —                                         | Li/Ca synth. ester           | —                | 2          | 105                                    | -40 / +120                | EU Ecolabel<br> | Rapidly biodegradable EP multipurpose grease for plain and roller bearing lubrication, e.g. water turbines or in agriculture and forestry. Good pumpability in central lubricating systems.                                                                                                                                                                                                                                                                                                                                      |
| <b>RENAX GLEITSPRAY</b><br>(Grease: RENOLIT GL 1)         | —                                         | Lithium Semi-synth. base oil | —                | 1          | —                                      | -30 / +140                | —                                                                                                   | Very adhesive, reduces friction and wear, protects from corrosion, temperature stable, noise-suppressing, suitable for plain and roller bearings and for gear boxes, bowden cables, guide rails, sun roofs, etc.                                                                                                                                                                                                                                                                                                                 |

## Greases

| Product name                                                 | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Appro-<br>vals, re-<br>commen-<br>dations | Main application area                                                                                                                                                                                                                                      |
|--------------------------------------------------------------|-------------------------------------------|------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases in Spray Cans or Rattle Cans                         |                                           |                        |                          |               |                                                   |                                        |                                           |                                                                                                                                                                                                                                                            |
| <b>RENOLIT<br/>CA-LZ SPRAY</b><br>(Grease:<br>RENOLIT CA-LZ) | KP2K-30<br>ISO-L-X-<br>CCHB2              | Calcium<br>Mineral oil | –                        | 2             | 700                                               | -30 /<br>+120                          | –                                         | Strongly adhesive, protects from wear even under extreme conditions, very resistant to water wash-out from metallic surfaces, long-term lubrication of passenger cars and commercial vehicles, construction industry, industrial and agricultural machines |
| <b>RENOLIT<br/>UNILOAD</b><br>(Grease:<br>RENOLIT CX-HT 2)   | –                                         | CaSX<br>Mineral oil    | •                        | 2             | 400                                               | -20 /<br>+180                          | –                                         | Lubrication of high loaded, low speed plain and roller bearings, e.g. for kiln cars, construction machinery, steel mills, coal and ore mills.                                                                                                              |

# RENOLIT



| Product name               | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil   | Solid lubricants | NLGI grade | Base oil viscosity at 40 °C<br>[mm²/s] | Temperature range<br>[°C] | Approvals, recommendations | Main application area                                                                                                                                                                                                                          |
|----------------------------|-------------------------------------------|-------------------------|------------------|------------|----------------------------------------|---------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assembly Pastes</b>     |                                           |                         |                  |            |                                        |                           |                            |                                                                                                                                                                                                                                                |
| <b>RENOLIT AS</b>          | —                                         | Lithium synth. base oil | —                | 1          | 3000                                   | -20 / +140                | —                          | Lubricating and sealing grease, reduces friction, and vibration, prevents stick-slip, resists many liquids and gases, protects from corrosion; pump bearings, ventilators, conveyors, printing machines, cleaning equipment and painting lines |
| <b>RENOLIT CHUCK PASTE</b> | —                                         | Li/Ca Mineral oil       | •                | 2-3        | 166                                    | -30 / +155                | —                          | Chucks for machine tools and as mounting aide for gears and electrical motors, etc., ejectors of plastic injection moulding machines (up to +100 °C), prevent corrosion and fretting corrosion                                                 |
| <b>RENOLIT LX-PG 2</b>     | —                                         | Li-X Polyglycol         | —                | 1-2        | 380                                    | -40 / +160                | VW TL52150                 | Plain and roller bearings, guides, gears, assembly aid for brake actuator boots made of EPDM                                                                                                                                                   |
| <b>RENOLIT PASTE PW</b>    | —                                         | CaSX Mineral oil        | •                | 2          | 350                                    | -20 / +1,200              | —                          | Assembly paste for prevent fretting corrosion , e.g. gears, electrical motors, etc., chucks, superheated steam valves, bearing seats on knuckle pins, or spline connections in length adjusters of cardan shafts                               |
| <b>RENOLIT SI 300 M</b>    | MSI2P-70                                  | Lithium Silicone oil    | —                | 2          | 75                                     | -70 / +160                | DBL 6812.10<br>VW TL 767 X | Low temperature grease for electric and electronic equipment, precision machines, sealing grease for radial waves sealing rings, groove rings, sealing-rings; lubrication of sealing bellows                                                   |

Ca-X: Calcium complex; CaSX: Calcium sulfonate complex; HDK: Gel thickener; Li/Ca: Lithium/Calcium; Li-X: Lithium complex; PU: Polyurea; Synth. NaX: Synthetic sodium complex; PFPE: Perfluoropolyether

## Greases

| Product name                | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil   | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm <sup>2</sup> /s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Approvals,<br>recommen-<br>dations | Main application area                                                                                                                                                    |
|-----------------------------|-------------------------------------------|-------------------------|--------------------------|---------------|----------------------------------------------------------------|----------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assembly Pastes</b>      |                                           |                         |                          |               |                                                                |                                        |                                    |                                                                                                                                                                          |
| <b>RENOLIT<br/>SI 300 S</b> | MSI3P-70                                  | Lithium<br>Silicone oil | –                        | 3             | 75                                                             | -70 /<br>+160                          | –                                  | Low temperature grease for electric<br>and electronic equipment, precision<br>machines, sealing grease for radial<br>waves sealing rings, groove rings,<br>sealing-rings |
| <b>RENOLIT<br/>SI 708</b>   | –                                         | HDK<br>Silicone oil     | –                        | 2-3           | 310                                                            | -40 /<br>+200                          | –                                  | Assembly aid for sealings, insulation<br>grease                                                                                                                          |



# RENOLIT

| Product name                          | Classification<br>DIN 51502<br>ISO 6743-9 | Thickener<br>Base oil                  | Solid<br>lubri-<br>cants | NLGI<br>grade | Base oil<br>viscosi-<br>ty at<br>40 °C<br>[mm²/s] | Tem-<br>pera-<br>ture<br>range<br>[°C] | Approvals,<br>recommen-<br>dations | Main application area                                                                                                                                                                                            |
|---------------------------------------|-------------------------------------------|----------------------------------------|--------------------------|---------------|---------------------------------------------------|----------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greases for Special Applications      |                                           |                                        |                          |               |                                                   |                                        |                                    |                                                                                                                                                                                                                  |
| <b>RENOLIT<br/>FOL 2</b>              | –                                         | Lithium<br>PAO                         | •                        | 2             | 110                                               | -10 /<br>+21                           | MPA<br>Stuttgart<br>approved       | Very ageing resistant, grease for sliding films in engineering, low sliding speed                                                                                                                                |
| <b>RENOLIT<br/>GL 1</b>               | –                                         | Lithium<br>Semi-<br>synth.<br>base oil | –                        | 1             | –                                                 | -30 /<br>+140                          | –                                  | Very adhesive, reduces friction and wear, protects from corrosion, temperature stable, noise-suppressing, suitable for plain and roller bearings and for gear boxes, bowden cables, guide rails, sun roofs, etc. |
| <b>RENOLIT<br/>SI 300 M</b>           | MSI2P-70                                  | Lithium<br>Silicone oil                | –                        | 2             | 75                                                | -70 /<br>+160                          | DBL 6812.10<br>VW TL 767 X         | Low temperature grease for electric and electronic equipment, precision machines, sealing grease for radial waves sealing rings, groove rings, sealing rings; lubrication of sealing bellows                     |
| <b>RENOLIT<br/>SI 300 S</b>           | MSI3P-70                                  | Lithium<br>Silicone oil                | –                        | 3             | 75                                                | -70 /<br>+160                          | –                                  | Low temperature grease for electric and electronic equipment, precision machines, sealing grease for radial waves sealing rings, groove rings, sealing rings                                                     |
| <b>RENOLIT<br/>SI 410 M</b>           | KSI2K-55<br>ISO-L-X-<br>ECEA 2            | Calcium<br>Silicone oil                | –                        | 2             | 750                                               | -55 /<br>+120                          | UBA (D),<br>eurofins (F)           | Beer tap grease for lubrication of taps, bearings and sealings of fermentation and filling plants for beverages, food plants and packaging                                                                       |
| <b>RENOLIT<br/>TFL 2</b>              | –                                         | Lithium<br>PAO                         | •                        | 2             | 110                                               | -40 /<br>+140                          | –                                  | With PTFE, for slide-pairs with and without plastic components                                                                                                                                                   |
| <b>SILICONFETT 300<br/>MITTEL BLQ</b> | MSI2P-70                                  | Lithium<br>Silicone oil                | –                        | 2             | 75                                                | -35 /<br>+21                           | MPA<br>Stuttgart<br>approved       | Bridge bearing quality<br>(DIN EN 1337-2)                                                                                                                                                                        |

# METAL PROCESSING LUBRICANTS

Today cutting fluids or forming lubricants for non-cutting metalworking have to meet a vast variety of requirements. For example, metalworking fluids must be efficient, economical, and free from environmental and health-damaging ingredients. They must comply with all legislative requirements and ensure stable and reliable manufacturing processes.

In the further production steps, adapted solutions for cleaning the workpieces as well as process-compatible and reliable corrosion preventives are crucial for manufacturing reliability and further product quality.

FUCHS does not only offer a complete and high performance lubricant, hardening media, cleaner and corrosion protection program to you and for your metalworking. In addition, we also offer you the process expertise you need to optimally meet the specific requirements of all machining operations in metalworking.





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**Metal Processing Lubricants**

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|                                 |         |
|---------------------------------|---------|
| Cutting Fluids – Water-miscible | 132-138 |
| Neat Cutting Fluids             | 139-143 |
| Quenching Fluids                | 144-145 |
| Cleaner                         | 146-157 |
| Corrosion Preventives           | 158-167 |
| Forming Lubricants              | 168     |

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## Cutting Fluids – Water-miscible



| Product name                  | Con-vent. Emul-sion | Semi synth. Emul-sion | Solution Fully synthetic | Densi-ty at 15 °C | pH Value 5% | Mixing water Hard-ness | Bo-ron-free | Material Recom-menda-tions           | Main application area                                                                                                                                                                                           |
|-------------------------------|---------------------|-----------------------|--------------------------|-------------------|-------------|------------------------|-------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Core Program</b>           |                     |                       |                          |                   |             |                        |             |                                      |                                                                                                                                                                                                                 |
| <b>ECOCOOL AFC 1515 BW</b>    | • (EP)              | –                     | –                        | 0.99              | 9.4         | S, M, H                | •           | Steel alloyed steel, Al*             | Multi-functional metalworking fluid, especially for difficult operations such as reaming and threading. DMG-Approval, GROB-Approval                                                                             |
| <b>ECOCOOL FERROSTAR MBF</b>  | –                   | • (ME EP)             | –                        | 0.97              | 9.6         | S, M, H                | •           | Steel alloyed steel, Al*             | Metalworking fluid for general machining, in particular for special cast alloys and high-alloy steels; good cooling, wetting and flushing properties; greater economy due to low drag-out losses. GROB-Approval |
| <b>ECOCOOL AFC 1515</b>       | •                   | –                     | –                        | 0.95              | 9.4         | S, M, H                | •           | Steel alloyed steel, Al*             | For roughing and precision machining, as well as the grinding of steel and aluminium materials; excellent lubricity                                                                                             |
| <b>ECOCOOL R - AFC 1515 L</b> | •                   | –                     | –                        | 0.99              | 9.6         | M, H                   | –           | Steel, alloyed steel, cast iron, Al* | Metalworking fluid for general and precision machining (such as reaming); low foaming; low misting and good abrasion sedimentation properties                                                                   |
| <b>ECOCOOL 68 CF 3-1</b>      | –                   | • (ME)                | –                        | 1.02              | 9.4         | M, H                   | –           | Steel alloyed steel, cast iron       | Metalworking fluid for general machining and grinding; outstanding flushing; greater economy due to low drag-out losses                                                                                         |
| <b>ECOCOOL R - GRINDSTAR</b>  | –                   | • (ME)                | –                        | 1.01              | 9.7         | S, M                   | –           | Steel, alloyed steel, cast iron, Al* | Metalworking fluid for general machining and grinding; very good flushing and high pH buffering properties; for soft water from 2° dH; greater economy due to low drag-out losses                               |



## ECOCOOL

| Product name       | Con-vent. Emul-sion | Semi synth. Emul-sion | Solution Fully syn-thetic | Densi-ty at 15 °C | pH Value 5% | Mixing water Hard-ness | Bo-ron-free | Material Recom-menda-tions                                                | Main application area                                                                                                                                                                                                               |
|--------------------|---------------------|-----------------------|---------------------------|-------------------|-------------|------------------------|-------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Core Program       |                     |                       |                           |                   |             |                        |             |                                                                           |                                                                                                                                                                                                                                     |
| ECOCOOL R - VHCM   | –                   | • (ME)                | –                         | 1.01              | 9.5         | M, H                   | –           | Steel, cast iron                                                          | Metalworking fluid for general machining operations; greater economy due to low drag-out losses. DMG-Approval                                                                                                                       |
| ECOCOOL S-AERO G   | –                   | –                     | • (EP)                    | 1.06              | 8.65        | S, M                   | •           | Steel, Al*                                                                | Fully-synthetic metalworking fluid for the most difficult machining and grinding operations on steel and aluminium alloys; very low foaming; suitable for high pressures and soft water; greater economy due to low drag-out losses |
| ECOCOOL S-CP       | –                   | –                     | • (EP)                    | 1.06              | 9.4         | S, M                   | •           | Steel, cast iron, Al*                                                     | Fully-synthetic metalworking fluid for the grinding and machining of cast iron and steel; extremely low foaming; good wetting and flushing properties; does not leave sticky residues                                               |
| ECOCOOL TN 2530    | • (EP)              | –                     | –                         | 0.98              | 9.4         | M, H                   | •           | Steel, alloyed steel, Titan, Inconel, Al*                                 | Metalworking fluid with EP additives; universally applicable for aluminium materials, titanium and stainless steels; stable at high pressures and low foaming                                                                       |
| ECOCOOL S-CO 5 BF  | –                   | –                     | •                         | 1.10              | 8.8         | S, M                   | •           | Tungsten carbides, nonferros metals                                       | Fully-synthetic metalworking fluid for the machining and grinding of tungsten carbides; reduces cobalt leaching; low drag-out losses                                                                                                |
| ECOCOOL VHCM       | –                   | • (ME EP)             | –                         | 0.99              | 9.4         | S, M                   | •           | Steel, cast iron                                                          | Metalworking fluid for general machining and grinding operations; the boron-free equivalent to ECOCOOL R -VHCM; greater economy due to low drag-out losses                                                                          |
| ECOCOOL ALUSTAR BF | •                   | –                     | –                         | 0.95              | 7.9         | M                      | •           | Steel, alloyed steel, Al*, zinc- and lead-containing nonferrous materials | High-quality, universal metalworking fluid, especially for machining of zinc- and lead-containing nonferrous materials and critical aluminium alloys; pH neutral; outstanding lubricity; good wetting and flushing properties       |
| ECOCOOL AL-PLUS B  | •                   | –                     | –                         | 0.93              | 9.1         | S, M, H                | •           | Alloyed steel, nonferrous materials, Al*                                  | High-quality, universal metalworking fluid, especially for the machining of zinc- and lead-free nonferrous metals and staining-prone aluminium; not suitable for gunmetal; outstanding lubricity                                    |

ME = Micro-emulsion; EP = EP additivation; ME EP = Micro-emulsion with EP additives; S = Water hardness: Soft; M = Water hardness: Medium; H = Water hardness: Hard;

\* = Check compatibility with critical alloys; • = Yes; – = No; (•) – conditional



