



# Product Program **Mining Lubricants**

V1



# 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.



## Facts and figures

**Company:** FUCHS LUBRICANTS SOUTH AFRICA, a company of the FUCHS Group

**Headquarters:** Isando

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

**Certifications:** IATF 16949, ISO 14001, ISO 45001

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 62 companies worldwide, the FUCHS Group is the leading independent supplier of lubricants.

A team of more than 950 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 tech-ology 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.

## The World of Mining Lubricants

FUCHS consistently relies on the so-called European Engine Lubricant Quality Management System (EELQMS), a European quality management system for engine oils. In addition to our development and production within the framework of the automotive industry quality standard IATF 16949, the EELQMS quality seal stands for highest product quality.



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### 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 longstanding 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** gear oils.

**TITAN**

### 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**

### 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**



**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**

**FUCHS lubricants**

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

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

-  Fuel saving
-  Process compatibility
-  Rapidly biodegradable
-  Corrosion protection
-  Reduced CO<sub>2</sub>
-  Extension of maintenance intervals
-  Food grade
-  Less wear
-  High thermal resistance
-  Reduced oil consumption

# MINING OILS

Technology driven lubricants developed by dedicated professionals are our CORE business.

As part of our commitment to technical excellence we continually develop new products and optimise existing products to better serve your mining needs.

Maintenance costs and breakdowns are reduced, your productivity increases and there's maximum value from your equipment. In addition, FUCHS mining lubricants can make a significant contribution to improved productivity in many other applications.

They can increase efficiency significantly and reduce energy consumption and associated CO2 emissions.

Engine Oils	14-17
Transmission Fluids	21-23
Multifunctional Oils	26-27
Service Products	30-31
Industrial Oils	36-37
Specialities	46
Greases	45-49
Planto	52-57
Aerosols	58

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#### TITAN CARGO SAE 15W-40

TITAN CARGO SAE 15W-40 was developed for use in the latest off highway mining equipment entering the market, with its advanced formulation it allowed for significantly extended drain intervals and a safety margin that other products could not offer.

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The drain intervals that were offered by other products was only 250 hours and with the introduction of this product the drain intervals were increased systematically to 500 hours. We have some applications where the oil was not drained until over 600 hours and the oil showed no signs of fatigue.

The product was proven to provide an extremely low rate of oil consumption vs products previously used. In special circumstance the oil has provided reliable protection and performance for up to 1000 hour drain intervals.



## ENGINE OILS

TITAN engine oils are the result of the latest research and development by the world's largest independent lubricant specialist. Developed together with leading automobile manufacturers, tailored to satisfy the demands of today's high-tech engines: offering outstanding high-performance, fuel-economy and wear protection.

TITAN engine oils: Premium quality from the German automobile industry's leading lubricant OEM.

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### Engine Oils

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Engine Oils for Commercial Vehicles	14-15
Monograde Engine Oils for Construction Machinery	16
Gas Engine Oils for Stationary Gas Engines	17

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# TITAN



# TITAN

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Engine Oils for Commercial Vehicles</b>				
<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 API CI-4/SL GLOBAL DHD-1 CAT ECF-1-a/ECF-2	CUMMINS CES 20076/7/8 DETROIT DIESEL 93K215 DEUTZ DQC III-10 MACK EO-N MAN M 3275-1 MB-APPROVAL 228.3 MTU DDC TYPE 2 RENAULT RLD/RLD-2 VOLVO VDS-3	ALLISON C-4 CAT TO-2 CASE MS 1121 CUMMINS CES 20071/2 IVECO 18-1804 CLASSE T2 E7 NH 330H

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Engine Oils for Commercial Vehicles</b>				
<b>TITAN CARGO MAXX SAE 10W-40</b>  <b>XTL</b> TECHNOLOGY	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 API CJ-4 CAT ECF-3 JASO DH-2	DEUTZ DQC IV-10 LA (incl. TTCD) MACK EO-O PREMIUM PLUS MAN M 3271-1 MAN M 3477 MAN M 3575 MB-APPROVAL 228.31 MB-APPROVAL 228.51 MTU DDC TYPE 2.1 MTU DDC TYPE 3.1 RENAULT RLD-3 SCANIA LA VOLVO VDS-4	CUMMINS CES 20081 DETROIT DIESEL 93K218 IVECO 18-1804 CLASSE TLS E9 IVECO 18-1809 CLASSE NG2 VOITH-RETARDER „B“
<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 E9/E7/E6 API CK-4/SN CAT ECF-3	CUMMINS CES 20077/8 DETROIT DIESEL 93K215 DEUTZ DQC III-10 MACK EO-M PLUS MACK EO-NMAN M 3277MB-APPROVAL 228.5 MTU DDC TYPE 3 RENAULT RXD/RLD-2 SCANIA LDF-2 VOLVO VDS-3	IVECO 18-1804SDFG OM-1901A
<b>TITAN CARGO SAE 15W-40</b>	Ultra High Performance, fuel-economy engine oil for a variety of commercial vehicle diesel engines. Specially developed for vehicles with extended service intervals, exhaust after treatment and turbocharger.	ACEA E9/E7/E6/E4 API CJ-4 JASO DH-2 CAT ECF-3	CUMMINS CES 20086 DETROIT DIESEL 93K222 DEUTZ DQC III-10 LA FORD M2C171-F1 MACK EOS-4.5 MAN M 3775 MB-APPROVAL 228.31 MTU DDC TYPE 2.1 RENAULT RLD-3 VOLVO VDS-4.5	MAN M 3575 RENAULT RLD-4



**TITAN**



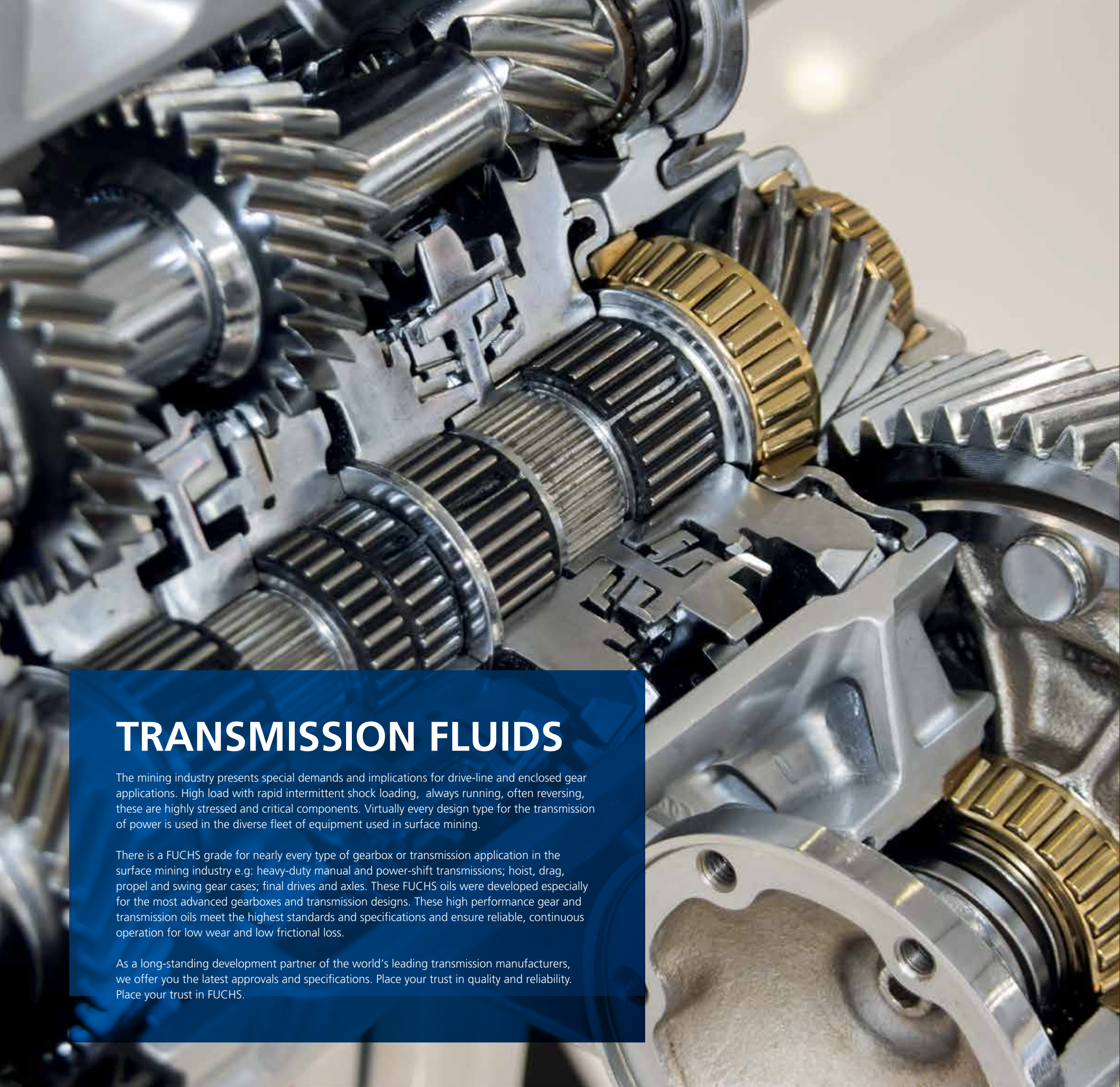
Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Monograde Engine Oils for Construction Machinery</b>				
<b>TITAN UNIVERSAL HD SAE 10W</b>	High Performance Monograde Engine Oil for gasoline and diesel engines. Specially developed for off-road vehicles. Depending upon manufacturer regulation also in other aggregates applicable.	–	MAN 270 ZF TE-ML 03B (ZF002013)	ACEA E2 API CF-4/SG MIL-L-2104 D ALLISON C-4 CAT TO-2 MB 228.0 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 MTU DDC TYPE 2 ZF TE-ML 04B (ZF001189)	ACEA E2 API CF-4/SG MIL-L-2104 D ALLISON C-4 CAT TO-2 MAN 270 MB 228.2 ZF TE-ML 02C
<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 MB-APPROVAL 228.2 MB-APPROVAL 235.12 MTU DDC TYPE 2 ZF TE-ML 04B (ZF001190)	ACEA E2 API CF-2/CF-4/SG MIL-L-2104 D ALLISON C-4 CAT TO-2 MAN 270 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 MAN M 3275-2	ACEA E2 API CF-2/CF-4/SG MIL-L-2104 D ALLISON C-4 CAT TO-2 MB 228.0 ZF TE-ML 02C

**TITAN**



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 AGROGEN, CATERPILLAR TR 0199-99-12105 INNIO JENBACHER TA 1000-1109 - A, CAT: series 2, 3, 4 (A, B), 6 (C, E) - B, CAT: series 2, 3, 4 (A, B), 6 (C, E) MAN M 3271-4 MTU Onsite Energy A001072/01D MWM TR 0199-99-2105 SEVA TRS-07, SPANNER RE <sup>2</sup> TEDOM 61-0-0281.1/L, B, S	–
<b>TITAN GANYMET PLUS</b>	Super High Performance Engine Oil, zinc-free, for stationary gas engines.	–	CATERPILLAR TR 0199-99-12105 DREYER & BOSSE INNIO JENBACHER TA 1000-1109 - B: series 2, 3 MTU Onsite Energy A001072/01D MWM TR 0199-99-2105 SEVA TRS-07	–
<b>TITAN GANYMET PLUS LA</b>	Super High Performance Engine Oil with low sulphated ash content, zinc-free, for stationary gas engines.	–	CATERPILLAR TR 0199-99-12105 DEUTZ TR 0199-99-01213 MWM TR 0199-99-2105, SEVA TRS-07 TEDOM 61-0-0281.1/G, P	CATERPILLAR CUMMINS WAUKESHA
<b>TITAN GANYMET</b>	High Performance Engine Oil for stationary gas engines.	–	ASIA AMBIENTE ITALIA GE JENBACHER TA 1000-1109, -C: series 2, MAN M 3271-4 MTU Onsite Energy A001072/01D SEVA TRS-07	
<b>TITAN GANYMET LA</b>	High Performance Engine Oil with low sulphated ash content for stationary gas engines.	–	CATERPILLAR TR 0199-99-12105 DEUTZ TR 0199-99-01213 GE JENBACHER TA 1000-1109 -A, CAT: series 2, 3, 4 (A, B), 6 (C, E) MAN M 3271-2 MTU Onsite Energy A001072/01D MWM TR 0199-99-2105 SEVA TRS-07	CATERPILLAR CUMMINS WAUKESHA

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



## TRANSMISSION FLUIDS

The mining industry presents special demands and implications for drive-line and enclosed gear applications. High load with rapid intermittent shock loading, always running, often reversing, these are highly stressed and critical components. Virtually every design type for the transmission of power is used in the diverse fleet of equipment used in surface mining.

There is a FUCHS grade for nearly every type of gearbox or transmission application in the surface mining industry e.g: heavy-duty manual and power-shift transmissions; hoist, drag, propel and swing gear cases; final drives and axles. These FUCHS oils were developed especially for the most advanced gearboxes and transmission designs. These high performance gear and transmission oils meet the highest standards and specifications and ensure reliable, continuous operation for low wear and low frictional loss.

As a long-standing development partner of the world's leading transmission manufacturers, we offer you the latest approvals and specifications. Place your trust in quality and reliability. Place your trust in FUCHS.

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### Transmission Fluids

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Gear Oils for Commercial Vehicles	21
Automatic Transmission Fluids (ATF)	23

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TITAN GEAR FD SAE 60

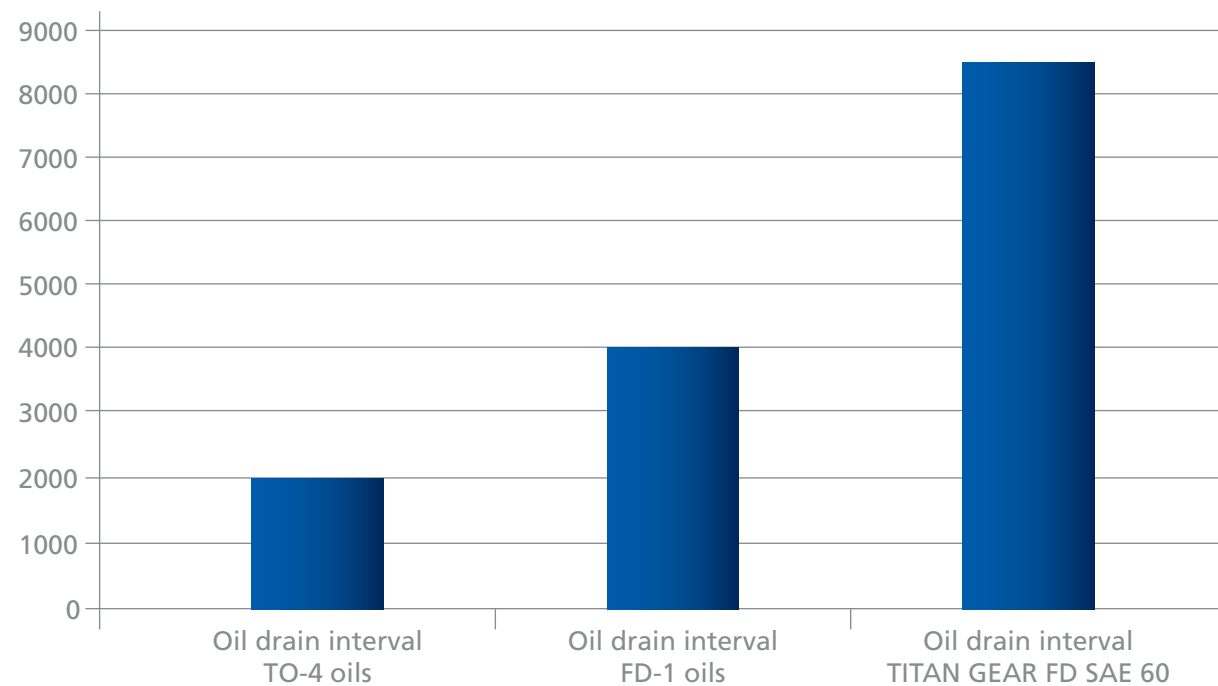
TITAN GEAR FD SAE 60 was designed for use where the specification FD-1 is called for, it was developed and tested in close co-operation between the FUCHS driveline specialists and with various major mining houses in Australia to meet and exceed the requirements of Caterpillar.