## Cutting Fluids – Water-miscible

| Product name                  | Con-vent. Emul-sion | Semi synth. Emul-sion | Solution Fully syn-thetic | Densi-ty at 15 °C | pH Value 5% | Mixing water Hard-ness | Bo-ron-free | Material Recom-menda-tions                                                | Main application area                                                                                                                                                                                                                   |
|-------------------------------|---------------------|-----------------------|---------------------------|-------------------|-------------|------------------------|-------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Machining Aluminium</b>    |                     |                       |                           |                   |             |                        |             |                                                                           |                                                                                                                                                                                                                                         |
| <b>ECOCOOL AL-PLUS B</b>      | •                   | –                     | –                         | 0.93              | 9.1         | S, M, H                | •           | Alloyed steel, nonferrous materials, Al*                                  | High-quality, universal metalworking fluid, especially for the machining of zinc- and lead-free nonferrous metals and staining-prone aluminium; not suitable for gunmetal; outstanding lubricity                                        |
| <b>ECOCOOL AFC 1515 BW</b>    | • (EP)              | –                     | –                         | 0.99              | 9.4         | S, M, H                | •           | Steel, alloyed steel, Al*                                                 | Multi-functional metalworking fluid, especially for difficult operations such as reaming and threading. DMG-Approval, GROB-Approval                                                                                                     |
| <b>ECOCOOL ALUSTAR BF</b>     | •                   | –                     | –                         | 0.95              | 7.9         | M                      | •           | Steel, alloyed steel, Al*, zinc- and lead-containing nonferrous materials | High-quality, universal metalworking fluid, especially for machining of zinc- and lead-containing nonferrous materials and critical aluminium alloys; pH neutral; outstanding lubricity; good wetting and flushing properties           |
| <b>ECOCOOL AFC 1515</b>       | •                   | –                     | –                         | 0.95              | 9.4         | S, M, H                | •           | Steel alloyed steel, Al*                                                  | For roughing and precision machining, as well as the grinding of steel and aluminium materials; excellent lubricity; always maintain minimum concentration                                                                              |
| <b>ECOCOOL R - AFC 1515 L</b> | •                   | –                     | –                         | 0.99              | 9.6         | M, H                   | –           | Steel, alloyed steel, cast iron, Al*                                      | Metalworking fluid for general and precision machining (for example, reaming); low foaming; low misting and good abrasion sedimentation properties                                                                                      |
| <b>ECOCOOL S-AERO G</b>       | –                   | –                     | • (EP)                    | 1.06              | 8.65        | S, M                   | •           | Steel, Al*                                                                | Fully-synthetic metalworking fluid for the most demanding machining and grinding operations on steel and aluminium alloys; extremely low foaming; suitable for soft water and high pressures; better economy due to low drag-out losses |

## ECOCOOL

| Product name                                                  | Con-vent. Emul-sion | Semi synth. Emul-sion | Solution Fully syn-thetic | Densi-ty at 15 °C | pH Value 5% | Mixing water Hard-ness | Bo-ron-free | Material Recom-menda-tions                | Main application area                                                                                                                                                                                           |
|---------------------------------------------------------------|---------------------|-----------------------|---------------------------|-------------------|-------------|------------------------|-------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Machining Cast Iron and Low-Alloy Steels</b>               |                     |                       |                           |                   |             |                        |             |                                           |                                                                                                                                                                                                                 |
| ECOCOOL FERROSTAR MBF                                         | –                   | • (ME EP)             | –                         | 0.97              | 9.6         | S, M, H                | •           | Steel, alloyed steel, Al*                 | Metalworking fluid for general machining, especially for special cast iron alloys and high-alloy steels; excellent cooling, wetting and flushing; low drag-out losses. GROB-Approval                            |
| ECOCOOL 68 CF 3-1                                             | –                   | • (ME)                | –                         | 1.02              | 9.4         | M, H                   | –           | Steel alloyed steel, cast iron            | Metalworking fluid for general machining and grinding; outstanding flushing; greater economy due to low drag-out losses                                                                                         |
| ECOCOOL R - GRINDSTAR                                         | –                   | • (ME)                | –                         | 1.01              | 9.7         | S, M                   | –           | Cast iron, steel, Al*                     | Metalworking fluid for general machining and grinding operations; very good flushing and high pH buffering capacity; for soft water from 2 °dH; low drag-out losses                                             |
| ECOCOOL R - VHCM                                              | –                   | • (ME)                | –                         | 1.01              | 9.5         | M, H                   | –           | Steel, cast iron                          | Metalworking fluid for general machining operations; low drag-out losses. DMG-Approval                                                                                                                          |
| ECOCOOL VHCM                                                  | –                   | • (ME EP)             | –                         | 0.99              | 9.4         | S, M                   | •           | Steel, cast iron                          | Metalworking fluid for general machining and grinding operations; boron-free equivalent to ECOCOOL R -VHCM; low drag-out losses                                                                                 |
| <b>Machining High-Alloy Steels and Hot Strength Materials</b> |                     |                       |                           |                   |             |                        |             |                                           |                                                                                                                                                                                                                 |
| ECOCOOL R - AFC 1515 L                                        | •                   | –                     | –                         | 0.99              | 9.6         | M, H                   | –           | Steel, alloyed steel, cast iron, Al*      | Metalworking fluid for general and precision machining (for example, reaming); low foaming; low misting and good abrasion sedimentation properties                                                              |
| ECOCOOL TN 2530                                               | • (EP)              | –                     | –                         | 0.98              | 9.4         | M, H                   | •           | Steel, alloyed steel, Titan, Inconel, Al* | Metalworking fluid with EP additives; universally applicable for aluminium materials, titanium and stainless steels; high-pressure stable and low foaming.                                                      |
| ECOCOOL AFC 1515                                              | •                   | –                     | –                         | 0.95              | 9.4         | S, M, H                | •           | Steel alloyed steel, Al*                  | For roughing and precision machining, as well as the grinding of steel and aluminium materials; excellent lubricity                                                                                             |
| ECOCOOL FERROSTAR MBF                                         | –                   | • (ME EP)             | –                         | 0.97              | 9.6         | S, M, H                | •           | Steel alloyed steel, Al*                  | Metalworking fluid for general machining, in particular for special cast alloys and high-alloy steels; good cooling, wetting and flushing properties; greater economy due to low drag-out losses. GROB-Approval |

## Cutting Fluids – Water-miscible

| Product name                                               | Con-vent. Emul-sion | Semi synth. Emul-sion | Solution Fully syn-thetic | Densi-ty at 15 °C | pH Value 5% | Mixing water Hard-ness | Bo-ron-free | Material Recom-menda-tions                                                | Main Application area                                                                                                                                                                                                                  |
|------------------------------------------------------------|---------------------|-----------------------|---------------------------|-------------------|-------------|------------------------|-------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Machining Nonferrous Metals (Copper, Brass, Bronze)</b> |                     |                       |                           |                   |             |                        |             |                                                                           |                                                                                                                                                                                                                                        |
| <b>ECOCOOL AL-PLUS B</b>                                   | •                   | –                     | –                         | 0.93              | 9.1         | S, M, H                | •           | Alloyed steel, nonferrous metals, Al*                                     | High-quality, universally applicable metalworking fluid, especially for the machining of zinc- and lead-free nonferrous metals and staining-prone aluminium; not suitable for gunmetal; excellent lubricity; good wetting and flushing |
| <b>ECOCOOL ALUSTAR BF</b>                                  | •                   | –                     | –                         | 0.95              | 7.9         | M                      | •           | Steel, alloyed steel, Al*, zinc- and lead-containing nonferrous materials | High-quality, universally applicable metalworking fluid, especially for the machining of zinc- and lead-containing nonferrous materials; pH neutral; outstanding lubricity; good wetting and flushing                                  |
| <b>Machining Magnesium</b>                                 |                     |                       |                           |                   |             |                        |             |                                                                           |                                                                                                                                                                                                                                        |
| <b>ECOCOOL 2516 MG-DC</b>                                  | •                   | –                     | –                         | 0.97              | 9.3         | H                      | •           | Al*, Mg                                                                   | High-quality, universally applicable metalworking fluid; specially developed for the machining of magnesium; mixing water > 30 °dH; stable up to 200 °dH without deposits forming                                                      |
| <b>Special Products</b>                                    |                     |                       |                           |                   |             |                        |             |                                                                           |                                                                                                                                                                                                                                        |
| <b>ECOCOOL GS 2000</b>                                     | –                   | –                     | •                         | 1.06              | 8-10        | –                      | •           | Cast iron, steel                                                          | Thread cutting medium for water pipes; approved by the German DVWG; dyed red                                                                                                                                                           |
| <b>ECOCOOL S CO 5 BF</b>                                   | –                   | –                     | •                         | 1.10              | 8.8         | S, M                   | •           | Nonferrous metals                                                         | Fully-synthetic metalworking fluid for the machining and grinding of tungsten carbides and nonferrous metals; reduces cobalt leaching and soap formation; low foaming; low drag-out losses                                             |
| <b>ECOCOOL S-240</b>                                       | –                   | –                     | •                         | 1.00              | 9.0         | S, M                   | •           | Composites                                                                | Fully-synthetic metalworking fluid for machining CFRP/GFRP, good wetting and flushing properties, extreme less foaming, leaves no sticky residues                                                                                      |

# Service Additives for Cutting Fluids

# ECOCOOL

| Product name                                                                           | Description/<br>Features        | Application conc.<br>(of the final<br>dilution)<br>[%] | Increased<br>corrosion<br>protection | Increase pH value | Main application area                                                                                       |
|----------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------|--------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Top-up Concentrate for Water-miscible Metalworking Fluids</b>                       |                                 |                                                        |                                      |                   |                                                                                                             |
| <b>ECOCOOL<br/>AKTIV 78</b>                                                            | EP top-up<br>concentrate        | 0.5% addition<br>to max. 2                             | –                                    | –                 | Increases EP performance. Not for machining<br>nonferrous metals and fully-synthetic products               |
| <b>ECOCOOL<br/>ALKALISATOR G</b>                                                       | Primary alkano-<br>lamine       | 0.1 - 0.5<br>steps                                     | (•)                                  | •                 | Increases pH value                                                                                          |
| <b>ECOCOOL<br/>AKTIV CU</b>                                                            | Copper<br>deactivator           | 0.2 - 3                                                | •                                    | –                 | Combats the staining and greenish<br>discolouration of nonferrous metals                                    |
| <b>ECOCOOL<br/>AKTIV ALU</b>                                                           | Against alumin-<br>ium staining | 0.1 - 0.15                                             | •                                    | –                 | Avoids aluminium staining                                                                                   |
| <b>NETZMITTEL 12</b>                                                                   | Wetting agent                   | 0.05 - 0.2                                             | –                                    | –                 | Improves wetting properties                                                                                 |
| <b>ECOCOOL<br/>AKTIV CPO</b>                                                           | Corrosion<br>protection         | 0.1 - 0.3                                              | •                                    | –                 | Increases the corrosion protection offered by<br>emulsions and synthetic metalworking fluids                |
| <b>Defoamers, Synergetically Matched to ECOCOOL Water-miscible Metalworking Fluids</b> |                                 |                                                        |                                      |                   |                                                                                                             |
| <b>ANTIFOAM<br/>46</b>                                                                 | Si-organic<br>compound          | 0.01 - 0.05<br>(of the<br>concentrate)                 | –                                    | –                 | Standard defoamer for emulsions and syn-<br>thetic solutions                                                |
| <b>ANTIFOAM<br/>46 W</b>                                                               | Si-organic<br>compound          | 0.001 - 0.01<br>(of the emulsion<br>volume)            | –                                    | –                 | Equivalent to ANTIFOAM 46 but with solubili-<br>zers, therefore mixes well                                  |
| <b>ANTIFOAM<br/>48</b>                                                                 | Si-organic<br>compound          | 0.01 - 0.05<br>(of the<br>concentrate)                 | –                                    | –                 | For use with emulsions and synthetic solutions                                                              |
| <b>ANTIFOAM<br/>51</b>                                                                 | Si-organic<br>compound          | 0.01 - 0.05<br>(of the<br>concentrate)                 | –                                    | –                 | For use with emulsions and synthetic solutions                                                              |
| <b>ANTIFOAM<br/>51 G</b>                                                               | Si-organic<br>compound          | 0.001 - 0.01<br>(of the emulsion<br>volume)            | –                                    | –                 | Equivalent to ANTIFOAM 51 but with solubili-<br>zers, therefore mixes well                                  |
| <b>ANTIFOAM<br/>LC 30 W</b>                                                            | Si-organic<br>compound          | 0.001 - 0.01<br>(of the emulsion<br>volume)            | –                                    | –                 | Mixture of various defoamers; very broad<br>range of applications                                           |
| <b>ANTIFOAM<br/>WS 1</b>                                                               | Ca hardening<br>compounds       | 0.01<br>(of the emulsion<br>volume)                    | –                                    | –                 | Agents to harden water; as a rule, 0.01%<br>increases water hardness by about 1 °dH, to a<br>max. of 30 °dH |

## Service Additives for Cutting Fluids

| Product name                                                                                         | Application concentration (of the final dilution) [%] | Formaldehyde-free | Fungicide | Bactericide | pH value effect | Main application area                                                          |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------|-----------|-------------|-----------------|--------------------------------------------------------------------------------|
| <b>Bactericides and Fungicides for the Maintenance of ECOCOOL Water-miscible Metalworking Fluids</b> |                                                       |                   |           |             |                 |                                                                                |
| <b>ACTICIDE OX</b>                                                                                   | 0.1 - 0.15                                            | –                 | –         | •           | •               | Formaldehyde-release agent                                                     |
| <b>TROY SHIELD PA 10</b>                                                                             | 0.1 - 0.2                                             | •                 | •         | –           | –               | Fungicide for emulsions                                                        |
| <b>ACTICIDE WB 200</b>                                                                               | 0.02 - 0.05<br>max. 0.1                               | •                 | •         | –           | –               | Fungicide for emulsions and synthetic solutions                                |
| <b>ACTICIDE MBS</b>                                                                                  | 0.1 - 0.2                                             | •                 | •         | •           | –               | Combination of fungicide and bactericide for emulsions and synthetic solutions |



## Neat Cutting Fluids

## ECOCUT



| Product name           | Kin. visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Steel | High-<br>Alloy<br>Steel | Alumi-<br>nium | Copper,<br>Copper<br>Alloys | Main application area                                                                                                                                                                                                                                                                                                                |
|------------------------|-----------------------------------|---------------------|------------------------|-------|-------------------------|----------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ECOCUT 3000 Series     |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>3010         | 11                                | 0.84                | 160                    | •     | –                       | •              | •                           | Multipurpose cutting oil; low misting; cop-<br>per inactive; for general machining; univer-<br>sally applicable for cutting and grinding; Vis-<br>cosities 32 and 46 also suitable as hydraulic<br>oils                                                                                                                              |
| ECOCUT<br>3022         | 22                                | 0.86                | 180                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>3032         | 32                                | 0.87                | 210                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>3046         | 45                                | 0.88                | 220                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT HFN Series      |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>HFN 5 LE-HC  | 4                                 | 0.83                | 136                    | •     | –                       | •              | •                           | Multipurpose cutting oil; low evaporation<br>and low misting; copper-inactive; for grin-<br>ding and cutting operations with geometri-<br>cally-defined cutting-tools. The low-viscosity<br>versions (5 and 10) are also suitable for<br>honing; the higher viscosities can be used as<br>multi-functional oils (HLP hydraulic oils) |
| ECOCUT<br>HFN 10 LE-HC | 10                                | 0.84                | 170                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>HFN 16 LE    | 15                                | 0.86                | 200                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>HFN 22 LE    | 22                                | 0.85                | 212                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |
| ECOCUT<br>HFN 32 LE    | 30                                | 0.85                | 200                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                                                                                      |