With the introduction of the new 795 CAT trucks into the market that did not have wet brakes, it was decided to change from a standard TO-4 SAE 60 oil to a dedicated final drive oil, with capabilities to double the oil drain interval and to lower wear rates

The change to the new TITAN GEAR FD SAE 60 allowed the oil drain intervals to be moved from 2000 hours to in excess of 4000 hours.

In some instances TITAN GEAR FD SAE 60 oil drain intervals have been extended to 8000 hours

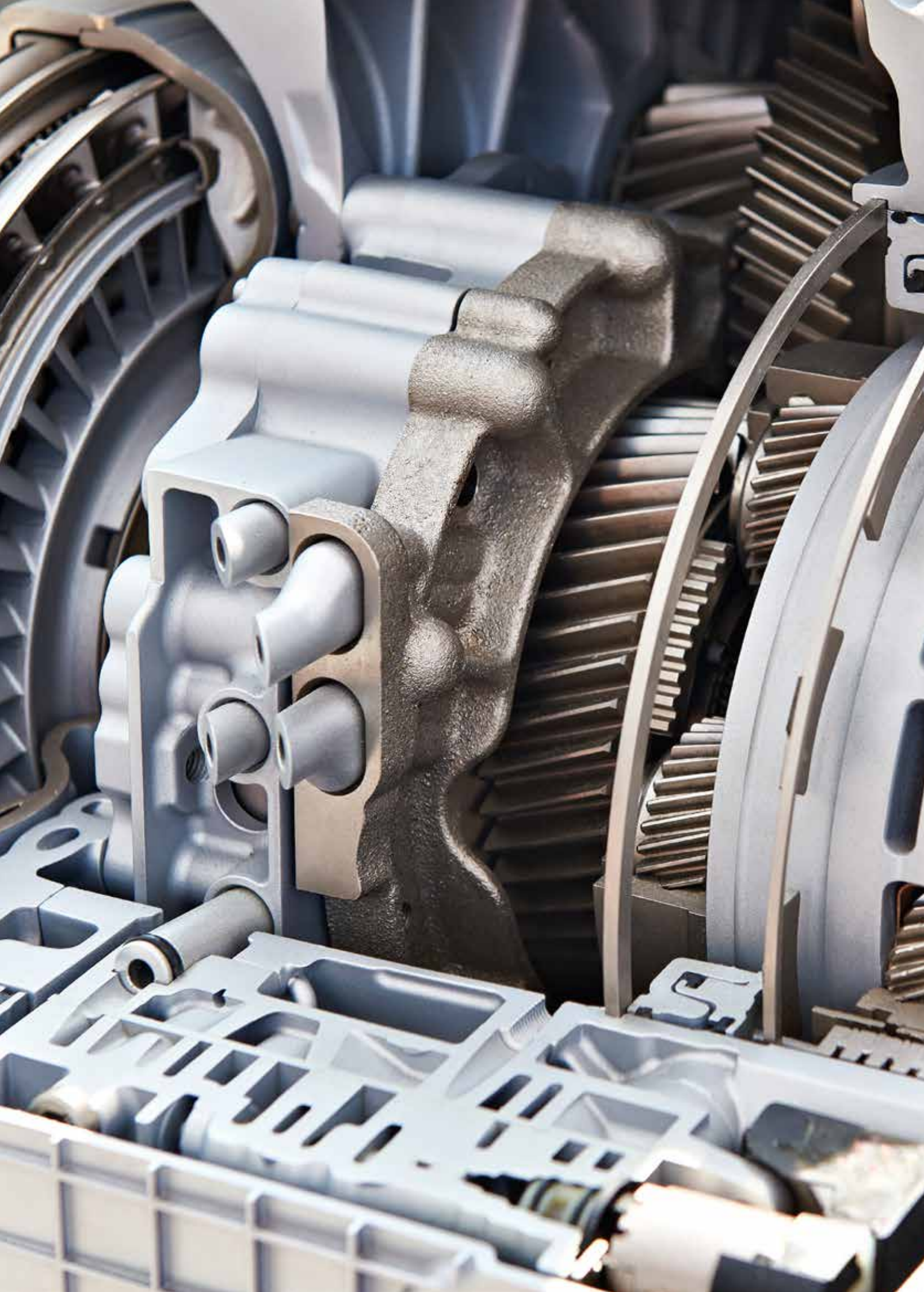
Benefits include: Reduced maintenance costs, Increase equipment availability, Lower waste disposal costs



Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Gear Oils for Commercial Vehicles</b>				
<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 SCANIA STO 1:0	–	JOHN DEERE JDM J11E OPEL 19 42 386 RENAULT VI VOLVO 97310 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 ZF TE-ML 05A, 12E, 17B, 19B, 21A (ZF000647)	MIL-L-2105 D VOLVO 97310 NH 520A 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 VOLVO 97310
<b>TITAN GEAR FD SAE 60</b>	Specialty final drive and axle oil, designed to meet CAT Specification FD-1. A SAE viscosity grade 60 final drive and axle oil. Also suitable for use in Allison transmissions for on-road and off-highway applications where a C4 specification is required.	CATERPILLAR FD-1	–	–
<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 SAE J306: 85W-90	ZF TE-ML 05C, 12C, 16E, 21C (ZF000651)	MIL-L-2105 D FORD M2C104-A JOHN DEERE JDM J11F NH 520B VOLVO 97310
<b>TITAN GEAR MP SAE 80</b>	High Performance Gear Oil for synchronized and non-synchronized manual gearboxes as well as auxiliary drives, axles and differentials in commercial vehicles and passenger cars.	API GL-4	MB-APPROVAL 235.1 ZF TE-ML 17A (ZF000654)	BMW 81 22 9 407 052 BMW 81 22 9 407 053 FORD M2C9008-A VW TL 726 ZF TE-ML 08
<b>TITAN CYTRAC SL SAE 75W-90</b>	High Performance Gear Oil for synchronized and non-synchronized manual gearboxes as well as auxiliary drives, axles and differentials in commercial vehicles and passenger cars.	API GL-5 SCANIA STO 1:0	MAN 341 TYPE S1	JOHN DEERE JDM J11E JOHN DEERE JDM J11G MB 235.8 VOLVO 97312 ZF TE-ML 05B, 07, 08, 12B, 16F, 17B
<b>TITAN CYTRAC HSY SAE 75W-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 SAE J306: 85W-90	ZF TE-ML 05A, 12L, 12N, 16F, 17B, 19C, 21A (ZF000642)	MAN 341 TYPE E3 MAN 341 TYPE Z2 MAN 342 TYPE M3 MAN M 3343 TYPE S JOHN DEERE JDM J11E JOHN DEERE JDM J11G SCANIA STO 1:0 ZF TE-ML 05B, 07, 21B