## Neat Cutting Fluids

| Product name                             | Kin. visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Steel | High-<br>Alloy<br>Steel | Alumi-<br>nium | Copper,<br>Copper<br>Alloys | Main application area                                                                                                                                                                                                                                            |
|------------------------------------------|-----------------------------------|---------------------|------------------------|-------|-------------------------|----------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ECOCUT FT Series Containing GTL-Base Oil |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>FT 10 HFN                      | 10                                | 0.82                | 191                    | •     | –                       | •              | •                           | Special machining oils containing GTL base oils (Fischer- Tropsch process) for grinding and for chip-forming machining operations. Particularly high flashpoint and low evaporation                                                                              |
| ECOCUT<br>FT 10 HES                      | 10                                | 0.83                | 196                    | •     | •                       | (•)            | (•)                         |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>FT 13 HFN                      | 13                                | 0.83                | 194                    | •     | –                       | •              | •                           |                                                                                                                                                                                                                                                                  |
| ECOCUT 500 Series                        |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>515                            | 15                                | 0.90                | 158                    | •     | •                       | –              | –                           | Cutting oils with high EP additive content for machining operations and especially thread cutting on high-alloy steels (stainless steels). Lower viscosities highly suitable for deep hole drilling                                                              |
| ECOCUT<br>522                            | 24                                | 0.90                | 204                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>532 LE                         | 30                                | 0.88                | 200                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT 600 Series                        |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>610 A                          | 10                                | 0.85                | 160                    | •     | •                       | –              | –                           | Neat cutting oils universally applicable for the most machining operations with definde edge in alloyed steels. Special additives with geometrically-defined cutting edges reduce the friction and increase the tool life. Low misting, chlorine- and zinc-free. |
| ECOCUT<br>615 LE                         | 16                                | 0.88                | 210                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>615 A                          | 17                                | 0.87                | 200                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>628 LE                         | 26                                | 0.86                | 210                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT 700 Series                        |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>710 LE                         | 10                                | 0.87                | 158                    | •     | •                       | –              | –                           | High performance oils with high EP additive content and universally applicable for opera-tions on high-alloy steels (Cr-Ni steels) in gear machining such as gear hobbing, broaching and deep hole drilling. Low misting, chlorine- and zinc-free                |
| ECOCUT<br>715 LE                         | 17                                | 0.89                | 200                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>717 KE                         | 18                                | 0.89                | 196                    | •     | •                       | –              | (•)                         |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>720 LE                         | 21                                | 0.89                | 210                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>732 LE                         | 32                                | 0.88                | 190                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT 800 Series                        |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>832                            | 29                                | 0.92                | 180                    | •     | •                       | –              | –                           | Broaching and special oils for very difficult machining processes and operations on high-alloy (also stainless) steels; particularly for the vertical and horizontal broaching of gear teeth and keyways. Low-misting; zinc-free; high EP additive content       |
| ECOCUT<br>8532                           | 32                                | 0.94                | 210                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |
| ECOCUT<br>8535 S                         | 36                                | 0.97                | 200                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                                  |

## ECOCUT, PLANTO

| Product name                                                           | Kin. visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Steel | High-<br>Alloy<br>Steel | Alumi-<br>nium | Copper,<br>Copper<br>Alloys | Main application area                                                                                                                                                                                             |
|------------------------------------------------------------------------|-----------------------------------|---------------------|------------------------|-------|-------------------------|----------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PLANTOCUT Series – Environmentally Friendly Metalworking Fluids</b> |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                   |
| PLANTOCUT 10 SR                                                        | 10                                | 0.86                | 206                    | •     | •                       | •              | •                           | Rapidly biodegradable, ester-based cutting oil. Particularly suitable for operations with geometrically-defined cutting edges such as turning, milling, drilling, etc. Low evaporation and low misting; H304-free |
| PLANTOCUT 22 SR                                                        | 22                                | 0.90                | 215                    | •     | •                       | •              | •                           |                                                                                                                                                                                                                   |
| PLANTOCUT 40 SR                                                        | 40                                | 0.92                | 216                    | •     | •                       | •              | •                           |                                                                                                                                                                                                                   |
| PLANTOCUT 18 S-CS                                                      | 38                                | 0.93                | 200                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                   |

| Product name                              | Kin. visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Steel | High-<br>Alloy<br>Steel | Alumi-<br>nium | Copper,<br>Copper<br>Alloys | Main application area                                                                                                                                                                                                                              |
|-------------------------------------------|-----------------------------------|---------------------|------------------------|-------|-------------------------|----------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Minimum Quantity Lubrication (MQL)</b> |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                    |
| PLANTO MIKRO 40 SR                        | 40                                | 0.92                | 216                    | •     | •                       | •              | •                           | Rapidly biodegradable, ester-based, high EP level minimum quantity lubrication oil, universally applicable for all materials including titanium and titanium alloys. Low evaporation and low misting; can be used with diverse application systems |
| PLANTO MIKRO UNI                          | 15                                | 0.88                | 200                    | •     | •                       | •              | •                           |                                                                                                                                                                                                                                                    |
| ECOCUT MIKRO PLUS 20                      | 27                                | 0.84                | 188                    | •     | •                       | •              | •                           | Minimum quantity lubrication oils based on fatty alcohols; evaporate with almost no residues. Suitable for all application systems                                                                                                                 |
| ECOCUT MIKRO PLUS 82                      | 20                                | 0.84                | 172                    | •     | •                       | •              | •                           |                                                                                                                                                                                                                                                    |

| Product name                                | Kin. visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Cutting<br>alloy | HSS<br>Steel | Main application area                                                                                                                                                                                      |
|---------------------------------------------|-----------------------------------|---------------------|------------------------|------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Specific Application – Tool grinding</b> |                                   |                     |                        |                  |              |                                                                                                                                                                                                            |
| ECOCUT FT 7 WSE                             | 7.7                               | 0.83                | 166                    | •                | (•)          | Grinding oil based on GTL oil, applicable for the grinding and sharpening of HSS and tungsten carbide tools; low aromatic content; combats cobalt solubility; suitable for micro-filtering systems         |
| ECOCUT HS                                   | 5.5                               | 0.80                | 160                    | •                | (•)          | PAO-based machining fluid, universally applicable for the grinding and sharpening of HSS and tungsten carbide tools; low aromatic content; combats cobalt solubility, suitable for micro-filtering systems |

## Neat Cutting Fluids

| Product name                                             | Kin. visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Steel | High-<br>Alloy<br>Steel | Alumi-<br>nium | Copper,<br>Copper<br>Alloys | Main application area                                                                                                                                                                                                                                 |
|----------------------------------------------------------|-----------------------------------|---------------------|------------------------|-------|-------------------------|----------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Specific Application – Gear Machining</b>             |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                       |
| ECOCUT<br>628 LE                                         | 26                                | 0.86                | 210                    | •     | •                       | –              | –                           | Universally applicable for all gear machining operations (shaving, hobbing, shaping, etc)                                                                                                                                                             |
| ECOCUT<br>720 LE                                         | 21                                | 0.89                | 210                    | •     | •                       | –              | –                           |                                                                                                                                                                                                                                                       |
| ECOCUT<br>HFN 13 LE UNI                                  | 13                                | 0.85                | 194                    | •     | •                       | •              | •                           | Universally applicable for gear machining and grinding. Approved by the leading grinding machine manufacturers; low misting and low evaporation; available in other viscosities on request. Available in a H 304 free version as ECOCUT HFN 13 LE CLP |
| ECOCUT<br>HSG 211 LE                                     | 11                                | 0.84                | 172                    | •     | •                       | •              | •                           | High-performance grinding oil for gear grinding. Approved by the leading grinding machine manufacturers. Low misting and low evaporation                                                                                                              |
| <b>Specific Application – Spark Erosion</b>              |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                       |
| ECOCUT<br>FE                                             | 4                                 | 0.81                | 134                    | •     | •                       | •              | •                           | Dielectric medium, especially for roughing; free of aromatics                                                                                                                                                                                         |
| ECOCUT<br>1520                                           | 2,3                               | 0.82                | 101                    | •     | •                       | •              | •                           | Dielectric, can be used for roughing as well as for finishing. Despite lower viscosity high flash point >100 °C                                                                                                                                       |
| <b>Specific Application – Threading</b>                  |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                       |
| ECOCUT<br>522                                            | 24                                | 0.89                | 204                    | •     | •                       | –              | (•)                         | Solvent raffinate with chlorine-free EP additives; low misting and zinc-free. Especially for the threading of stainless steels and other machining operations on high-alloy materials                                                                 |
| <b>Specific Applications – Honing, Finishing</b>         |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                       |
| ECOCUT<br>HFN 5 LE-HC                                    | 4                                 | 0.84                | 136                    | •     | (•)                     | •              | •                           | Honing oil for steel and cast iron; also suitable for super-finishing and high-performance honing operations                                                                                                                                          |
| ECOCUT<br>GBS 5                                          | 5                                 | 0.83                | 150                    | •     | (•)                     | •              | •                           | For grinding and honing of balls and races in the roller bearing industry                                                                                                                                                                             |
| ECOCUT<br>FE                                             | 4                                 | 0.81                | 134                    | •     | •                       | •              | •                           | Machining medium for honing and finishing; based on white oils and free of aromatics                                                                                                                                                                  |
| <b>Spezific applications – AERO and Medical Industry</b> |                                   |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                                       |
| PLANTOCUT<br>10 SR                                       | 10                                | 0.86                | 206                    | •     | •                       | •              | •                           | Rapidly biodegradable, ester-based cutting oil. Recommended turning, milling, drilling, etc. Low evaporation and low misting; H304-free.                                                                                                              |
| ECOCUT<br>7520 LE-S                                      | 17                                | 0.88                | 210                    | •     | •                       | –              | –                           | High performance machining oil for the machining of high-alloy, difficult-to-cut materials used in aviation and medical technology.                                                                                                                   |

## ECOCUT

| Product name                                     | Kin. visc.<br>at 40 °C<br>[mm <sup>2</sup> /s] | Density<br>at 15 °C | Flash<br>point<br>[°C] | Steel | High-<br>Alloy<br>Steel | Alumi-<br>nium | Copper,<br>Copper<br>Alloys | Main application area                                                                                                                                                                                                                        |
|--------------------------------------------------|------------------------------------------------|---------------------|------------------------|-------|-------------------------|----------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Specific Application – Lapping</b>            |                                                |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                              |
| ECOCUT<br>HO 74                                  | 4                                              | 0.84                | 128                    | •     | •                       | •              | •                           | Universal lapping oil for all materials and for use with commonly-used lapping powders                                                                                                                                                       |
| <b>Specific Application – Deep Hole Drilling</b> |                                                |                     |                        |       |                         |                |                             |                                                                                                                                                                                                                                              |
| ECOCUT<br>MX 10                                  | 10                                             | 0.86                | 178                    | •     | •                       | •              | •                           | Mineral oil-based machining medium with EP additives for deep hole drilling; also suitable for nonferrous metals; conducting a suitability trial is recommended                                                                              |
| ECOCUT<br>717 EK                                 | 18                                             | 0.89                | 196                    | •     | •                       | –              | (•)                         |                                                                                                                                                                                                                                              |
| ECOCUT<br>MXB 18                                 | 16                                             | 0.90                | 180                    | •     | •                       | –              | –                           | Mineral oil-based, low-misting machining medium with EP and AW additives for deep hole drilling; especially for the most difficult-to-machine materials; also suitable for drilling fuel injection holes; not suitable for nonferrous metals |

## Service Additives for Neat Cutting Fluids

| Product name                                  | Kin. visc.<br>at 40 °C<br>[mm <sup>2</sup> /s] | Copper active | Application<br>concentration<br>[%] | Main application area                                                                                                    |
|-----------------------------------------------|------------------------------------------------|---------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Adjusting Concentrate for Cutting Oils</b> |                                                |               |                                     |                                                                                                                          |
| ECOCUT PLUS<br>AN- NTN                        | 75                                             | –             | 1 - 2                               | Adjusting concentrate to reduce oil misting                                                                              |
| ECOCUT PLUS<br>KWU                            | 36                                             | •             | 1 - 100                             | Adjusting concentrate to improve cutting performance, tool life and surface finish                                       |
| ECOCUT PLUS<br>800                            | 27                                             | •             | 1 - 100                             | Adjusting concentrate to improve cutting performance, tool life and surface finish; especially for the ECOCUT 800 Series |
| ECOCUT PLUS<br>HK                             | 32                                             | –             | 1 - 100                             | Special adjusting concentrate for the PLANTOCUT Series when copper-inactivity is necessary                               |



## Quenching Fluids



| Product name                                            | Kin. Visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C<br>[g/ml] | Flash-<br>point<br>[°C] | Temperature range<br>bath temperature<br>[°C] | Main application area                                                                                                                                                                                        |
|---------------------------------------------------------|-----------------------------------|-------------------------------|-------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bright Hardening Oils                                   |                                   |                               |                         |                                               |                                                                                                                                                                                                              |
| THERMISOL<br>QB 32                                      | 31                                | 0.87                          | 231                     | 50 – 90                                       | Heat treatment of alloyed tool steels as well as case-hardening steels, which can be considered due to their hardenability. Mainly used in open systems.                                                     |
| THERMISOL<br>QB 46                                      | 46                                | 0.87                          | 220                     | 50 – 100                                      |                                                                                                                                                                                                              |
| High-performance Hardening Oils based on Mineral Oil    |                                   |                               |                         |                                               |                                                                                                                                                                                                              |
| THERMISOL<br>QH 10                                      | 12                                | 0.85                          | 178                     | 50 – 80                                       | Hardening of unalloyed and alloyed case-hardening steels, heat-treatable steels and tool steels (screws and bolts, springs, chains, assembly tools, gear parts, ball bearings). Mainly used in open systems. |
| THERMISOL<br>QH 25                                      | 21                                | 0.86                          | 196                     | 50 – 100                                      | Hardening of unalloyed and alloyed case-hardening steels, heat-treatable steels and tool steels. For open and closed systems.                                                                                |
| THERMISOL<br>QH 40                                      | 45                                | 0.87                          | 234                     | 50 – 110<br>(max. 150)                        |                                                                                                                                                                                                              |
| THERMISOL<br>QH 55                                      | 51                                | 0.87                          | 232                     | 50 – 110<br>(max. 150)                        | Hardening of tool steels and high-alloyed heat-treatable steels. Suitable for open and closed systems.                                                                                                       |
| High-performance Hardening Oils based on Hydrocrack Oil |                                   |                               |                         |                                               |                                                                                                                                                                                                              |
| THERMISOL<br>QH 10 MC                                   | 11                                | 0.84                          | 172                     | 50 – 80                                       | Hardening of unalloyed and alloyed case-hardening steels, heat-treatable steels and tool steels (screws and bolts, springs, chains, assembly tools, gear parts, ball bearings). Mainly used in open systems. |
| THERMISOL<br>QH 30 MC                                   | 26                                | 0.84                          | 220                     | 50 – 100<br>(max. 150)                        | Hardening of unalloyed and alloyed case-hardening steels, heat-treatable steels and tool steels. Can be used in open and closed systems for continuous processes.                                            |
| THERMISOL<br>QH 35 MC                                   | 37                                | 0.85                          | 236                     | 40 – 100 (max. 150)                           | Hardening of unalloyed and alloyed case-hardening steels, heat-treatable steels and tool steels. Can be used in open and closed plants, for batches and continuous processes.                                |

## THERMISOL

| Product name                                                                                             | Kin. Visc.<br>at 40 °C<br>[mm²/s] | Density<br>at 15 °C<br>[g/ml] | pH value<br>10% | Factor<br>Hand-held<br>Refracto-<br>meter | Main application area                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|-----------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High-performance Hot Bath Hardening Oils or Tempering Oils                                               |                                   |                               |                 |                                           |                                                                                                                                                                                                                                                                                                                   |
| THERMISOL<br>QH 120                                                                                      | 119                               | 0.89                          | 256             | 50 – 170<br>(max. 200)                    | Hardening and tempering of tool steels and high-alloyed heat-treatable steels. Suitable for open and closed systems.                                                                                                                                                                                              |
| THERMISOL<br>QWA 460                                                                                     | 503                               | 0.90                          | 328             | 100 – 180<br>(max. 275)                   |                                                                                                                                                                                                                                                                                                                   |
| Synthetic High-performance Hardening Oils and High-performance Hot Bath Hardening Oils or Tempering Oils |                                   |                               |                 |                                           |                                                                                                                                                                                                                                                                                                                   |
| THERMISOL<br>QHY 10                                                                                      | 11                                | 0.87                          | 204             | 50 – 130                                  | Hardening of unalloyed and alloyed case-hardening steels, heat-trea-<br>table steels and tool steels (screws and bolts, springs, chains, assem-<br>bly tools, gear parts, ball bearings). Mainly used in open systems.                                                                                            |
| THERMISOL<br>QHY 35                                                                                      | 36                                | 0.93                          | 226             | 60 – 270                                  | Hardening of unalloyed and alloyed case-hardening steels, heat-trea-<br>table steels and tool steels. Can be used in open and closed systems for continuous processes.                                                                                                                                            |
| THERMISOL<br>QHY 150                                                                                     | 145                               | 0.93                          | 312             | 60 – 260                                  | Hardening and tempering of tool steels and high-alloyed heat-treatable steels. Suitable for open and closed systems.                                                                                                                                                                                              |
| Water-miscible Quenching Concentrates                                                                    |                                   |                               |                 |                                           |                                                                                                                                                                                                                                                                                                                   |
| THERMISOL<br>QZS 700                                                                                     | 125                               | 1.100                         | 8.8             | 1.7                                       | Especially suitable for quenching during induction and flame harde-<br>ning. Hardening of low-alloyed forgings and unalloyed to low-<br>alloyed materials possible. Especially for high corrosion protection<br>requirements.                                                                                     |
| THERMISOL<br>QZS 400                                                                                     | 430                               | 1.092                         | 9.0             | 1.8                                       | Especially suitable for quenching during induction and flame harde-<br>ning. Hardening of low-alloyed forgings and unalloyed to high-<br>alloyed materials possible. Particularly suitable for components sensi-<br>tive to cracking.                                                                             |
| THERMISOL<br>QZS 400 WB                                                                                  | 680                               | 1.110                         | 9.1             | 1.5                                       | Especially suitable for quenching during induction and flame harde-<br>ning. Hardening of low-alloyed forgings and unalloyed to high-<br>alloyed materials possible. Particularly suitable for components sensi-<br>tive to cracking. Contains no biocides and offers a particularly good<br>dissolving capacity. |
| THERMISOL<br>QZS 300 ALU                                                                                 | 301                               | 1.072                         | 8.5             | 2.4                                       | Especially suitable for the heat treatment of aluminium (aerospace).<br>Meets the requirements of SAE AMS 3025 C (paragraph 3.2).<br>Universally applicable for quenching materials in induction and<br>flame hardening.                                                                                          |
| THERMISOL<br>QZS 100 Plus A                                                                              | 1800                              | 1.131                         | 9.7             | 1.2                                       | Hardening of low-alloyed forgings and of unalloyed to low-alloyed<br>materials possible. Suitable for quenching during induction and<br>flame hardening. Can be used as a substitute for low viscosity har-<br>dening oils.                                                                                       |
| THERMISOL<br>QZS 150 MM                                                                                  | 290                               | 1.039                         | 9.0             | 4.1                                       | Hardening of low-alloyed forgings and unalloyed to high-alloyed<br>materials possible. Particularly suitable for quenching large work-<br>pieces in open baths. Can be used as a substitute for low viscosity<br>hardening oils.                                                                                  |
| THERMISOL<br>QZS 550 CPO                                                                                 | 220                               | 1.042                         | 9.0             | 2.9                                       | Hardening of high-alloyed forgings and of low-alloyed to high-<br>alloyed materials possible. Particularly mild quenching processes can<br>be achieved. Can be used as a substitute for higher viscosity harde-<br>ning oils. Especially for high corrosion protection requirements.                              |
| THERMISOL<br>QZS 550                                                                                     | 510                               | 1.047                         | 9.3             | 4.0                                       | Hardening of high-alloyed forgings and low-alloyed to high-alloyed<br>materials possible. Particularly mild quenching processes can be<br>achieved. Can be used as a substitute for higher viscosity hardening<br>oils.                                                                                           |

## Cleaner



| Product name              | Function                                                                                   | Materials                                                    | Comments                                                                                                                                                                         | Corrosion protection, chip/filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range | Injection pressure in bar to app. | Density at 15 °C in kg/m³ |
|---------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------|--------------------------|-------------------|-----------------------------------|---------------------------|
| <b>Neutral Cleaner</b>    |                                                                                            |                                                              |                                                                                                                                                                                  |                                                       |                        |                          |                   |                                   |                           |
| <b>RENOCLEAN VR 1948</b>  | Neutral cleaner for spray and high-pressure cleaning up to 300 bar, salt-free              | Fe, Al, Zn, (Cu, Brass) <sup>1</sup> , Plastics <sup>1</sup> | High pressure suitable; without turbidity point                                                                                                                                  | Temporary, '3% / 10 °dH                               | 8.3 ± 0.3 at 3.5%      | 1 - 5                    | 60 (20 - 80)      | 300                               | 1075 ± 10                 |
| <b>RENOCLEAN WSO 3005</b> | Neutral cleaner for spray application, salt-free                                           | Fe, Al, Zn, (Cu, Brass) <sup>1</sup> , Plastics <sup>1</sup> | Mild alkaline version of RC VR 1021! E. g.: can be used before heat treatment                                                                                                    | Temporary, '4.0% / DIN water (20 °dH)                 | 9.2 ± 0.3 at 4%        | 1 - 3                    | 50 (30 - 80)      | 25                                | 1045 ± 10                 |
| <b>RENOCLEAN MSO 3011</b> | Neutral cleaner for spray and high-pressure cleaning, deburring, salt-free                 | Fe, Al, Brass, Cu                                            | High pressure suitable, boron-free new development for RC VR 1021 DGI! Highly demulsifying, virtually foam-free from 25 °C upwards                                               | Temporary, '2.5% / 10 °dH                             | 9.2 at 3.5%            | 1 - 5                    | 50 (10 - 80)      | 600                               | 1064 ± 10                 |
| <b>RENOCLEAN WSA 3002</b> | Spray cleaner for high-pressure cleaning and high-pressure deburring systems               | Fe, Al                                                       | Contains phosphates, suitable for high-pressure applications VVW approval A29 2862. Demulsifying adjusted, nearly foam-free from 30 °C                                           | Temporary, '2.5% / 10 °dH                             | 9,2 ± 0.3              | 1 - 5                    | 65 (30 - 80)      | 30 / HD 350                       | 1082 ± 12                 |
| <b>RENOCLEAN MTO 3002</b> | Neutral cleaner for spray, pressure flood, high-pressure cleaning and deburring, salt-free | Fe, Al, Brass, Cu, (Al, Mg) <sup>1</sup>                     | Residue formation very low, very good temporary corrosion protection. Neutral cleaner and corrosion protection "All-in-one", low-foam application from 20 °C, pressure-dependent | Temporary, '2% / 10 °dH                               | 9.4 ± 0.4              | 1 - 5                    | 60 (20 - 80)      | 500 (above 50 °C)                 | 1090 ± 10                 |

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| Product name                  | Function                                                                                   | Materials                                                    | Comments                                                                                                                                                                                       | Corrosion protection, chip/filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range | Injection pressure in bar to app. | Density at 15 °C in kg/m³ |
|-------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------|--------------------------|-------------------|-----------------------------------|---------------------------|
| Neutral Cleaner               |                                                                                            |                                                              |                                                                                                                                                                                                |                                                       |                        |                          |                   |                                   |                           |
| <b>RENOCLEAN MTO 3001</b>     | Neutral cleaner for spray, immersion, pressure flood and ultrasonic cleaning, salt-free    | Fe, Al, Zn, (Cu, Brass) <sup>1</sup> , Plastics <sup>1</sup> | Residue formation very low, salt-free. Universally applicable, e. g. before heat treatment, low-foam application from 30 °C, sprayable from ~ 45 °C                                            | Temporary, '2% / in DI water                          | 9.6 ± 0.3              | 1 - 5                    | 65 (30 - 80)      | 25                                | 1027 ± 10                 |
| <b>RENOCLEAN MSO 3004</b>     | Neutral cleaner for spray and high-pressure cleaning up to 500 bar, salt-free              | Fe, Al, Brass, Cu                                            | Suitable for microfiltration, salt-free, very low residue formation, suitable for high-pressure applications. E. g.: can be used before heat treatment, almost free of foam from 10 °C onwards | Temporary, '2% / in DI water                          | 9.8 ± 0.4              | 1 - 5                    | 60 (10 - 80)      | 500 (above 50 °C)                 | 1038 ± 10                 |
| <b>RENOCLEAN MSA 3011</b>     | Neutral cleaner for spray, pressure flood, high-pressure cleaning and deburring, salt-free | Fe, Al, Brass, Cu, Mg                                        | Contains hydroxides, suitable for high pressure. PSA approval worldwide: MABEC-code Z 000 533 700. Foam-free from 20 °C, depending on pressure and temperature                                 | Temporary, '2.5 % / 10 °dH                            | 9.8 ± 0.3              | 1 - 5                    | 60 (20 - 80)      | 500 (above 50 °C)                 | 1046 ± 10                 |
| <b>RENOCLEAN VR 1021 CXV</b>  | Neutral cleaner for spray, flood and high-pressure cleaning                                | Fe, Al, Brass, Cu, Mg                                        | Contains hydroxides, suitable for high pressure. VW approval A29 0976. High-pressure cleaning (200 bar, 300 short term), nearly foam-free from 30 °C upwards                                   | Temporary, '2% / 10 °dH                               | 9.8 ± 0.3              | 1 - 5                    | 65 (30 - 80)      | 200 (300 short term)              | 1053 ± 10                 |
| <b>RENOCLEAN VR 1021 CXV+</b> | Neutral cleaner for spray, flood and high-pressure cleaning                                | Fe, Al, Brass, Cu, Mg                                        | Contains hydroxides, suitable for high pressure. VW approval A29 0976. High-pressure cleaning (100 bar, 200 short term), nearly foam-free from 30 °C                                           | Temporary, '2% / 10 °dH                               | 9.8 ± 0.3              | 1 - 5                    | 65 (30 - 80)      | 100 (200 short term)              | 1049 ± 10                 |
| <b>RENOCLEAN VR 1021</b>      | Neutral cleaner for spray application, salt-free                                           | Fe, Mg, (Al, Cu, Brass) <sup>1</sup>                         | Residue formation very low, salt-free. E. g.: can be used before heat treatment                                                                                                                | Temporary, '2% / 10 °dH                               | 10.2 ± 0.3             | 1 - 5                    | 65 (30 - 80)      | ~ 20                              | 1040 ± 10                 |
| <b>RENOCLEAN C 20 K 1427</b>  | Neutral cleaner for spray application, salt-free                                           | Fe, (Mg) <sup>1</sup>                                        | Very good corrosion protection, low residue formation, salt-free. VW approval A29 2863. E. g.: can be used before heat treatment                                                               | Temporary, '1.5% / 10 °dH                             | 10.2 ± 0.3             | 1 - 5                    | 65 (40 - 80)      | ~ 15                              | 1044 ± 10                 |



## Cleaner

| Product name                | Function                                                           | Materials                            | Comments                                                                                                                                       | Corrosion protection, chip/filter test 0/0 at x% in _ | pH (2%), if applicable      | Concentration range in % | Temperature range | Injection pressure in bar to app. | Density at 15 °C in kg/m³ |
|-----------------------------|--------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------|--------------------------|-------------------|-----------------------------------|---------------------------|
| <b>1-Component Products</b> |                                                                    |                                      |                                                                                                                                                |                                                       |                             |                          |                   |                                   |                           |
| <b>RENOCLEAN VR 2950</b>    | Spray cleaner for ferrous metals                                   | Fe, cast iron, stainless steel       | Contains amines, borates. Spray cleaner for bathtubs before enamelling                                                                         | Temporary, '2% / 10 °dH                               | 9.6 ± 0.4 in 10 ° DIN water | 1 - 4                    | 60 (30 - 80)      | ~ 20                              | 1055 ± 10                 |
| <b>RENOCLEAN MTA 3003</b>   | Spray cleaner, suitable for immersion and ultrasonic cleaning      | Fe, Al, (Zn, Cu, Brass) <sup>1</sup> | Silicate-free, contains hydroxides, phosphates and amines. Universally applicable, e. g. for engine reconditioning                             | Temporary, '3% / 10 °dH                               | 9.7 ± 0.3 (3%)              | 2 - 7                    | 65 (40 - 80)      | ~ 15                              | 1120 ± 10                 |
| <b>RENOCLEAN MSA 3001</b>   | Spray cleaner, suitable for immersion and ultrasonic cleaning      | Fe, Al, Brass, Cu, Zn                | Silicate-free, contains hydroxides, phosphates and amines. Universally applicable, RC MTA 3003 precursor                                       | Temporary, '2% / 10 °dH                               | 9.7 ± 0.3 (3%)              | 2 - 7                    | 60 (40 - 80)      | ~ 15                              | 1070 ± 10                 |
| <b>RENOCLEAN VR 1798/2</b>  | Cleaner for immersion, ultrasonic and manual use                   | Fe, (Al, Cu, Brass) <sup>1</sup>     | Contains phosphates, amines and silicates. Suitable for floor and manual cleaning from 20°C.                                                   | (Temporary) '9% / 10 °dH                              | 10.8 ± 0.5                  | 2 - 7                    | 65 (20 - 80)      | –                                 | 1050 ± 10                 |
| <b>RENOCLEAN WSA 4002</b>   | Cleaner for spraying, immersion, ultrasonic and manual application | Fe, Al, (Mg) <sup>1</sup>            | Contains hydroxides, amines and silicates. For heavily soiled parts and aggregates (e. g. railways, engine and chassis parts)                  | Temporary, '2.5% / 20 °dH                             | 12.1 ± 0.4 at 2.5%          | 2 - 7                    | 60 (30 - 70)      | 15                                | 1085 ± 10                 |
| <b>RENOCLEAN FDC 4001</b>   | Cleaner for immersion, ultrasonic and manual use                   | Fe, Mg, Titan, Plastics <sup>1</sup> | Contains phosphates, hydroxides. For cleaning tasks in medical technology, supports spot-free drying. Can be combined with RENOCLEAN MDT 3002. | –                                                     | 12.1 ± 0.4                  | 2 - 7                    | 65 (50 - 80)      | –                                 | 1090 ± 10                 |
| <b>RENOCLEAN MDA 4002</b>   | Immersion and ultrasonic cleaner, sprayable                        | Fe, Fe galv., Mg, (Al) <sup>1</sup>  | Silicate-free, contains hydroxides and phosphates. For cleaning of parts, e. g. with difficult to remove forming lubricants.                   | Temporary, '2.5 % / 20 °dH                            | 12.2 ± 0.3                  | 1 - 7                    | 65 (40 - 80)      | 8                                 | 1145 ± 10                 |
| <b>RENOCLEAN FSA 4017</b>   | Spray cleaner, suitable for immersion and ultrasonic cleaning      | Fe, (Mg) <sup>1</sup>                | Silicate-free, contains hydroxides, amines and phosphates. For cleaning of parts, e. g. with difficult to remove pigment dirt.                 | Temporary, '2 % / 20 °dH                              | 12.3 ± 0.5                  | 1 - 7                    | 65 (35 - 85)      | 25                                | 1168 ± 10                 |
| <b>RENOCLEAN VR 2999</b>    | Spray and immersion cleaner, suitable for ultrasonic cleaning      | Fe, cast iron, stainless steel       | Contains hydroxide and phosphate. For cleaning of parts, e. g. with difficult to remove pigment dirt.                                          | Temporary, '2% / 10 °dH                               | 12.4 ± 0.6                  | 2 - 7                    | 60 (40 - 80)      | ~ 10                              | 1175 ± 10                 |



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| Product name              | Function                                                                                              | Materials | Comments                                                                                                                                                                                                                                                 | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range | Injection pressure in bar to app. | Density at 15 °C in kg/m <sup>3</sup> |
|---------------------------|-------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|-------------------|-----------------------------------|---------------------------------------|
| Acid Cleaner              |                                                                                                       |           |                                                                                                                                                                                                                                                          |                                                        |                        |                          |                   |                                   |                                       |
| <b>RENOCLEAN FSO 2010</b> | Neutral deruster for spraying, immersion and ultrasonic applications                                  | Fe, (Al)  | Chloride-free, applicable after thermal or electro-chemical deburring. Parts are metallically blank after treatment and therefore to be provided immediately with corrosion protection (RENOCLEAN or ANTICORIT products).                                | –                                                      | 5.9 ± 0.5 at 5%        | 2 - 30                   | 50 (20 - 75)      | 20                                | 1265 ± 20                             |
| <b>RENOCLEAN FTM 1001</b> | Rust removal, descaling, phosphoric acid containing, for immersion, ultrasonic and manual application | Fe        | Suitable for cleaning calcified and germ-infested cleaning systems. Integrated consumption indicator. Parts are metallically blank after treatment and therefore to be provided immediately with corrosion protection (RENOCLEAN or ANTICORIT products). | –                                                      | 1.5 ± 0.5 in DI water  | 5 - 50                   | 30 (20 - 60)      | 5                                 | 1360 ± 10                             |