**TITAN**

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Automatic Transmission Fluids (ATF)</b>				
<b>TITAN ATF 6008</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+) CHRYSLER 68157995AA FIAT 9.55550-AV5 JAGUAR 02JDE 26444 LAND ROVER LR023288 VW G 055 162; VW G 060 162
<b>TITAN ATF 6006</b>	Ultra High Performance ATF, specially developed to optimize the shifting performance of ZF automatic transmissions. Product dyeing: none.	–	–	AML Oil No. 4G4319A509/AAVS BENTLEY PY112995PA BMW 83 22 0 142 516 BMW 83 22 2 305 396 HYUNDAI 040000C905G JAGUAR FLUID 8432 LAND ROVER TYK500050 MASERATI 231603 VW G 055 005
<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.	–	EvoBus 27.000-017 MAN 339 TYPE V1 MAN 339 TYPE V2 MAN 339 TYPE Z3 MAN 339 TYPE Z12 MB-APPROVAL 236.9 VOITH 150.014524.xx VOLVO 97341 ZF TE-ML 04D, 14C, 16M, 16S, 20C, 25C (ZF001797)	DEXRON III (H) ALLISON TES 295 ALLISON TES 389 MAN 339 TYPE Z4
<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. Product dyeing: red.	JASO M315 TYPE 1A	–	DEXRON III BMW MINI 83 22 0 402 413 BMW MINI 83 22 7 542 290 CHRYSLER MS7176E/9602 (ATF +3/+4) DAIHATSU ALUMIX ATF MULTI FIAT 9.55550-AV1/AV4 FORD MERCON FORD M2C924-A/M2C922-A1 GM 9986195 HONDA ATF Z-I HYUNDAI SP III ISUZU BESCO ATF -II/ATF -III JATCO 3100 PLO85/FWD (N402)/JF506E (K17) JWS 3309/TYP T-IV MAZDA ATF D-III/ATF M-3/M-V MITSUBISHI SP-II-III NISSAN MATIC C/D/J SAAB 3309 SUBARU ATF OIL/ATF OIL SPECIAL/ATF HP SUZUKI ATF 3309/3317 TOYOTA TYPE D-2/T/T-II/T-III/T-IV VW G 052 990/055 025
<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 ALLISON TES 389 DEXRON III (H) MAN 339 TYPE L1 MAN 339 TYPE V1 MAN 339 TYPE Z1 MB-APPROVAL 236.1 MB-APPROVAL 236.9 VOITH H55.6335.xx VOLVO 97341 ZF TE-ML 04D, 14A (ZF000728)	BMW 81 22 9 400 272 BMW 81 22 9 400 275 BMW 81 22 9 400 783 BMW 83 22 0 403 248 BMW 83 22 9 407 765 BMW 83 22 9 407 807 BMW 83 22 9 407 858 BMW 83 22 9 407 859 CAT TO-2 FORD MERCON OPEL 19 40 707; OPEL 19 40 767 VW TL 521 62 (G 052 162) ZF TE-ML 02F, 03D, 09, 118 17C



# MULTIFUNCTIONAL OILS

In many applications in the agricultural and construction industries there are, in addition to Lubricants that are only used for a specific component so-called all-rounders: STOU and UTTO products.

Both were developed for use in transmissions and hydraulic systems and can also be used in brakes running in an oil bath (wet brakes).

STOU products can also be used in the engine if the relevant specifications are met. In simple terms, this means that a STOU is a UTTO with engine performance.

The advantages of such all-rounders are obvious: on the one hand, a real sort rationalization is possible, on the other hand, the risk of incorrect filling is significantly reduced.

FUCHS is a real pioneer in these UTTO and STOU lubricants and offers a comprehensive product range.

# Multifunctional Oils



Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>UTTO 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 SAE J 306: 75W-80	VOLVO WB 101	ALLISON C-4 CASE MS 1207/1209/1210 FORD M2C86-C FORD ESN-M2C134-D JOHN DEERE JDM J20C JOHN DEERE JDM J20D KOMATSU AXO 80 (KES 07.866) KUBOTA UDT FLUID MASSEY FERGUSON CMS M 1143, 1135 VOLVO WB 102 ZF TE-ML 03E, 03F, 05F, 06K
<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.	API GL-4	ZF TE-ML 05F, 06K, 17E, 21F (ZF000661)	VOLVO WB 101 ZF TE-ML 03E



Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>UTTO Oils for Construction Machinery</b>				
<b>TITAN UTTO TO-4 SAE 10W</b>	Super High Performance multi-functional lubricant for hydraulics in construction machinery.	API GL-4 CAT TO-4	ZF TE-ML 03C (ZF002186)	ALLISON C-4 KOMATSU KES 07.868.1
<b>TITAN UTTO TO-4 SAE 30</b>	Super High Performance multi-functional transmission lubricant for construction machinery.	API GL-4 CAT TO-4	ZF TE-ML 03C, 07F (ZF002185)	ALLISON C-4 ALLISON TES-439 KOMATSU KES 07.868.1
<b>TITAN UTTO TO-4 SAE 40</b>	Super High Performance multi-functional transmission lubricant for construction machinery.	API GL-4 CAT TO-4	ZF TE-ML 03C, 07F (ZF002185)	ALLISON C-4 ALLISON TES-439 KOMATSU KES 07.868.1
<b>TITAN UTTO TO-4 SAE 50</b>	Super High Performance multi-functional lubricant for final drives in construction machinery.	API GL-4 CAT TO-4	-	KOMATSU KES 07.868.1
<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 AGCO Q-186 (Whitefarm) ALLISON C-4; CASE MS 1230, 1210, 1209, 1207, 1206; CLAAS/LANDINI/SAME-Transmission CNH MAT 3505, 3506, 509 3525, 3526, 3540 FNHA-2-C-200.00 / -201.00 FORD M2C48-C3, ESN M2C86-B/C, M2C134-D JOHN DEERE JDM J20C KUBOTA UDT FLUID MASSEY FERGUSON CMS M1145, 1143, 1141, 1135 NH 410B SAE J300: 10W-30; SAE J306: 75W-80 SDFG OT 1891 A VALTRA G2-08, G2-B10



## SERVICE PRODUCTS

The FUCHS MAINTAIN range of workshop and service products is a comprehensive portfolio of coolants, brake fluids and fuel additives. FUCHS MAINTAIN offers your vehicle optimum protection at all times.

Our MAINTAIN products match with nearly every vehicle type and offer the best possible protection together with the latest technology.

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### Service Products

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Antifreezes	30-31
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Brake Fluids, Degreaser, Fuel Additives, Oil Binder, Cleaner	31
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## Service Products

## MAINTAIN

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Antifreezes</b>				
<b>MAINTAIN FRICOFIN LL 50</b>  <b>NEW</b>	Premium Performance Coolant Ready-Mix based on monoethylene glycol. Free from nitrite, amine, phosphate and silicates. Offers frost protection down to -35 °C. Product dyeing: orange.	ASTM D 3306 TYPE III ASTM D 6210 TYPE III-FF BS 6580:2010	CAT / MWM TR 0199-99-2091 DAF 74002 DEUTZ DQC CB-14 MAN 324 TYPE SNF MB-APPROVAL 326.3	ASTM D 4985 SAE J1034 Bez.Reg.Arnsbg. E62.12.22.64-2011-1 CATERPILLAR MAK A4.05.09.01 CHRYSLER MS 12106 CNH MAT 3624 CUMMINS CES 14603, CES 14439 DETROIT DIESEL 93K217 FIAT 9.55523 FORD WSS-M97-B44-D2 GM GMW 3420 (6277M) HYUNDAI MS 591-08 JAGUAR LAND ROVER STJLR.651.5003 JOHN DEERE JDM H5 KOMATSU AF-NAC (ready mix) (07.892 (2009)) LIEBHERR MD 1-36-130 MACK 014 GS 17009 MAZDA MEZ MN 121 D PSA B 71 5110 RENAULT 41-01-001/- -S Type D SAAB B 040 1065 SKODA 61-0-0257 TOYOTA TSK 2601G-8A VAUXHALL GME L1301 VOLVO COOLANT VCS (STD 418-0001) VW TL 774-D/F (G12+ / different colour)
<b>MAINTAIN FRICOFIN DP 50</b>  <b>NEW</b>	Ultra High Performance Coolant Ready-Mix based on monoethylene glycol. Free of nitrites, amines and phosphates with Si-OAT-technology. Offers frost protection down to -40 °C. Product dyeing: pink-violet	AFNOR NF R 15-601 TYPE 3 ASTM D 3306 TYPE III ASTM D 4985 BS 6580:2010 SAE J814 CUMMINS CES 14603	DEUTZ DQC CC-14 MB-APPROVAL 326.5 MB-APPROVAL 326.6 VW TL 774-G (G12++)	DETROIT DIESEL 93K217 MAN 324 TYPE Si-OAT SCANIA TB 1451

## MAINTAIN

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Antifreezes</b>				
<b>MAINTAIN FRICOFIN 50</b>  <b>NEW</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 TYPE 3 ASTM D 3306 TYPE III ASTM D 4985 BS 6580:2010 SAE J814	DEUTZ DQC CA-14 MB-APPROVAL 326.0	BMW GS 94000 (BMW N 600 69.0) DAF 74001 JENBACHER TA 1000-0201 LIEBHERR TLV 035/TLV 23009 A MAN 324 TYPE NF MAN 324 TYPE NF PRITARDER MTU MTL 5048 CAT / MWM TR 0199-99-2091 OPEL/GM B 040 0240 PN-C 40007:2000 VOITH TURBO 172.00225010 VW TL 774-C (G11)
<b>Brake Fluids</b>				
<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 3/4 ISO 4925 CLASS 3/4 SANS 1905:2007 SAE J 1703/1704	–	–
<b>MAINTAIN DOT 3</b> <b>NEW</b>	Hydraulic Brake and Clutch Fluid	–	–	FMVSS NR. 116 DOT 3 ISO 4925 SANS 1905:2007 SAE J 1703
<b>Degreaser</b>				
<b>MAINTAIN ENGINE CLEANER</b> <b>NEW</b>	Heavy Duty Solvent Based Engine Cleaner	–	–	–
<b>Fuel Additives</b>				
<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 Institute Gelsenkirchen MPL	–	–
<b>Cleaner</b>				
<b>BIO CLEAN</b>	Solvent free, readily biodegradable, environmentally friendly water based heavy duty cleaner	–	NSF Non Food compound listing-A1 (133135) SANHA HALAAL Approved	–



# 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), 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 CO2 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.