## Cleaner

| Product name                  | Function                                                                                                                             | Materials                       | Comments                                                                                                                                | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range | Injection pressure in bar to app. | Density at 15 °C in kg/m³ |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|-------------------|-----------------------------------|---------------------------|
| Special Products              |                                                                                                                                      |                                 |                                                                                                                                         |                                                        |                        |                          |                   |                                   |                           |
| <b>RENOCLEAN SPEZIAL 2000</b> | Emulsifying universal cleaner for immersion, ultrasonic and manual cleaning of commercial vehicles, tarpaulins, halls and workshops. | All materials <sup>1</sup>      | Contains phosphates Specs<br>• FORD 800 51 007. Suitable for all manual cleaning, for immersion, steam jet and floor cleaning equipment | –                                                      | 10.9 ± 0.4 at 3%       | 2 - 20                   | 35 (20 - 80)      | –                                 | 1045 ± 10                 |
| <b>RENOCLEAN GXA 3004</b>     | Floor, system and hall cleaner                                                                                                       | All materials <sup>1</sup>      | Odour neutral. For all manual and mechanical applications, especially suitable for floor cleaning devices                               | –                                                      | 9.1 ± 0.5 (100%)       | 1 - 20                   | 20 (20 - 40)      | –                                 | 1047 ± 10                 |
| <b>RENOCLEAN GXA 4014</b>     | Universal cleaner for floors, halls and vehicles                                                                                     | All materials <sup>1</sup>      | Lime scent. For the mechanical and manual cleaning of workshop, vehicle fleet, etc.                                                     | –                                                      | 11.7 ± 0.5 (1%)        | 1 - 20                   | 20 (20 - 80)      | –                                 | 1036 ± 10                 |
| <b>RENOCLEAN GSO 3001</b>     | Cleaner for transport containers (KLT) for spraying and manual application                                                           | All materials <sup>1</sup>      | For removing oil, grease, abrasion and transport dust. Designed for container cleaning systems                                          | –                                                      | 8.5 ± 0.5 (100%)       | 1 - 10                   | 60 (20 - 80)      | 5                                 | 1004 ± 10                 |
| <b>RENOCLEAN GTM 3001</b>     | Drying accelerator for spraying and immersion application                                                                            | Plastics, (metals) <sup>1</sup> | Antistatic effect on plastic surfaces. Dosage in rinse tank e. g. for faster drying of plastic containers                               | –                                                      | 8.7 ± 1                | 0.2 - 1.0                | 50 (20 - 80)      | 5                                 | 1017 ± 10                 |
| <b>RENOCLEAN AKTIV DA</b>     | Demulsifier for the separation of emulsified oil                                                                                     | –                               | Demulsifier with defoaming action. Devices to remove the demulsified oil are necessary (oil separator etc.)                             | –                                                      | 9.3 ± 0.5 (100%)       | 0.05 - 1.0               | 10 - 90           | –                                 | 988 ± 10                  |
| <b>RENOCLEAN GXM 3001</b>     | Defoamer, foam regulating additive especially for cleaning solutions                                                                 | –                               | Based on paintable polysiloxanes. Immediate, long-lasting defoaming and de-aerating effect                                              | –                                                      | 7.4 ± 1 (100%)         | 0.01 - 0.25              | 10 - 90           | –                                 | 998 ± 10                  |
| <b>ENTSCHÄUMER W</b>          | Defoamer based on silicone oil, foam regulating additive for general use                                                             | –                               | Silicone oil based. May cause interference with subsequent coating                                                                      | –                                                      | 7.4 ± 1 (100%)         | 0.05 - 0.5               | –                 | –                                 | 998 ± 10                  |

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| Product name              | Function                                                                                                      | Materials                            | Comments                                                                                                                  | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range | Injection pressure in bar to app. | Density at 15 °C in kg/m <sup>3</sup> |
|---------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|-------------------|-----------------------------------|---------------------------------------|
| Special Products          |                                                                                                               |                                      |                                                                                                                           |                                                        |                        |                          |                   |                                   |                                       |
| <b>RENOCLEAN 431</b>      | Industrial assembly aid for rubber and elastomers                                                             | –                                    | Lubricant, e. g. for fitting window seals made of rubber, hoses etc. Parts are fixed after drying, no more sliding effect | –                                                      | 7 ± 1 (100%)           | 10 - 30                  | 15 - 30           | –                                 | 1017 ± 10                             |
| <b>RENOCLEAN MXO 3001</b> | Vibratory grinding compound with synth. Corrosion protection, mild alkaline cleaner for immersion application | Fe, (Mg, Al, Cu, Brass) <sup>1</sup> | Suitable for all ferrous metals, after testing also for aluminium, zinc and magnesium materials                           | Temporary, '5% / in DI water                           | 8.8 ± 0.5 (5 %)        | 2 - 5                    | 20 - 80           | –                                 | 1029 ± 10                             |
| <b>RENOCLEAN FXM 3014</b> | Ready-to-use synthetic welding release agent in finished application concentration                            | Fe                                   | Forms a continuous moist film that prevents the adhesion of welding beads.                                                | –                                                      | 8.7 ± 0.5 (100%)       | 100                      | Room temperature  | –                                 | 1032 ± 10                             |

## Cleaner

| Product name                  | Function                                                                                                                       | Materials                                                        | Comments                                                                                                                            | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range | Injection pressure in bar to app.                                        | Density at 15 °C in kg/m³ |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|-------------------|--------------------------------------------------------------------------|---------------------------|
| <b>Builder Components</b>     |                                                                                                                                |                                                                  |                                                                                                                                     |                                                        |                        |                          |                   |                                                                          |                           |
| <b>RENOCLEAN MTA 2001</b>     | Builder, neutral, for immersion, pressure flood, flood and spray application                                                   | Al, Cu, Brass, (Zn) <sup>1</sup> , Plastics                      | Free of borate, silicate and surfactants, phosphate-containing, micro-filterable. *                                                 | –                                                      | 7.8 ± 0.8              | 2 - 7                    | 65 (20 - 80)      | Applicable spraying pressure according to the surfactant component used! | 1335 ± 20                 |
| <b>RENOCLEAN MTA 4001</b>     | Builder, medium alkaline, for immersion, pressure flood, flood and spray application                                           | Fe, (Mg, Al, Cu, Brass, Zn) <sup>1</sup> , Plastics              | Free of borate, silicate and surfactants, phosphate-containing, micro-filterable. *                                                 | –                                                      | 10.0 ± 0.5             | 2 - 7                    | 65 (20 - 80)      |                                                                          | 1568 ± 20                 |
| <b>RENOCLEAN FTA 4002</b>     | Builder, highly alkaline, for immersion, pressure flood, flood and spray application                                           | Fe, Mg, Plastics <sup>1</sup>                                    | Free of borate, silicate and surfactants, containing hydroxide and phosphate, micro-filterable. *                                   | –                                                      | 12.5 ± 0.5             | 2 - 8                    | 65 (20 - 80)      |                                                                          | 1435 ± 20                 |
| <b>RENOCLEAN ENTFETTER 39</b> | Builder, highly alkaline, contains silicate, for immersion, pressure flood, flood and spray application                        | Fe, Mg, Al, (Cu, Brass, Zn) <sup>1</sup> , Plastics <sup>1</sup> | Borate-free, contains hydroxides, phosphates and silicates. *                                                                       | –                                                      | 12.6 ± 0.6             | 1 - 20                   | 65 (20 - 80)      |                                                                          | 1370 ± 10                 |
| <b>RENOCLEAN FTA 4001</b>     | Builder, highly alkaline, for immersion, pressure flood, ultrasonic and spray cleaning, electrolytic degreasing, dephosphating | Fe, Mg, (Cu, Brass) <sup>1</sup> , Plastics <sup>1</sup>         | Borate-free, contains hydroxides, microfilterable. *                                                                                | –                                                      | 12.9 ± 0.6 (1 %)       | 2 - 18                   | 65 (20 - 80)      |                                                                          | 1433 ± 20                 |
| <b>RENOCLEAN VR 3222</b>      | Builder with corrosion protection, recyclable, salt-free, for immersion, pressure flood, flood and spray application           | All materials                                                    | Free of nitrite, borate, silicate and surfactants, amine-containing, micro-filterable, suitable for high-pressure applications. *   | Temporary, '3.5% / 10 °dH                              | 8.0 ± 0.4 (3.5%)       | 2 - 5                    | 60 (20 - 80)      |                                                                          | 1079 ± 10                 |
| <b>RENOCLEAN VR 2729 K</b>    | Builder with corrosion protection, recyclable, salt-free, for immersion, pressure flood, flood and spray application           | Fe, Mg, (Zn) <sup>1</sup> , Plastics                             | Nitrite, borate, silicate and surfactant-free, amine-containing, microfilterable. Protects against corrosion in the vapour phase. * | Temporary, '2 % / DI water                             | 10.8 ± 0.5 (3 %)       | 2 - 5                    | 60 (20 - 80)      |                                                                          | 1035 ± 10                 |

Fe – steel, iron, cast iron and stainless steel

1 – to check first

\* – Observe product information - use with appropriate surfactant components

## RENOCLEAN

| Product name                 | Function                                                                             | Materials                            | Comments                                                                     | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range                | Injection pressure in bar to app. | Density at 15 °C in kg/m <sup>3</sup> |
|------------------------------|--------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|----------------------------------|-----------------------------------|---------------------------------------|
| <b>Surfactant Components</b> |                                                                                      |                                      |                                                                              |                                                        |                        |                          |                                  |                                   |                                       |
| <b>RENOCLEAN MST 2001</b>    | Cleaning booster for immersion, pressure flooding, ultrasonic and spray cleaning     | All materials, Plastics <sup>1</sup> | Micro-filterable, strongly dependent on membrane and operating parameters! * | –                                                      | 6.0 ± 1                | 0.3 - 3                  | 65 (40 - 80)<br>Spraying min. 50 | 5 (7,5 bei > 65)                  | 1027 ± 10                             |
| <b>RENOCLEAN MTT 2003</b>    | Cleaning booster for immersion, pressure flooding, ultrasonic and spray cleaning     | All materials, Plastics <sup>1</sup> | Micro-filterable, strongly dependent on membrane and operating parameters! * | –                                                      | 7.9 ± 1                | 0.3 - 3                  | 60 (20 - 80)<br>Spraying min. 40 | 15 (25 bei >60)                   | 1024 ± 20                             |
| <b>RENOCLEAN TENSID 161</b>  | Cleaning booster for immersion, ultrasonic and pressure flood cleaning               | All materials, Plastics <sup>1</sup> | Micro-filterable, strongly dependent on membrane and operating parameters! * | –                                                      | 8.6 ± 0.5              | 0.1 - 1                  | 65 (40 - 80)                     | 2 (>60)                           | 1025 ± 10                             |
| <b>RENOCLEAN VR 1500</b>     | Cleaning booster for spray cleaning, neutral cleaner                                 | All materials, Plastics <sup>1</sup> | As a neutral cleaner free of corrosion protection components. *              | –                                                      | 8.5 ± 0.5              | 0.3 - 4                  | 65 (30 - 80)                     | 25                                | 1047 ± 10                             |
| <b>RENOCLEAN MDT 3002</b>    | Cleaning booster, emulsifying, for immersion, ultrasonic and pressure flood cleaning | All materials, Plastics <sup>1</sup> | Good ultrasonic support, high oil and fat absorption. *                      | –                                                      | 9.8 ± 0.8 (3 %)        | 0.3 - 2                  | 65 (20 - 80)                     | –                                 | 1050 ± 10                             |

Fe – steel, iron, cast iron and stainless steel

1 – to check first

\* – Compliance with Regulation (EC) No 648/2004 on detergents



## Cleaner

| Product name                      | Function                                                                                                             | Comments                                                 | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Density at 15 °C in kg/m <sup>3</sup> |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|---------------------------------------|
| <b>System Cleaner</b>             |                                                                                                                      |                                                          |                                                        |                        |                          |                                       |
| <b>GROTANOL FF 1 N</b>            | System cleaner for coolant supply systems, registered in most European countries!                                    | Contact time 6 - 24h                                     | –                                                      | app. 9 at 1%           | 1 - 3                    | ~ 1012                                |
| <b>RENOCLEAN SMC+</b>             | System Cleaner Complete Products for coolant supply systems, does not contain any formaldehyde separators            | Contact time 8 - 24h                                     | –                                                      | 10.4 ± 0.3             | 1 - 2                    | 1016 ± 10                             |
| <b>RENOCLEAN FXM 4005</b>         | System cleaner free of biocides and fungicides, for coolant supply systems, basic system without biocide / fungicide | Contact time 8 - 24h                                     | –                                                      | 10.0 ± 0.5             | 1 - 2                    | 1005 ± 10                             |
| <b>ACTICIDE OX / MBS / WB 200</b> | Biocides and fungicides for system cleaning, in combination with RENOCLEAN FXM 4005 for targeted dosage.             | See Service Program Product Management 1 "Preservatives" | –                                                      | –                      | –                        | –                                     |

# RENOCLEAN

| Product name              | Function                                                                  | Flash point | Boiling range | Density at 15 °C in kg/m³ | Materials                            | Comments                                                                                                                                                                            |
|---------------------------|---------------------------------------------------------------------------|-------------|---------------|---------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solvents                  |                                                                           |             |               |                           |                                      |                                                                                                                                                                                     |
| <b>RENOCLEAN MTS 7001</b> | Cleaning agent based on modified alcohols                                 | ≥ 61 °C     | 165 - 175 °C  | 880 ± 10 kg/m³            | All materials, plastics <sup>1</sup> | Distillable and recyclable. Specially designed for closed cleaning systems!                                                                                                         |
| <b>RENOCLEAN MVS 8015</b> | Hydrocarbon cleaner based on isoparaffin, aromatic-free                   | ≥ 56 °C     | 179 - 197 °C  | 760 ± 5 kg/m³             |                                      | Distillable and recyclable. Specially designed for closed cleaning systems!                                                                                                         |
| <b>RENOCLEAN MVS 8016</b> | Hydrocarbon cleaner based on isoparaffin, aromatic-free                   | ≥ 62 °C     | 184 - 206 °C  | 763 ± 10 kg/m³            |                                      | Narrow boiling range, fast drying, distillable, recyclable. Specially designed for closed cleaning systems!                                                                         |
| <b>RENOCLEAN MVS 9014</b> | Hydrocarbon cleaner with corrosion protection, VOC- and aromatic-free     | 91 ± 5 °C   | 217 - 255 °C  | 820 ± 20 kg/m³            |                                      | Universal application, good corrosion protection due to very thin oil film, VOC-compliant. Good corrosion protection properties, for solvent cleaning systems without distillation. |
| <b>RENOCLEAN KLV</b>      | Hydrocarbon cleaner, VOC- and aromatic-free                               | ≥ 90 °C     | 217 - 255 °C  | 810 ± 15 kg/m³            |                                      | VOC-compliant, universal application, slow evaporation. VW approval A29 2819. Simple application, e. g. for removal of car wax preservation.                                        |
| <b>FUCHS MULTICLEAN</b>   | Hydrocarbon cleaner, low aromatic, environmentally friendly, demulsifying | ≥ 61 °C     | 180 - 330 °C  | 795 ± 10 kg/m³            |                                      | Free of caustic and corrosive substances. Universal application in industry and commerce, can be applied with steam jet, good corrosion protection properties.                      |
| <b>RENOCLEAN KU</b>       | Hydrocarbon cleaner based on isoparaffin, aromatic-free                   | ≥ 61 °C     | 180 - 220 °C  | 762 ± 10 kg/m³            |                                      | Gentle cleaning, for precision mechanics and cleaning of electronic parts, not irritating to the skin. Simple application, for solvent systems without permanent distillation.      |
| <b>RENOCLEAN E</b>        | Hydrocarbon cleaner emulsifying, especially low-temperature stable        | ≥ 63 °C     | 180 - 330 °C  | 800 ± 10 kg/m³            |                                      | For the cleaning of engines, transmissions, chassis, as well as other aggregates and components. Easy application, also available as aerosol in spray can.                          |
| <b>RENOCLEAN KAF</b>      | Hydrocarbon cleaner, aromatic-free                                        | ≥ 61 °C     | 160 - 245 °C  | 790 ± 25 kg/m³            |                                      | Fine cleaning, fast drying. Simple application, suitable for solvent systems (without permanent distillation!)                                                                      |
| <b>RENOCLEAN MVS 9005</b> | Wash oil for air cleaning systems                                         | ≥ 220 °C    | –             | 840 ± 10 kg/m³            |                                      | Washing oil for air cleaning systems in aluminium rolling mills, distillable, recyclable. Formerly PENTOWASH 30.                                                                    |

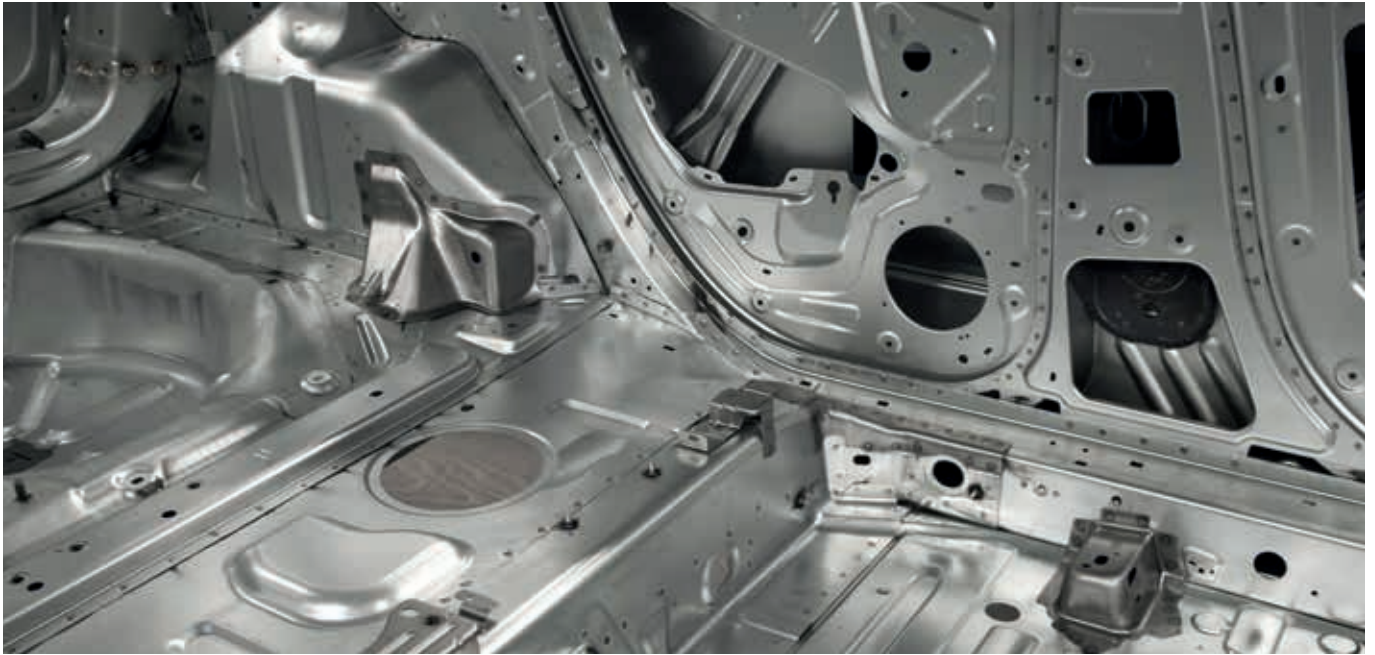
## Cleaner

| Product name               | Function                                                                                                        | Materials                                | Comments                                                                                                       | Corrosion protection, chip/ filter test 0/0 at x% in _ | pH (2%), if applicable | Concentration range in % | Temperature range    | Injection pressure in bar to app. | Density at 15 °C in kg/m³ |
|----------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------------|----------------------|-----------------------------------|---------------------------|
| Corrosion Protection       |                                                                                                                 |                                          |                                                                                                                |                                                        |                        |                          |                      |                                   |                           |
| <b>RENOCLEAN VR 3222</b>   | Temporary, mineral-oil-free corrosion protection for immersion, pressure flooding, flood and spray applications | All materials <sup>1</sup>               | Nitrite- and borate-free, suitable for vibratory finishing. Water-miscible                                     | Temporary, '3.5 % / 10 °dH                             | 8.0 ± 0.4 (3.5%)       | 0.5 - 3                  | 60 (20 - 80)         | 0.1 - ~100                        | 1079 ± 10                 |
| <b>ANTICORIT SKR 3001</b>  | Temporary, mineral-oil-free corrosion protection for immersion, pressure flooding, flood and spray applications | Fe, Mg, Al, Zn, (Cu, Brass) <sup>1</sup> | Nitrite-free, protects against corrosion in the vapour phase, suitable for vibratory finishing                 | Temporary, '2 % / 20 °dH                               | 9.8 ± 0.3              | 0.5 - 5                  | 60 (20 - 80)         | 0.1 - 3                           | 1033 ± 10                 |
| <b>RENOCLEAN VR 2729 K</b> | Temporary, mineral-oil-free corrosion protection for immersion, pressure flooding, flood and spray applications | Fe                                       | Nitrite-free, protects against corrosion in the vapour phase, suitable for vibratory finishing. Water-miscible | Temporary, '2 % / VE                                   | 10.8 ± 0.5 bei 3%      | 0.5 - 5                  | 60 (20 - 80)         | 0.1 - ~300                        | 1035 ± 10                 |
| <b>ANTICORIT MKR 30</b>    | Emulsion cleaner, mineral oil containing corrosion protection emulsion for immersion and flood application      | Fe, Al, Cu, Brass                        | Spray application only possible to a very limited extent, boron and monoethanolamine-free. Water-miscible      | Good, '3 % / 20 °dH                                    | 8.8 ± 0.4              | 3 - 5                    | 50 (20 - 60)         | 2                                 | 986 ± 15                  |
| <b>RENOCLEAN 1895</b>      | Cooling, pressing off and corrosion protection liquid for immersion and filling applications                    | Fe                                       | Boron, amine and fragrance containing, VVW approval A29 0481                                                   | Temporary, '3 % / 10 °dH                               | 9.6 ± 0.3 (3%)         | 2 - 8                    | Application-specific | 15                                | 1140 ± 10                 |
| <b>ANTICORIT SKR 40</b>    | Synthetic pressing water and corrosion protection concentrate for immersion and filling applications            | Fe                                       | Especially for pressing water applications, drinking water release is cancelled! Water-miscible                | Temporary, '4 % / 20 °dH                               | 9.4 ± 0.3 (10%)        | 3 - 10                   | 20 (10 - 40)         | 10                                | 1038 ± 10                 |
| <b>ANTICORIT SKR 42</b>    | Synthetic hydraulic test and corrosion protection concentrate for immersion and filling applications            | Fe                                       | Stable against salt and alkali infiltration. Water-miscible                                                    | Temporary, '1.5 % / 20 °dH                             | 10 ± 0.5 (10%)         | 1 - 5                    | 20 (10 - 50)         | 10                                | 1068 ± 10                 |

# RENOCLEAN

| Product name                        | Function                                                                                     | Application                                                                                                                 | Comments                                                                                                                                                                                 | Available packaging units                      | Accessories                                             |
|-------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------|
| Skin Protection Prior to Work       |                                                                                              |                                                                                                                             |                                                                                                                                                                                          |                                                |                                                         |
| RENOCLEAN<br>HAND PROTECT<br>MULTI  | Silicone-free, fingerprint-free, breathable and universally applicable skin protection cream | Before working with alternating substances (water-soluble and water-insoluble contaminants and irritants)                   | Forms a thin, invisible and protective film on the skin. Active support of cleaning after work                                                                                           | 50 * 100 ml tube<br>6 * 1000 ml pouch bottle   | RENOCLEAN<br>DONA 2000K<br>Dispenser (for pouch bottle) |
| RENOCLEAN<br>HAND PROTECT<br>PRO    | Silicone-free, water-soluble skin protection cream                                           | Before working with heavy non-water-miscible contaminants such as oils, greases, lubricants, metal abrasion, dust and soot. | Forms a non-slip, thin and protective microfilm on the skin. Contains special surfactants that are well tolerated by the skin and actively support the subsequent cleansing of the skin. | 50 * 100 ml tube<br>6 * 1000 ml pouch bottle   |                                                         |
| Skin Cleansing                      |                                                                                              |                                                                                                                             |                                                                                                                                                                                          |                                                |                                                         |
| RENOCLEAN<br>HAND WASH<br>MILD      | Mild, soap-free, unscented skin cleansing gel                                                | For the cleansing of highly stressed and sensitive skin                                                                     | Especially suitable where frequent hand washing is necessary. Free of perfume, dyes and preservatives                                                                                    | 25 * 250 ml bottle<br>6 * 2000 ml pouch bottle | RENOCLEAN<br>DONA 2000K<br>Dispenser (for pouch bottle) |
| RENOCLEAN<br>HAND WASH<br>INTENSIVE | Hand cleaner with abrasive particles for heaviest soiling                                    | Excellent for cleaning very dirty hands in repair workshops, mechanical engineering etc.                                    | Contains plastic powder as scrubbing agent, slightly perfumed. Is pH-neutral and contains skin caring substances.                                                                        | 25 * 250 ml bottle<br>6 * 2000 ml pouch bottle |                                                         |
| Skin Care                           |                                                                                              |                                                                                                                             |                                                                                                                                                                                          |                                                |                                                         |
| RENOCLEAN<br>HAND CARE              | Silicone-free skin care cream                                                                | After work, it is ideal as a care cream for hands whose natural protective barrier is damaged during work                   | Contains caring vegetable oils, beeswax and moisture regulating substances. Keeps the skin healthy and strong when used regularly                                                        | 50 * 100 ml tube<br>6 * 1000 ml pouch bottle   | RENOCLEAN<br>DONA 2000K<br>Dispenser (for pouch bottle) |

## Corrosion Preventives



| Product name                | Description                                                                                | Kin. visc. at 40 °C [mm²/s] DIN 51562 | Density at 15 °C [KG/m³] | Consumption [l/m²] | Film weight [g/m²] | Shed storage [Mon.] | Hall storage [Mon.] | FP [°C] | Thixotropic | VCI | Lubricating properties |
|-----------------------------|--------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|--------------------|--------------------|---------------------|---------------------|---------|-------------|-----|------------------------|
| Corrosion Protection Oils   |                                                                                            |                                       |                          |                    |                    |                     |                     |         |             |     |                        |
| <b>ANTICORIT RPO 1001</b>   | Conventional corrosion protection oil with low viscosity                                   | 8                                     | 839                      | 0.002              | 2                  | 2-4                 | 4-8                 | 146     | –           | –   | –                      |
| <b>ANTICORIT RPO 2001</b>   | Conventional corrosion protection oil with medium viscosity                                | 15                                    | 839                      | 0.005              | 4                  | 2-4                 | 4-8                 | 194     | –           | –   | –                      |
| <b>ANTICORIT RPO 2002</b>   | Conventional corrosion protection oil with medium viscosity; improved corrosion protection | 15                                    | 846                      | 0.005              | 4                  | 3-5                 | 5-8                 | 190     | –           | –   | –                      |
| <b>ANTICORIT RPO 3001</b>   | Conventional corrosion protection oil with high viscosity                                  | 30                                    | 847                      | 0.011              | 9                  | 3-6                 | 6-9                 | 190     | –           | –   | –                      |
| <b>ANTICORIT RPO 3002</b>   | Conventional corrosion protection oil with high viscosity; improved corrosion protection   | 30                                    | 851                      | 0.011              | 9                  | 3-6                 | 6-8                 | 226     | –           | –   | –                      |
| <b>ANTICORIT RPO 3003</b>   | Conventional corrosion protection oil with high viscosity                                  | 30                                    | 871                      | 0.010              | 9                  | 3-5                 | 5-8                 | 226     | –           | –   | –                      |
| <b>ANTICORIT RPO BGI 15</b> | Corrosion protection oil with VCI; medium viscosity                                        | 14                                    | 865                      | 0.006              | 5                  | 3-6                 | 9-15                | 155     | –           | •   | •                      |
| <b>ANTICORIT RPO BGI 21</b> | Corrosion protection oil with VCI                                                          | 20,5                                  | 902                      | 0.006              | 6                  | 3-6                 | 9-15                | 150     | –           | •   | •                      |
| <b>ANTICORIT KL 7</b>       | Corrosion protection oil; medium viscosity                                                 | 14                                    | 885                      | 0.003              | 3                  | 2-4                 | 4-8                 | 136     | –           | –   | –                      |



# ANTICORIT

| Product name                             | Description                                                                                                                              | Kin. visc. at 40 °C [mm²/s] DIN 51562 | Density at 15 °C [KG/m³] | Consumption [l/m²] | Film weight [g/m²] | Shed storage [Mon.] | Hall storage [Mon.] | FP [°C] | Thixotropic | VCI | Lubricating properties |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|--------------------|--------------------|---------------------|---------------------|---------|-------------|-----|------------------------|
| Corrosion Protection Oils                |                                                                                                                                          |                                       |                          |                    |                    |                     |                     |         |             |     |                        |
| ANTICORIT LBO 160 TT                     | Corrosion protection oil with very high viscosity, suitable for use in low temperature situations                                        | 160                                   | 920                      | 0.038              | 35                 | 3-6                 | 6-9                 | 150     | –           | –   | •                      |
| ANTICORIT RPS 30 N                       | Corrosion protection oil with good environmental and work safety properties, designed for mill application                               | 23                                    | 840                      | 0.011              | 9                  | 3-6                 | 6-9                 | 230     | –           | –   | –                      |
| ANTICORIT RP 30 NT                       | Corrosion protection oil designed for steel mill application                                                                             | 30                                    | 889                      | 0.010              | 9                  | 3-6                 | 6-9                 | 172     | –           | –   | –                      |
| ANTICORIT RPS 28                         | Corrosion protection oil designed for steel mill application                                                                             | 24                                    | 880                      | 0.010              | 9                  | 3-6                 | 6-9                 | 180     | –           | –   | –                      |
| ANTICORIT RP 4107 A                      | Mid-viscous, non thixotropic modification of ANTICORIT RP 4107 S                                                                         | 15                                    | 870                      | 0.010              | 9                  | 3-6                 | 6-9                 | 130     | –           | –   | –                      |
| ANTICORIT RP 4107 LV NT                  | Low-viscous, non thixotropic modification of ANTICORIT RP 4107 S                                                                         | 12                                    | 864                      | 0.007              | 6                  | 3-6                 | 6-9                 | 150     | –           | –   | –                      |
| ANTICORIT PL 3802 39 LV 8                | Low-viscous blank washing oil with advanced lubrication, non thixotropic                                                                 | 8                                     | 890                      | 0.002              | 2                  | 3-6                 | 6-9                 | 110     | –           | –   | •                      |
| ANTICORIT PL 3802 39 NT                  | Non thixotropic modification of ANTICORIT PL 3802 39 S                                                                                   | 26                                    | 880                      | 0.009              | 8                  | 3-6                 | 6-9                 | n/a     | –           | –   | •                      |
| ANTICORIT PL 39 LV 8                     | Low-viscous blank washing oil                                                                                                            | 8                                     | 880                      | 0.002              | 2                  | 3-6                 | 6-9                 | 116     | –           | –   | •                      |
| ANTICORIT PL 39 LV 18                    | Mid-viscous blank washing oil                                                                                                            | 17                                    | 900                      | 0.008              | 7                  | 3-6                 | 6-9                 | 158     | –           | –   | •                      |
| Oily Corrosion Preventative Concentrates |                                                                                                                                          |                                       |                          |                    |                    |                     |                     |         |             |     |                        |
| ANTICORIT RPC 5000                       | Corrosion protection concentrate                                                                                                         | 85                                    | 887                      | Depends on conc.   | Depends on conc.   | Depends on conc.    | Depends on conc.    | 248     | –           | –   | –                      |
| ANTICORIT RPC 5002                       | Corrosion protection concentrate, low-viscous                                                                                            | 45                                    | 863                      |                    |                    |                     |                     | 160     | –           | –   | –                      |
| ANTICORIT MPC 5000                       | Corrosion protection concentrate, advanced corrosion protection and lubrication performance; is compatible with chlorinated hydrocarbons | 90                                    | 890                      |                    |                    |                     |                     | 240     | –           | –   | –                      |
| ANTICORIT 03 W C                         | High-viscous, thixotropic corrosion protection concentrate                                                                               | 160                                   | 912                      |                    |                    |                     |                     | 150     | •           | –   | –                      |