## Industrial Oils

Hydraulic Oils	34
Zinc-containing Hydraulic Oils, Fire-resistant Hydraulic Fluids	35
Turbine Oils, Screw Compressor Oils Piston and Rotary Vane Compressor Oils	36
Gear and Circulating Oils	36-37
Fully Synthetic Gear and Circulating Oils	37

# HYDRAULIC OILS

In many surface mining operations hydraulic excavators are taking on a greatly expanded role. The demands on these machines are increasing as is their importance to the efficiency and productivity of the mine. In turn the hydraulic oil is a crucial contributor to the efficiency and productivity of the excavator.

The hydraulic systems are always running at high load and often operate at full capacity (low tank volume, high circulation rates, high pressure) and potentially in very hot or very cold environments. In other words, today's hydraulic oils are a more critical component than ever. Standard hydraulic oils cannot reliably meet the requirements placed upon them in all instances. Therefore FUCHS offers a full range of hydraulic oils to meet the specific requirements of our customers operations. From premium performance mineral oils to special synthetics we have your hydraulic oil needs covered. The demand for lower fuel consumption and the associated reduction of emissions, while maintaining the same level of performance, can now only be met by using special hydraulic oils.

Fuel economy and energy saving are becoming more and more important. In the light of this, and in order to meet the special demands of a heavy machinery manufacturer, we have developed specialty hydraulic oil that significantly reduces fuel consumption while at the same time offering high efficiency and longer service life. Less maintenance and lower failure related downtime as well as a broader operating temperature range make a significant reduction in operating costs. You can benefit from our experience too!

## Industrial Oils

## RENOLIN

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Zinc-containing Hydraulic Oils</b>				
<b>RENOLIN B Plus Range</b>	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.	DIN 51524-2: HLP; ISO 6743-4: HM; Vickers vane pump	Denison HF-0, HF-1, HF-2; Bosch Rexroth RDE 90245	OUTOTEC; KOMATSU
<b>RENOLIN B HVI Range</b>	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.	DIN 51524-3, HVLP; ISO 6743-4, HV; ISO 11158; Denison HF0; Bosch Rexroth; Vickers; US Steel; Cincinnati Milacron		TEREX
<b>RENOLIN B HVI PLUS Range</b>	Hydraulic and lubricating oils based on high quality hydrated base oils (Group II). High viscosity index and excellent shear stability, in combination with extraordinary oxidation stability, effects in long lifetime. High wear protection by using zinc-containing AW/EP additives, demulsifying.	DIN 51524-3, HVLP; ISO 6743-4, HV; ISO 11158; Denison HF0; Bosch Rexroth; Vickers; US Steel; Cincinnati Milacron	Denison HF-0, HF-1, HF-2	–
<b>Fire-resistant Hydraulic Fluids</b>				
<b>RENOSAFE FireProtect Range</b>	Water-free, fire-resistant hydraulic fluids based on latest ester and additive technology, type HFDU. 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 HFDU oils acc. to ISO 12922.	DIN 51502; HEES, ISO 15380; HFDU according to ISO 12922; Biodegradable acc. to OECD 301 B >60%	–	–
<b>RENOSAFE WG Range</b>	Water glycol based, fire-resistant hydraulic fluids with excellent anti-wear and corrosion inhibitor properties. Provides highest thermal and oxidative stability.	DIN 51502: HFC ISO 12922: HFC	–	–
<b>SOLCENIC GM20</b>	Fire resistant HFA-E hydraulic fluid developed by the global R&D resources of the Fuchs Mining Division for worldwide application.	EPA 40 CFR 796.3240 modified OECD 301E "Ready Biodegradability"	Caterpillar Global Mining Specification EWN 8350; Joy Mining Machinery for 2% #18 according to Specification CTR 02-14; MSHA Approval: 35-A060002	–

## Industrial Oils

## RENOLIN

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Turbine Oils</b>				
<b>RENOLIN ETERNA Range</b>	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. Approved by SIEMENS, MAN and many other turbine manufacturers and power station operators.	DIN 51515-1 (TDP) with and without gearbox DIN 51515-2 (TGP) with and without gearbox DIN 51524-2: HLP DIN 51524-3: HVLP – (with exception of the VI) DIN 51517	GE GEK 28568 A GE GEK 32568 J GE GEK 101941 A GE GEK 107395 A Siemens TLV 901304 / 901305 Alstom HTGD 90117 V0001W Siemens MAT 812109 MAN Turbo AG – SP10000494596, Germany	–
<b>Screw Compressor Oils</b>				
<b>RENOLIN UNISYN OL Range</b>	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.	ISO 6743-3: L-DAA, L-DAB (reciprocating compressors); ISO 6743-3: L-DAG, L-DAH, L-DAJ (rotating compressors); DIN 51506: VDL	–	–
<b>RENOLIN SynAir 46</b>	High performance synthetic air compressor fluid, excellent bio-degradability according to OECD 301C > 60%. Excellent thermal and oxidation stability. Guarantee a reliable corrosion protection and compatibility with elastomers	OECD 301 C > 60% biodegradation	–	–
<b>RENOLIN GOLDSCREW SERIES</b>	Outstanding high-tech air compressor fluids for oil injected screw compressors. For extra-long oil lifetime.	DIN 51506-VDL; ISO 6743-3-DAJ	–	–
<b>Piston and Rotary Vane Compressor Oils</b>				
<b>RENOLIN C Range</b>	High viscosity index mineral oils and additives intended for the lubrication of reciprocating piston compressors and rotaryvane and screw compressors. Viscosity grade depends on manufacturer's recommendation.	DIN 51506 (VBL; VCL; VDL); ISO / DP 6521 (DAA; DAB; DAH; DAG)	–	–

Product name	Description	Specifications	Approvals	FUCHS Recommendations
<b>Circulating and Hydraulic Oils</b>				
<b>RENOLIN HO Range</b>	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.	ISO 6743-4: HL; ISO 6743-6; ISO 12925-1: CKB; DIN 51524-1: HL	–	–
<b>RENOLIN HO V Range</b>	Zinc free, high viscosity index hydraulic oils blended from carefully selected virgin base oils in combination with selected anti-wear, anti-rust, anti-oxidant and anti-foam additives.	DIN 51524-2: HLP; DIN 51524-3: HVLP; ISO 6743-4: HM; ISO 6743-4: HV	–	–
<b>RENOLIN UNISYN OL Range</b>	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.	DIN 51524-2: HLP; DIN 51524-3: HVLP	–	–
<b>Gear Oils</b>				
<b>RENOLIN CLP Range</b>	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.	DIN 51517-3: CLP ISO 6743-6 and ISO 12925-1: CKC / CKD / CKSMP AGMA 9005/E02: EP AIST 224 David Brown S1 53.101	Flender BA 7300, table A; Müller Weingarten AG, Germany DT 55 005, 10/2003; David Brown	OUTOTEC
<b>RENOLIN CLP PLUS Range</b>	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. RENOLIN CLP PLUS oils were developed especially for the extreme conditions (e.g. in surface mining).	DIN 51517-3: CLP; ISO 6743-6 and ISO 12925-1: CKC / CKD / CKSMP; AGMA 9005/E02: EP	Flender BA 7300, table A; CAT:rope shovel gearcase; SEW	OUTOTEC
<b>RENOLIN SUPER SERIES GO 1500</b>	High performance gear lubricant used in swing, drag and proper gear boxes found in draglines and other applications requiring a high viscosity grade gear lubricant.	ASTM D-2509	Bucyrus SD 4721	–





## SPECIALITY LUBRICANTS FOR THE MINING INDUSTRY

Machines that are used in mining production are subjected to massive loads, strong vibrations and extreme temperatures. Together with gear and machinery manufacturers, we develop innovative speciality lubricants for crushers, mills, rotary kilns and roller pressers. In doing this, we strive for highly application-specific solutions which help to effectively protect key machinery parts from wear, increase maintenance intervals and prolong the life of your equipment.



# 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

Off-Highway Greases	46
Multipurpose Automotive and Industry Greases	46
Rope Dressing	47
Plant Processing	47
Assembly Pastes	48
Specialities	48
Testimonials	49-50

## RENOLIT

Product name	Description	Applications
<b>Off-Highway Greases</b>		
<b>RENOLIT LUBRENE LMG 960 EP Range</b>	Ultra performing heavy duty grease with MoS <sub>2</sub> and graphite.	Highly loaded plain and roller bearings operating at low to medium speeds
<b>RENOLIT LUBRENE LX 5M 500 EP2</b>	Super high performing heavy duty grease with 5% MoS <sub>2</sub>	Highly loaded plain and roller bearings operating at low to medium speeds requiring 5% MoS <sub>2</sub>
<b>RENOLIT LUBRENE LIM 450 EP Range</b>	High performing Heavy duty multipurpose grease with MoS <sub>2</sub>	Medium to high loaded plain and roller bearings operating at low to medium speeds
<b>RENOLIT LUBRENE LX 960 EP Range</b>	Super High performing heavy duty grease with no solids	Highly loaded plain and roller bearings operating at low to medium speeds where solid free grease is required
<b>RENOLIT LUBRENE LI 500 EP2</b>	High performing heavy duty multipurpose grease with no solids	Medium to high loaded plain and roller bearings operating at low to medium speeds
<b>RENOLIT LUBRENE MULTI SERV OGL</b>	Medium to high loaded plain and roller bearings operating at low to medium speeds	Open gears, plain bearings, wire ropes
<b>RENOLIT LUBRENE WALK-IN CAM CPD</b>	Ultra performing lubricant designed for the walking cam mechanism found on drag lines	Draglines and open couplings
<b>Multipurpose Automotive and Industry Greases</b>		
<b>RENOLIT M Range</b>	Multipurpose grease with good corrosion protection	Extreme pressure (EP) grease for medium to high speed roller element or plain bearings
<b>RENOLIT SUPER LUPLEX Range</b>	Super high performing heavy duty grease with 5% MoS <sub>2</sub>	Highly loaded plain and roller bearings operating at low to medium speeds requiring 5% MoS <sub>2</sub>
<b>RENOLIT LUBRENE LX 220 EP2</b>	High performing Heavy duty multipurpose grease with MoS <sub>2</sub>	Medium to high loaded plain and roller bearings operating at low to medium speeds
<b>RENOLIT LUBRENE LX 960 EP Range</b>	Super High performing heavy duty grease with no solids	Highly loaded plain and roller bearings operating at low to medium speeds where solid free grease is required
<b>RENOLIT LUBRENE LX/CA 700 EP2</b>	Ultra performing long life grease with high water resistant qualities	Long life extreme pressure (EP) grease for low to medium speed roller element or plain bearings where hot, humid and wet environments are found
<b>RENOLIT LC-WP 2</b>	Multipurpose extreme water resistant grease	Extreme pressure (EP) grease for low speed roller element or plain bearings and underwater applications
<b>RENOLIT LSTO</b>	Ultra performing long life synthetic PAG grease	Gear units over a wide temperature range
<b>RENOLIT RED RUBBER GREASE</b>	Red elastomer grease	Automotive brake assemblies and lubricant oil resistant seals
<b>RENOLIT HI TEMP 220</b>	Super long life synthetic PAO grease	Long life extreme pressure (EP) grease for low to high speed roller element or plain bearings at elevated temperatures

Product name	Description	Applications
<b>Rope Dressing</b>		
<b>RENOLIT LUBRENE WIRE ROPE LUBRICANT</b>	Asphaltic based lubricant	Dragline ropes, Shaft guide ropes, civil and crane ropes
<b>NOXAL ROPE DRESSING 8 SUPER</b>	Solid type, bituminous based lubricant	Shaft ropes, Shaft guide ropes, civil and crane ropes
<b>RENOLIT LUBRENE WIRE ROPE LUBRICANT NF</b>	High performing Heavy duty multipurpose grease with MoS <sub>2</sub>	Medium to high loaded plain and roller bearings operating at low to medium speeds
<b>RENOLIT LUBRENE LX 960 EP Range</b>	Non-Fling fluid type grease	Civil and crane ropes
<b>RENOLIT GC R</b>	Solid containing grease spray	Gear, chain and rope spray
<b>Plant Processing</b>		
<b>RENOLIT LUBRENE OGL E HEAVY</b>	High performance heavy metal free lubricant	Solid containing open gear lubricant for process plants
<b>RENOLIT LUBRENE LX 960 EP2</b>	High performing heavy duty grease with no solids	Highly loaded plain and roller bearings operating at low to medium speeds where solid free grease is required
<b>RENOLIT SO-GFB</b>	High performance soft, stringy and adhesive semi-fluid sodium thickened grease	Geared couplings, semi-enclosed gearboxes
<b>RENOLIT LUBRENE TB GREASE</b>	Special sealing grease	Trunnion or plain bearings in mills
<b>RENOLIT LUBRENE AL CAST GREASE</b>	High temperature, water resistant grease	Slipper pads and lubricated couplings with high centrifugal forces
<b>RENOLIT TUBE MILL 6</b>	High performance block grease	High load, slow speed trunnion bearings
<b>CEPLATTYN GT 10</b>	Ultra high performance open gear lubricant	Light coloured, solid containing, high viscosity base oil lubricant for ultimate protection of open gears
<b>CEPLATTYN GT RN</b>	Ultra high performance running-in compound	Light coloured, solid containing, medium viscosity base oil lubricant for running-in of open gears
<b>CEPLATTYN 300</b>	High performance graphite adhesive lubricant	Primer for large Open Gears and lubrication of toothed racks and sliding surfaces
<b>CEPLATTYN KG10 HMF 1000, 2500</b>	High performance heavy metal free lubricant	Solid containing open gear lubricant for process plants
<b>CEPLATTYN KG 10 LC</b>	High performance heavy metal free viscous lubricant	Low consumption Solid containing open gear lubricant for process plants
<b>CEPLATTYN HT</b>	High temperature graphite adhesive lubricant	Kiln riding ring bearings, chains and rollers
<b>CEPLATTYN SF 10 and 30</b>	Super high performance solid free open gear lubricant	Solid free viscous lubricant open gear lubricant for process plants
<b>RENOLIT HIGH SPEED 2</b>	High performance synthetic grease	High temperature, medium to high speed roller element or plain bearings
<b>RENOLIT LUBRENE XHT 500</b>	High temperature grease	Slow moving plain and rolling bearings operating at extreme temperatures



Product name	Description	Applications
<b>Assembly Pastes</b>		
<b>RENOLIT ANTI SEIZE PMP</b>	Aluminium based anti-seize paste	Nuts, screws and bolts, steam pipe threads, boiler gaskets, drilling rod threads
<b>RENOLIT COPPER COMPOUND</b>	Copper based anti-seize paste	Nuts, screws and bolts, steam pipe threads, boiler gaskets, exhaust manifolds
<b>RENOLIT GR 2 EP</b>	Graphite based anti-seize grease	Drilling rods and sliding surfaces
<b>Specialities</b>		
<b>URETHYN E 2</b>	Ultra high performance synthetic based polyurea grease	High speed roller element or plain bearings at elevated temperatures
<b>URETHYN MP2</b>	Super High performance mineral based polyurea grease	Medium to high speed roller element or plain bearings
<b>STABYL TA</b>	Super high performance boom grease	Telescopic booms with Teflon plates
<b>LAGERMEISTER XXL</b>	Long life multi purpose grease	High temperatures, electric motors, roller element and plain bearings
<b>MOLYPAUL PBC GREASE</b>	Super high performing anti-seize compound	Threaded Fastenings, Plain Bearings, Pivots, Trips, Slow Moving Mating Surface and Splined Shafts



The importance of choosing the right lubricating grease or multi-service open gear lubricant must never be underestimated. These lubricants are integral components of heavy machinery, particularly for surface mining applications. bearings, both plain pin & bush type and rolling element type, and massive open gears are constantly subjected to extremely high load and shock load conditions, constant reversing and oscillating motion, and operating in the most severe environmental conditions.