## Corrosion Preventives

| Product name                          | Description                                                                                                | Kin. visc.<br>at 40 °C<br>[mm²/s]<br>DIN 51562 | Density<br>at 15 °C<br>[KG/m³] | Con-<br>sump-<br>tion<br>[l/m²] | Film<br>weight<br>[g/m²] | Shed<br>stor-<br>age<br>[Mon.] | Hall<br>stor-<br>age<br>[Mon.] | FP<br>[°C] | Thix-<br>otro-<br>pic | VCI | Lubri-<br>cating<br>proper-<br>ties |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------|---------------------------------|--------------------------|--------------------------------|--------------------------------|------------|-----------------------|-----|-------------------------------------|
| Thixotropic Corrosion Protection Oils |                                                                                                            |                                                |                                |                                 |                          |                                |                                |            |                       |     |                                     |
| <b>ANTICORIT BGO 15 X</b>             | Thixotropic corrosion protection oil with very good corrosion protection and lubrication properties        | 14                                             | 860                            | 0.006                           | 5                        | 12-24                          | 12-36                          | 130        | •                     | –   | –                                   |
| <b>ANTICORIT LBO 18 X</b>             | Thixotropic corrosion protection oil and lubrication properties                                            | 15                                             | 860                            | 0.006                           | 5                        | 12-18                          | 12-24                          | 130        | •                     | –   | •                                   |
| <b>ANTICORIT TX 11</b>                | Thixotropic corrosion protection oil with lubrication properties                                           | 40                                             | 883                            | 0.034                           | 30 at 60 °C              | 6-12                           | 12-24                          | 160        | •                     | –   | •                                   |
| <b>ANTICORIT TW 16</b>                | High-viscous corrosion protection oil for hot application                                                  | 32 at 50 °C                                    | 883                            | 0.012                           | 11 at 85 °C              | 6-12                           | 12-24                          | 170        | •                     | –   | –                                   |
| <b>ANTICORIT LSB</b>                  | Thixotropic corrosion protection oil                                                                       | 140                                            | 907                            | 0.011                           | 10 at 70 °C              | 4-8                            | 8-16                           | 196        | •                     | –   | –                                   |
| <b>ANTICORIT BGI 14 X</b>             | Thixotropic corrosion protection oil with VCI                                                              | 30 at 20 °C                                    | 860                            | 0.005                           | 4                        | 12-24                          | 12-36                          | 130        | •                     | •   | –                                   |
| <b>ANTICORIT RP 4107 S</b>            | Thixotropic corrosion protection oil for still mill application on body-in-white strips, meets VDA 230-213 | 35                                             | 887                            | 0.012                           | 11                       | 6-12                           | 12-20                          | 210        | •                     | –   | –                                   |
| <b>ANTICORIT RP 4107 LV</b>           | Low-viscous modification of ANTICORIT RP 4107 S, meets VDA 230-213                                         | 12                                             | 865                            | 0.002                           | 2                        | 4-8                            | 8-16                           | 150        | •                     | –   | –                                   |
| <b>ANTICORIT PL 3802 39 S</b>         | First generation thixotropic prelube, meets VDA 230-213                                                    | 60                                             | 910                            | 0.012                           | 11                       | 6-12                           | 12-20                          | 180        | •                     | –   | •                                   |
| <b>ANTICORIT PLS 100 T</b>            | Second generation thixotropic prelube, meets VDA 230-213                                                   | 100                                            | 910                            | 0.012                           | 11                       | 6-12                           | 12-20                          | 180        | •                     | –   | •                                   |
| <b>ANTICORIT PL 3802 39 LV</b>        | Low-viscous modification of ANTICORIT PL 3802 39 S, suitable as blank washing oil, meets VDA 230-213       | 15                                             | 891                            | 0.007                           | 6                        | 4-8                            | 8-16                           | 150        | •                     | –   | •                                   |
| <b>ANTICORIT PL 39 SX</b>             | Hotmelt for mill application, meets VDA 230-213                                                            | 20 at 60 °C                                    | 895                            | –                               | –                        | 6-12                           | 12-20                          | 175        | •                     | –   | •                                   |
| <b>ANTICORIT LBX 5000</b>             | High-viscous corrosion protection oil with good lubrication performance                                    | 10 at 100 °C                                   | 810                            | 0.010                           | 8 at 120 °C              | 6-12                           | 12-24                          | 240        | •                     | –   | •                                   |

# ANTICORIT

| Product name                                          | Description                                                                                      | Kin. visc.<br>at 40 °C<br>[mm <sup>2</sup> /s]<br>DIN 51562 | Density<br>at 15 °C<br>[KG/m <sup>3</sup> ] | Con-<br>sump-<br>tion<br>[l/m <sup>2</sup> ] | Film<br>weight<br>[g/m <sup>2</sup> ] | Shed<br>stor-<br>age<br>[Mon.] | Hall<br>stor-<br>age<br>[Mon.] | FP<br>[°C] | Thix-<br>otro-<br>pic | VCI | Lubri-<br>cating<br>proper-<br>ties |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------|----------------------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------|-----------------------|-----|-------------------------------------|
| <b>Mineral Oil-free Corrosion Protection Products</b> |                                                                                                  |                                                             |                                             |                                              |                                       |                                |                                |            |                       |     |                                     |
| <b>ANTICORIT EB 1</b>                                 | Ester based corrosion protection oil for mill application, suitable for embalage sheets          | 17                                                          | 951                                         | –                                            | 0.3                                   | –                              | 1-3                            | 175        | –                     | –   | •                                   |
| <b>ANTICORIT BML 3</b>                                | Corrosion protection based on polyglycol, suitable for brake components                          | 35                                                          | 985                                         | –                                            | –                                     | 1-3                            | 3-6                            | 200        | –                     | –   | –                                   |
| <b>ANTICORIT SYNTH</b>                                | Fully synthetic multipurpose oil, good lubrication properties                                    | 102                                                         | 834                                         | –                                            | –                                     | 3-6                            | 6-12                           | 150        | –                     | –   | •                                   |
| <b>Solvent based Corrosion Protection Products</b>    |                                                                                                  |                                                             |                                             |                                              |                                       |                                |                                |            |                       |     |                                     |
| <b>ANTICORIT RPS 6201</b>                             | Solvent based corrosion protection oil, 20% evaporation residue, D40 solvent                     | 2.2<br>at 20 °C                                             | 800                                         | 0.003                                        | 2                                     | 6-9                            | 12-18                          | >40        | –                     | –   | –                                   |
| <b>ANTICORIT RPS 7201</b>                             | Solvent based corrosion protection oil, 20% evaporation residue, D60 solvent                     | 3.3<br>at 20 °C                                             | 810                                         | 0.002                                        | 2                                     | 6-9                            | 12-18                          | >60        | –                     | –   | –                                   |
| <b>ANTICORIT RPS 7601</b>                             | Solvent based corrosion protection oil, 60% evaporation residue, D60 solvent                     | 16.5<br>at 20 °C                                            | 840                                         | 0.006                                        | 5                                     | 9-12                           | 18-24                          | >60        | –                     | –   | –                                   |
| <b>ANTICORIT 04 W 2</b>                               | Pre-diluted corrosion protection oil, 75% evaporation residue, isoparaffin                       | 32<br>at 20 °C                                              | 906                                         | De-<br>pends<br>on<br>conc.                  | De-<br>pends<br>on<br>conc.           | 6-12                           | 12-20                          | >60        | –                     | –   | –                                   |
| <b>ANTICORIT 04 W 2 VOC kon.</b>                      | Pre-diluted corrosion protection oil, 75% evaporation residue, VOC-free according to 31. BlmSchV | 47<br>at 20 °C                                              | 920                                         | De-<br>pends<br>on<br>conc.                  | De-<br>pends<br>on<br>conc.           | 6-12                           | 12-20                          | >90        | –                     | –   | –                                   |

## Corrosion Preventives

| Product name                                   | Description                                                                            | Kin. visc. at 40 °C<br>[mm <sup>2</sup> /s]<br>DIN 51562 | Density at 15 °C<br>[KG/m <sup>3</sup> ] | Consumption<br>[l/m <sup>2</sup> ] | Film weight<br>[g/m <sup>2</sup> ] | Shed storage<br>[Mon.] | Hall storage<br>[Mon.] | FP<br>[°C] | Thixotropic | VCI | Lubricating properties |
|------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------|------------------------------------|------------------------------------|------------------------|------------------------|------------|-------------|-----|------------------------|
| Water Displacing Corrosion Protection Products |                                                                                        |                                                          |                                          |                                    |                                    |                        |                        |            |             |     |                        |
| <b>ANTICORIT DFO 6101</b>                      | Dewatering fluid, leaving a thin, oily protection layer                                | 1.8 at 20 °C                                             | 795                                      | 0.001                              | 0.8                                | 3-6                    | 6-12                   | >40        | –           | –   | –                      |
| <b>ANTICORIT DFO 6301</b>                      | Dewatering fluid, leaving a thick, oily protection layer                               | 2.6 at 20 °C                                             | 821                                      | 0.002                              | 2                                  | 6-12                   | 12-24                  | >40        | –           | –   | –                      |
| <b>ANTICORIT DFO 7101</b>                      | Dewatering fluid, leaving a thin, oily protection layer                                | 2.8 at 20 °C                                             | 810                                      | 0.001                              | 1                                  | 3-6                    | 6-12                   | >60        | –           | –   | –                      |
| <b>ANTICORIT DFO 7301</b>                      | Dewatering fluid, leaving a thick, oily protection layer                               | 4.6 at 20 °C                                             | 825                                      | 0.002                              | 2.5                                | 6-12                   | 12-24                  | >60        | –           | –   | –                      |
| <b>ANTICORIT DFO 8101</b>                      | Dewatering fluid, leaving a thin, oily protection layer, isoparaffin                   | 2.4 at 20 °C                                             | 780                                      | 0.001                              | 1                                  | 3-6                    | 6-12                   | >60        | –           | –   | –                      |
| <b>ANTICORIT DFO 8301</b>                      | Dewatering fluid, leaving a thick, oily protection layer, isoparaffin                  | 4 at 20 °C                                               | 800                                      | 0.002                              | 2.5                                | 6-12                   | 12-24                  | >60        | –           | –   | –                      |
| <b>ANTICORIT DFO 9101</b>                      | Dewatering fluid, leaving a thin, oily protection layer, VOC-free acc. to 31. BlmSchV  | 4.4 at 20 °C                                             | 820                                      | 0.001                              | 1                                  | 3-6                    | 6-12                   | >90        | –           | –   | –                      |
| <b>ANTICORIT DFO 9301</b>                      | Dewatering fluid, leaving a thick, oily protection layer, VOC-free acc. to 31. BlmSchV | 7.2 at 20 °C                                             | 835                                      | 0.002                              | 2.5                                | 6-12                   | 12-24                  | >90        | –           | –   | –                      |
| <b>ANTICORIT DFW 6101</b>                      | Dewatering fluid, leaving a thin, waxy protection layer                                | 1.6 at 20 °C                                             | 795                                      | 0.001                              | 1                                  | 3-6                    | 6-12                   | >40        | •           | –   | –                      |
| <b>ANTICORIT DFW 6301</b>                      | Dewatering fluid, leaving a thick, soft waxy protection layer                          | 3.7 at 20 °C                                             | 813                                      | 0.002                              | 2                                  | 6-12                   | 12-24                  | >40        | •           | –   | –                      |
| <b>ANTICORIT DFW 7101</b>                      | Dewatering fluid, leaving a thin, waxy protection layer                                | 2.7 at 20 °C                                             | 800                                      | 0.001                              | 1                                  | 3-6                    | 6-12                   | >60        | •           | –   | –                      |
| <b>ANTICORIT DFW 7301</b>                      | Dewatering fluid, leaving a thick, soft waxy protection layer                          | 4.3 at 20 °C                                             | 820                                      | 0.002                              | 2.5                                | 6-12                   | 12-24                  | >60        | •           | –   | –                      |
| <b>ANTICORIT DFW 8101</b>                      | Dewatering fluid, leaving a thin, waxy protection layer, isoparaffin                   | 3.5 at 20 °C                                             | 780                                      | 0.001                              | 1                                  | 3-6                    | 6-12                   | >60        | •           | –   | –                      |
| <b>ANTICORIT DFW 8301</b>                      | Dewatering fluid, leaving a thick, soft waxy protection layer, isoparaffin             | 3.7 at 20 °C                                             | 800                                      | 0.002                              | 2.5                                | 6-12                   | 12-24                  | >60        | •           | –   | –                      |

# ANTICORIT

| Product name                                           | Description                                                                                           | Kin. visc. at 40 °C<br>[mm²/s]<br>DIN 51562 | Density at 15 °C<br>[KG/m³] | Con-<br>sump-<br>tion<br>[l/m²] | Film weight<br>[g/m²]       | Shed stor-<br>age<br>[Mon.] | Hall stor-<br>age<br>[Mon.] | FP<br>[°C] | Thix-<br>otropic | VCI | Lubri-<br>cating<br>proper-<br>ties |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|---------------------------------|-----------------------------|-----------------------------|-----------------------------|------------|------------------|-----|-------------------------------------|
| Water Displacing Corrosion Protection Products         |                                                                                                       |                                             |                             |                                 |                             |                             |                             |            |                  |     |                                     |
| ANTICORIT DFW 9101                                     | Dewatering fluid, leaving a thin, waxy protection layer, VOC-free acc. to 31. BlmSchV                 | 4.2 at 20 °C                                | 820                         | 0.001                           | 1                           | 3-6                         | 6-12                        | >90        | •                | –   | –                                   |
| ANTICORIT DFW 9301                                     | Dewatering fluid, leaving a thick, soft waxy protection layer, VOC-free according to 31. BlmSchV      | 6.7 at 20 °C                                | 835                         | 0.002                           | 2.5                         | 6-12                        | 12-24                       | >90        | •                | –   | –                                   |
| ANTICORIT DFW 9302                                     | Dewatering fluid, leaving a thick, soft waxy protection layer, VOC-free according to 31. BlmSchV      | 7.1 at 20 °C                                | 841                         | 0.002                           | 2                           | 6-12                        | 12-24                       | >100       | •                | –   | –                                   |
| ANTICORIT DFW 9601                                     | Dewatering fluid, leaving a very thick, soft waxy protection layer, VOC-free according to 31. BlmSchV | 10.4 at 40 °C                               | 855                         | 0.006                           | 5                           | 9-15                        | 18-24                       | >100       | •                | –   | –                                   |
| Water-miscible, Oily Corrosion Protection Products     |                                                                                                       |                                             |                             |                                 |                             |                             |                             |            |                  |     |                                     |
| ANTICORIT WMC 7000                                     | Emulsifiable corrosion protection oil with medium performance                                         | 60 at 40 °C                                 | 922                         | De-<br>pends<br>on<br>conc.     | De-<br>pends<br>on<br>conc. | De-<br>pends<br>on<br>conc. | De-<br>pends<br>on<br>conc. | >175       | –                | –   | –                                   |
| ANTICORIT WMC 9000                                     | Emulsifiable corrosion protection oil with high performance                                           | 100 at 40 °C                                | 942                         |                                 |                             |                             |                             | >175       | –                | –   | –                                   |
| ANTICORIT MKR 10                                       | Emulsifiable corrosion protection oil with high performance and thixo-tropic characteristics          | 128 at 40 °C                                | 931                         |                                 |                             |                             |                             | >150       | •                | –   | –                                   |
| ANTICORIT WOK 50                                       | Emulsifiable corrosion protection oil with high performance, semi stable emulsion                     | 180 at 40 °C                                | 948                         |                                 |                             |                             |                             | >190       | –                | –   | –                                   |
| Water-miscible, Synthetic Corrosion Protection Product |                                                                                                       |                                             |                             |                                 |                             |                             |                             |            |                  |     |                                     |
| ANTICORIT SKR 3001                                     | Mineral oil-free (synthetic) corrosion protection concentrate                                         | –                                           | 1030                        | De-<br>pends<br>on<br>conc.     | De-<br>pends<br>on<br>conc. | –                           | <1                          | –          | –                | •   | –                                   |