Subjected to prolonged and continuous exposure to a combination of dust and dirt, water, process minerals contamination and extremes of hot and cold operating temperatures this class of lubricants is critical to the protection of your entire surface mining fleet.

### Testimonials

"It is recommended that RENOLIT LUBRENE LMG be used as the primary grease for our pin and bushes. Field trials and experience confirm it to be a superior grease. Moreover this reflects superior properties outlined in relative performance specifications. From a total cost perspective, reduced failures and longer life from wear components on critical mobile equipment are expected to lead to substantial savings."

- Senior engineer, diamond Mine in South Africa

### Testimonials

"Our fleet of draglines has been using LUBRENE CAM COMPOUND and MULTI -SERV OGL for the last 19 years, with excellent results. Due to this performance, excellent lives are being obtained and open gears last up to 24 years before replacement."

- Divisional dragline engineer, open Cast Coal Mine in South Africa



## PLANTO – REAL BIOGENIC LUBRICANTS

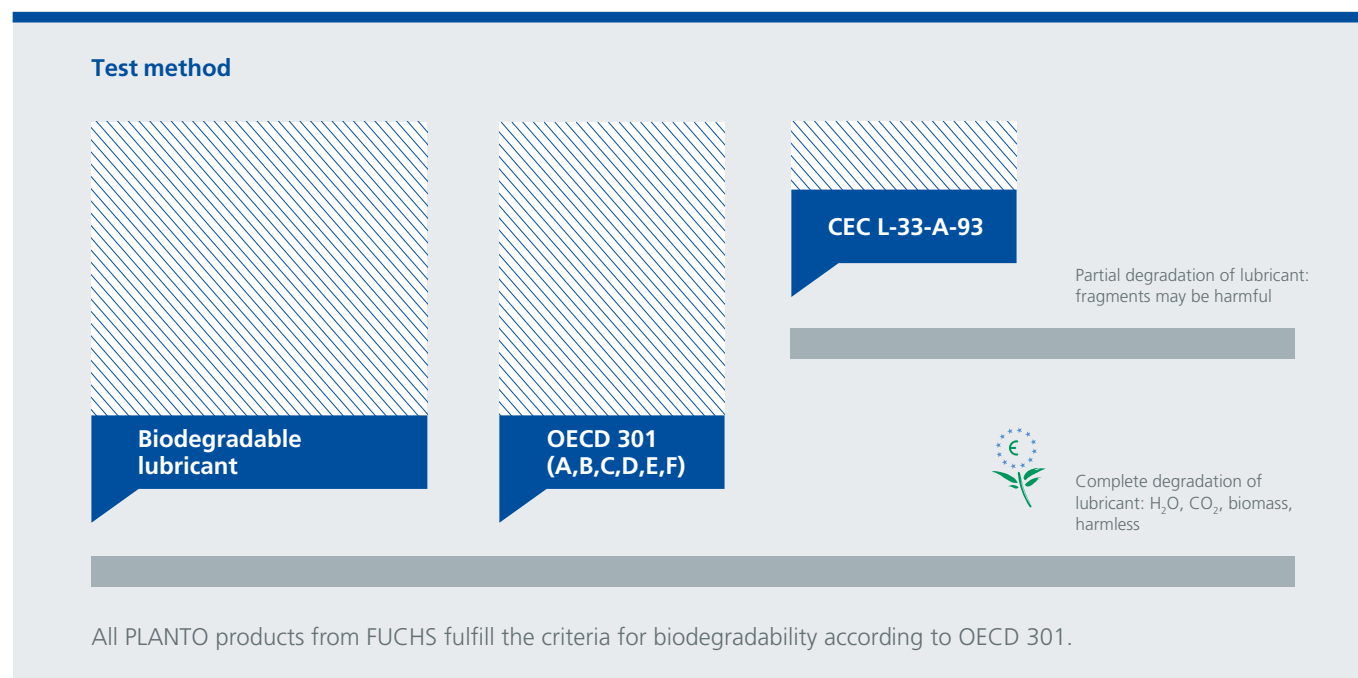
### Perfect Marriage Of Nature And State-Of-The-Art Technology

The new products from the PLANTO range are biogenic lubricants. In the past, so-called "bio-lubricants" could generally also be manufactured from oil products. Biogenic lubricants, on the other hand, contain a very high proportion of renewable raw materials. As such, they represent a further development of the "bio-lubricants", taking into account the source of the raw materials as well as environmental compatibility. For example, the carbon content derived from renewable raw materials is more than 50% for hydraulic fluids with the EU Ecolabel; for saw chain oil this is over 70%, for two-stroke and gear oils more than 50% and for lubricating greases in excess of 45%. Our rapidly biodegradable PLANTO products are based on synthetic esters or vegetable oils: This means that the natural oils are stabilized through chemical modification such that the finished products fulfill and surpass the required technical performance.

#### Planto - Real biogenics lubricants

Environmentally friendly industrial and hydraulic oils	54-55
Slideway oils, machine oils	55
Synthetically based compressor oils / circulating oils	55
Environmentally friendly industrial and hydraulic oils	56
Adhesive oils, machine oils	56
Forming and mold release oils	56
Air line lubricant	56
Saw chain oil	57
Automotive	57
Greases	57

# Requirements of rapidly biodegradable lubricants



## What does "biodegradable" mean?

There is no single definition of the term "biodegradable". The process of biological decomposition generally proceeds in various steps. In the first step of partial biological degradation, fragments of the initial material are formed, which can still be damaging to the environment. Only when the initial material has fully degraded to H<sub>2</sub>O, CO<sub>2</sub> and biomass is a lubricant said to be fully biodegradable. In contrast to CEC L-33-A-93, the OECD-301 test analyzes the full biodegradability of lubricants. Biodegradability according to CEC L-33-A-93 is no longer the state of the art for the rapidly biodegradable lubricants on the market today. Although the CEC L-33-A-93 standard from 1993 was updated with with CEC L-103-A-12 in 2012, the ultimate biodegradability tests according to OECD Guideline 301 are generally authoritative today.

## The six test methods according to OECD 301

OECD Guideline 301 is divided into six different test methods: A, B, C, D, E and F. A fluid is designated biodegradable when the dissolved organic carbon (DOC) has reduced by at least 70% in all six test methods within 28 days or the theoretical oxygen demand (ThOD) and theoretical carbondioxide production (ThCO) is at least 60%. These requirements relating to the biodegradability of lubricants also apply for the EU Ecolabel. Test methods B, C and F are applied for water-insoluble products such as oils or greases and are therefore authoritative for FUCHS. Water-soluble products such as the RENOLIN PG 35 hydraulic oil are tested according to OECD 301 C.