## Corrosion Preventives

| Product name                              | Description                                                                                                                  | Kin. visc. at 40 °C [mm <sup>2</sup> /s] DIN 51562 | Density at 15 °C [KG/m <sup>3</sup> ] | Consumption [l/m <sup>2</sup> ] | Film weight [g/m <sup>2</sup> ] | Shed storage [Mon.] | Hall storage [Mon.] | FP [°C] | Thixotropic | VCI | Lubricating properties |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------|---------------------------------|---------------------------------|---------------------|---------------------|---------|-------------|-----|------------------------|
| <b>Waxy Corrosion Protection Products</b> |                                                                                                                              |                                                    |                                       |                                 |                                 |                     |                     |         |             |     |                        |
| <b>ANTICORIT BW 10</b>                    | Solvent containing corrosion protection wax, leaves a transparent touch dry film, contains Barium                            | FT - 4mm nozzle = 20s                              | 822                                   | 0.022                           | 18                              | 6-24                | 12-36               | >40     | •           | –   | –                      |
| <b>ANTICORIT BW 12</b>                    | Solvent containing corrosion protection wax, leaves a transparent touch dry film                                             | FT - 4mm nozzle = 17s                              | 809                                   | 0.010                           | 8                               | 6-18                | 12-24               | >60     | •           | –   | –                      |
| <b>ANTICORIT BW 366</b>                   | Solvent containing corrosion protection wax, leaves a brownish touch dry film with very high corrosion protection properties | FT - 4mm nozzle = 60s                              | 885                                   | 0.056                           | 50                              | 12-36               | 12-36               | >60     | •           | –   | –                      |
| <b>ANTICORIT HKW 350</b>                  | Solvent containing corrosion protection wax for cavity protection                                                            | FT - 4mm nozzle = 27s                              | 950                                   | 0.032                           | 30                              | 12-36               | 12-36               | >60     | •           | –   | –                      |
| <b>ANTICORIT CPX 3373</b>                 | Solvent-free corrosion protection wax with very high performance, air curing properties                                      | dyn. visc. at 300 1/min = 350m*Pas                 | 1005                                  | 0.075                           | 75                              | >36                 | >36                 | >135    | •           | –   | –                      |
| <b>ANTICORIT CPX 3373 LV</b>              | Solvent-free corrosion protection wax with very high performance, reduced thixotropic properties, easy to spray, air curing  | dyn. visc. at 300 1/min = 170m*Pas                 | 1005                                  | 0.030                           | 30                              | >24                 | >24                 | >220    | •           | –   | –                      |
| <b>ANTICORIT CPX 3373 HV</b>              | Solvent-free corrosion protection wax with very high performance, air curing properties                                      | dyn. visc. 300 1/min = 190m*Pas                    | 1005                                  | 0.075                           | 75                              | >36                 | >36                 | >160    | •           | –   | –                      |
| <b>ANTICORIT CPX 3373 UBC</b>             | High-viscous modification of ANTICORIT CPX 3373 for under body coating                                                       | dyn. visc. at 300 1/min = 500m*Pas                 | 1005                                  | –                               | –                               | >36                 | >36                 | >130    | •           | –   | –                      |
| <b>ANTICORIT CPW 9001</b>                 | Water-miscible wax dispersion for automotive outer skin protection                                                           | –                                                  | 1000                                  | 0.05                            | 50                              | 6-18                | 12-24               | –       | •           | –   | –                      |

# ANTICORIT

| Product name                        | Description                                                                                                                                            | Iron, Steel | Copper | Aluminium | Film weight [g/m <sup>2</sup> ] | Shed storage [Mon.] | Hall storage [Mon.] | FP [°C] | Thixotropic | VCI | Lubricating properties |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|-----------|---------------------------------|---------------------|---------------------|---------|-------------|-----|------------------------|
| <b>Volatile Corrosion Inhibitor</b> |                                                                                                                                                        |             |        |           |                                 |                     |                     |         |             |     |                        |
| <b>ANTICORIT VCI UNI O 40</b>       | Corrosion protection of closed systems like tanks and gear boxes. Miscible with diesel, gear oils, and other mineral oils                              | •           | •      | •         | –                               | ≤6                  | ≤24                 | >120    | –           | •   | –                      |
| <b>ANTICORIT VCI UNI IP 30</b>      | Corrosion protection of closed packaging systems like blisters and card board boxes. Suitable for e. g. power train components and body in white parts | •           | •      | •         | –                               | ≤6                  | ≤24                 | >60     | –           | •   | –                      |
| <b>ANTICORIT VCI FE W 50</b>        | Additive to improve corrosion protection properties of water based cleaners, cutting fluids and cooling fluids in closed systems                       | •           | –      | –         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI UNI W 50</b>       | Additive to improve corrosion protection properties of water based cleaners, cutting fluids and cooling fluids in closed systems                       | •           | •      | •         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI UNI S</b>          | Corrosion protection for easy application in already existing packaging solutions.                                                                     | •           | •      | •         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI UNI T</b>          | Corrosion protection for easy application in already existing packaging solutions. Suitable for small cavities.                                        | •           | •      | •         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI UNI G</b>          | Corrosion protection for easy application in already existing packaging solutions. Contains desiccants.                                                | •           | •      | •         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI UNI FI</b>         | VCI film for corrosion protection during shipping and storage (available as gusseted bags, flat films and others).                                     | •           | •      | •         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI UNI P</b>          | VCI paper for protection during shipping and storage.                                                                                                  | •           | •      | •         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |
| <b>ANTICORIT VCI FE P</b>           | VCI paper for protection of steel during shipping and storage.                                                                                         | •           | –      | –         | –                               | ≤6                  | ≤24                 | –       | –           | •   | –                      |

## Corrosion Preventives

| Product name               | Description                                                                | Kin. visc. at 40 °C<br>[mm <sup>2</sup> /s]<br>DIN 51562 | Density<br>at 15 °C<br>[KG/m <sup>3</sup> ] | Con-<br>sump-<br>tion<br>[l/m <sup>2</sup> ] | Film<br>weight<br>[g/m <sup>2</sup> ] | Shed<br>storage<br>[Mon.] | Hall<br>storage<br>[Mon.] |
|----------------------------|----------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------|----------------------------------------------|---------------------------------------|---------------------------|---------------------------|
| Spray Cans                 |                                                                            |                                                          |                                             |                                              |                                       |                           |                           |
| <b>ANTICORIT 5F</b>        | Rust preventative spray forming a thin film with active water displacement | 3.7<br>at 20 °C                                          | 813                                         | –                                            | 2.5                                   | 6-12                      | 12-24                     |
| <b>ANTICORIT BW 366</b>    | Solvent-based and durable high performance corrosion protection wax        | FT 4mm nozzle = 60s                                      | 885                                         | –                                            | 50                                    | 12-36                     | 12-36                     |
| <b>ANTICORIT DFG</b>       | Classic anti-corrosive oil and contact spray, multipurpose                 | 84                                                       | 887                                         | –                                            | 5                                     | 6-12                      | 12-24                     |
| <b>ANTICORIT RPC</b>       | Rust preventative spray, after evaporation a highly viscous film is formed | 84                                                       | 887                                         | –                                            | 5                                     | 6-12                      | 6-24                      |
| <b>ANTICORIT CPX 3373</b>  | Solvent-free and durable high performance corrosion protection wax         | Dyn. visc. at 300<br>1/min = 350m*Pas                    | 1005                                        | –                                            | 50                                    | >36                       | >36                       |
| <b>ANTICORIT SYNTH</b>     | Synthetic multipurpose oil                                                 | 102                                                      | 834                                         | –                                            | 15                                    | 3-6                       | 6-12                      |
| <b>RENOCLEAN E</b>         | Highly effective degreaser for multipurpose use                            | 1.7<br>at 20 °C                                          | 800                                         | –                                            | 0                                     | –                         | –                         |
| <b>ANTICORIT RP 4107 S</b> | Thixotropic corrosion protection oil, meets VDA 230-213                    | 35                                                       | 887                                         | –                                            | 11                                    | 6-12                      | 12-20                     |

# ANTICORIT

| Product name                               | Description                                                                             | Kin. visc.<br>at 40 °C<br>[mm <sup>2</sup> /s]<br>DIN 51562 | Density<br>at 15 °C<br>[KG/m <sup>3</sup> ] | Con-<br>sump-<br>tion<br>[l/m <sup>2</sup> ] | Film<br>weight<br>[g/m <sup>2</sup> ] | Shed<br>storage<br>[Mon.] | Hall<br>stor-<br>age<br>[Mon.] | FP<br>[°C] | Thix-<br>otro-<br>pic | VCI | Lubri-<br>cating<br>proper-<br>ties |
|--------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------|----------------------------------------------|---------------------------------------|---------------------------|--------------------------------|------------|-----------------------|-----|-------------------------------------|
| Maintenance Fluids for Dewatering Products |                                                                                         |                                                             |                                             |                                              |                                       |                           |                                |            |                       |     |                                     |
| <b>ANTICORIT DF 6000</b>                   | Water displacement, leaving no residues, D40 solvent                                    | 1.2<br>at 20 °C                                             | 780                                         | –                                            | –                                     | –                         | –                              | >40        | –                     | –   | –                                   |
| <b>ANTICORIT DF 7000</b>                   | Water displacement, leaving no residues, D60 solvent                                    | 2.0<br>at 20 °C                                             | 795                                         | –                                            | –                                     | –                         | –                              | >60        | –                     | –   | –                                   |
| <b>ANTICORIT DF 8000</b>                   | Water displacement, leaving no residues, isoparaffin solvent                            | 1.8<br>at 20 °C                                             | 777                                         | –                                            | –                                     | –                         | –                              | >60        | –                     | –   | –                                   |
| <b>ANTICORIT DF 9000</b>                   | Water displacement, leaving no residues, D90 solvent, VOC-free according to 31. BImSchV | 2.8<br>at 20 °C                                             | 810                                         | –                                            | –                                     | –                         | –                              | >90        | –                     | –   | –                                   |
| <b>ANTICORIT DFC 1001</b>                  | Additive to enhance water displacement properties                                       | 6.2<br>at 20 °C                                             | 953<br>at 20 °C                             | –                                            | –                                     | –                         | –                              | >105       | –                     | –   | –                                   |

## Forming Lubricants

## RENOFORM



| Product name                        | Description                                                                                                                  | Kin. visc.<br>at 40 °C<br>[mm²/s]<br>DIN 51562 | Density<br>at 15 °C<br>[KG/m³] | Copper<br>strip<br>test | Applica-<br>tion                            | Materials                                               | FP<br>[°C] |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------|-------------------------|---------------------------------------------|---------------------------------------------------------|------------|
| <b>RENOFORM<br/>MZA 08 T</b>        | Drawing oil for car body pressing used as spot lubricant                                                                     | 25                                             | 878                            | 2                       | Drawing,<br>deep-<br>drawing                | Steel and<br>aluminium                                  | 154        |
| <b>RENOFORM<br/>MCO 3802<br/>SN</b> | Drawing oil for car body pressing, meets VDA 230-201                                                                         | 100                                            | 918                            | 2                       | Drawing,<br>deep-<br>drawing                | Steel and<br>aluminium                                  | 142        |
| <b>RENOFORM<br/>MCO 3028</b>        | Suitable for drawing and deep-drawing of bodywork sheet metal for medium and difficult forming operations, meets VDA 230-201 | 130                                            | 918                            | 4                       | Drawing,<br>deep-<br>drawing                | Cold rolled,<br>galvanised<br>and aluminium<br>surfaces | 155        |
| <b>RENOFORM<br/>MCO 3028<br/>LV</b> | Mainly free of residues after evaporation, evaporation residue corresponds with RENOFORM MCO 3028                            | 2.5<br>at 20 °C                                | 775                            | 4                       | Stamping,<br>forming<br>and easy<br>drawing | Cold rolled,<br>galvanised<br>and aluminium<br>surfaces | 260        |

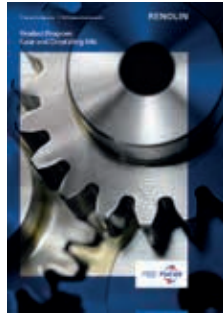
### Non Water-miscible Cold Rolling Oils

|                             |                                            |   |     |   |                                                           |                                 |      |
|-----------------------------|--------------------------------------------|---|-----|---|-----------------------------------------------------------|---------------------------------|------|
| <b>RENOFORM<br/>WO 52 B</b> | Rolling oil for cold rolling and skin pass | 6 | 850 | 1 | Cold<br>rolling,<br>rerolling,<br>corrosion<br>protection | Iron and non-<br>ferrous metals | >100 |
| <b>RENOFORM<br/>WO 79 A</b> | Rolling oil with high EP additivation      | 9 | 854 | 1 | Cold<br>rolling with<br>high reduc-<br>tions per<br>pass  | Iron and non-<br>ferrous metals | >170 |

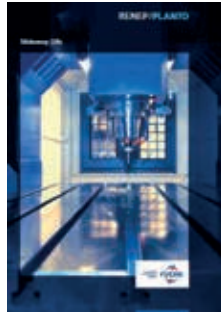
## Industrial Product Brochures



Hydraulic oils – RENOLIN



Gear and general lubricating oils – RENOLIN



Slideway oils – RENEP



Lubricants for the paper industry



Refrigeration oils – RENISO



Special lubricants for wind power plants



Rapidly biodegradable industrial lubricants – PLANTO



Lubricant solutions for the medical technology



AEROSPACE lubricants



ECOCOOL GLOBAL 10 PLUS – Metal working fluid for aerospace



Water-miscible and Neat Cutting Fluids – ECOCOOL / ECOCUT



ECOCUT FT-Series – Non water-miscible cooling lubricants based on innovative base oils



Quenching Oils and Polymer Quenchants – THERMISOL



Advanced Quenchants from FUCHS: For Performance and Peace of Mind



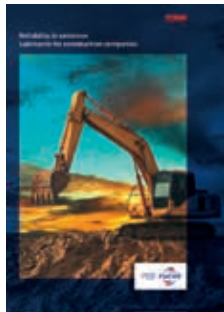
Cleaner for metalworking – RENOCLEAN



Lubricants in spray cans



## Automotive Product Brochures



Lubricants for construction companies



XTL for commercial vehicles



Lubricants for stationary gas engines



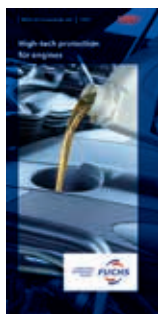
Lubricants for agricultural machinery



Rapidly biodegradable industrial lubricants – PLANTO



TITAN XTL for passenger cars



Motor oils for passenger cars



Gear oils



Automatic transmission fluids



Antifreeze, brake fluids and service products



XTL-Video for passenger cars



XTL-Video for commercial vehicles



Oils are not all created equal



Automatic transmission fluid flushing

## This image shows a blank sheet of white paper designed for writing. It features ten horizontal blue lines spaced evenly down the page. On the left side, there are four vertical red lines that serve as margins, creating three distinct columns of varying widths. The topmost column is the widest, followed by a narrower column, and then two more narrow columns at the bottom left. The rest of the page is open space for writing.

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## Innovative lubricants need experienced application engineers

Every lubricant change should be preceded by expert consultation on the application in question. Only then the best lubricant system can be selected. Experienced FUCHS employees will be glad to advise on products for the application in question and also on our full range of lubricants.

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