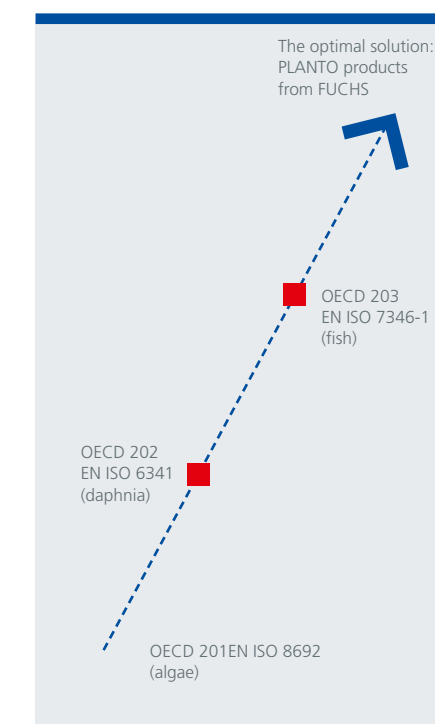
Test method	Principle	Test criterion
<b>301 B CO<sub>2</sub> formation (CO<sub>2</sub> evolution)</b>	A measured volume of the inoculated mineral medium, which contains a certain concentration of the test substance as the only nominal source of organic carbon, is aerated by the passage of carbon dioxide-free air at a controlled speed in the dark or in diffused light. The resulting CO <sub>2</sub> is trapped in sodium hydroxide and its content is determined by means of titration.	The amount of carbon dioxide derived from the test substance is given as a percentage of ThCO <sub>2</sub> . The degree of biodegradability can also be calculated by also determining the DOC at the beginning and end of the test.
<b>301 C MITI test</b>	A stirred solution, or suspension, of the test substance in a mineral medium, inoculated with specially grown, unadapted micro-organisms, is incubated in a darkened, enclosed respirometer at 25 ± 1°C. The evolved carbon dioxide is absorbed by soda lime.	The oxygen uptake of a test substance is automatically measured over 28 days. Biodegradability is given as the percentage of the oxygen uptake of the ThOD.
<b>301 F Manometric Respirometry</b>	A measured volume of the inoculated mineral medium, which contains a known concentration of the test substance as the nominal sole source of organic carbon, is stirred in a closed flask and is observed at a constant temperature over 28 days.	The consumption of oxygen is determined either by measuring the quantity of oxygen required to maintain a constant gas volume in the respirometer flask, or from the change in volume or pressure in the apparatus.

## The aquatic toxicity of lubricants

The lubricant must fulfill the requirements defined for the EEL regarding its main components or the requirements regarding every lubricant component that exists in a concentration of more than 0.10 percent by weight. The aquatic toxicity must not be determined if:

- the classification of the base oil or the additive is already defined on the lubricant substance classification list,
- a valid declaration of conformity can be presented,
- the substance is so large that it cannot penetrate any biological membranes (molecular mass > 800 g/mol, molecule diameter > 1.5 nm), or if the molecular weight fraction of a polymer is under 1.000 g / mol and amounts to less than 1% due to the low water solubility of the substance (< 10 µg / l)

The OECD also stipulates three different test methods for testing the aquatic toxicity of lubricants: OECD 201, 202 and 203. The concentration for acute aquatic toxicity to algae (OECD 201), daphnia (OECD 202) and fish (OECD 203) must be at least 100 mg / l for hydraulic fluids and gear oils. For all other lubricants, the concentration must be at least 1.000 mg / l according to the EEL. The EC50 value must be checked after 72 hours for algae or after 48 hours for daphnia, and the LC50 value must be checked after 96 hours for



## PLANTO

Product name	Description	Applications
<b>Environmentally friendly industrial and hydraulic oils</b>		
<b>PLANTOHYD 40 N*</b> <b>EU Ecolabel</b> <b>DE / 027 / 159</b>	Vegetable oil-based hydraulic oils with additives to increase oxidation and aging stability. >60% biodegradable (OECD 301). High wear protection (FZG stage 12). Surpass the minimum requirements of DIN 51524-3 HVLP. Exception: DIN 51587 "TOST" test. Miscible with conventional, mineral oil-based hydraulic oils. 46 N: HVLP 46, HETG 46 Designation according to DIN ISO 15380: HETG. Awarded the EU Ecolabel.	Universally deployable in hydraulic systems from -27°C to +70°C (container temperature). The changeover guidelines according to DIN ISO 15380 must be observed
<b>PLANTOHYD 15 S*</b> <b>EU Ecolabel</b> <b>DE / 027 / 154</b>	Synthetic ester oils with additives to increase aging stability. >60% biodegradable (OECD 301). High wear protection (FZG stage 12). Surpass the minimum requirements of DIN ISO 15380 HEES. Miscible and compatible with conventional, mineral oil-based hydraulic oils. 32 S: HVLP 32, HEES 32 46 S: HVLP 46, HEES 46 68 S: HVLP 68, HEES 68 Designation according to DIN ISO 15380 "HEES". ISO VG 15S – 46S: non-hazardous to water (NWG): Awarded the EU Ecolabel.	Universally deployable as a lubricating and hydraulic oil, especially in areas with strict environmental protection requirements / goals. Container temperature: -30°C to +90°C.
<b>PLANTOHYD 22 S*</b> <b>EU Ecolabel</b> <b>DE / 027 / 155</b>		Changeover guideline DIN ISO 15380 must be observed!
<b>PLANTOHYD 32 S*</b> <b>EU Ecolabel</b> <b>DE / 027 / 156</b>		
<b>PLANTOHYD 46 S*</b> <b>EU Ecolabel</b> <b>DE / 027 / 157</b>		
<b>PLANTOHYD 46 S*</b> <b>EU Ecolabel</b> <b>DE / 027 / 158</b>		
<b>PLANTOLUBE POLAR 15 S</b>	PLANTOLUBE POLAR S oils are environmentally friendly, rapidly biodegradable and have an extremely low pour point. Thanks to their very high VI, they can be used in a wide temperature range. POLAR S oils offer outstanding protection against corrosion and wear and are highly aging-resistant. Surpass the requirements of DIN 51 5242. Exception: "TOST test". Miscible and compatible with mineral oil.	Gears, bearings, actuators used at extremely low temperatures (e.g. polar regions). Hydraulic systems operated under similar temperatures can also be run with oils from the POLAR S range. The changeover guidelines according to DIN ISO 15380 must be observed.
<b>PLANTOLUBE POLAR 22 S</b>	POLAR 15 S: HVLP 15, HEES 15 POLAR 22 S: HVLP 22, HEES 22 Designation according to DIN ISO 15380.	



Product name	Description	Applications
<b>Environmentally friendly industrial and hydraulic oils</b>		
<b>PLANTOSYN 32 HVI*</b> <b>EU Ecolabel</b> <b>DE / 027 / 104</b>	Environmentally friendly hydraulic and circulating oils based on synthetic saturated esters. > 60% rapidly biodegradable according to OECD 301 B; high degree of wear protection, good seal and non-ferrous metal compatibility, excellent oxidation stability. Fulfills the minimum requirements of HEES hydraulic oils according to DIN ISO 15380 and HVLP according to DIN 51524-3. Awarded the EU Ecolabel.	Universally deployable in 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 changing intervals possible.  Container temperature: -30°C to 100°C. Observe DIN ISO 15380 when making changeovers.
<b>PLANTOSYN 46 HVI*</b> <b>EU Ecolabel</b> <b>DE / 027 / 105</b>		Approvals: MANNESMANN REXROTH SUNDSTRAND
<b>PLANTOSYN 46 HVI*</b> <b>EU Ecolabel</b> <b>DE / 027 / 106</b>		
<b>PLANTOSYN 3268*</b> <b>EU Ecolabel</b> <b>DE / 027 / 149</b>	Environmentally friendly, high temperature-stable HVI multigrade hydraulic oil based on fully saturated, synthetic ester (HEES), surpasses DIN ISO 15380, > 60% rapidly biodegradable according to OECD 301 B. Awarded the EU Ecolabel.	FUCHS recommendations: BOSCH REXROTH AG, CAT BF-1, KRAMER ALLRAD, PALFINGER, SAUER DANFOS, TIMBERJACK, VALMET / KOMATSU FOREST, PONSSE  Approvals: FENDT O&K
<b>PLANTOSYN 3268 ECO*</b> <b>EU Ecolabel</b> <b>DE / 027 / 160</b>	Environmentally friendly, universally deployable HVI multigrade hydraulic oil based on synthetic esters (HEES), > 60% rapidly bio-degradable according to OECD 301 B. Awarded the EU Ecolabel.	Approvals: FENDT KDM
<b>Slideway oils, machine oils</b>		
<b>PLANTOLUBE CGLP 68 S</b>	Slideway oil based on synthetic esters with very good biodegradability, prevents stick-slip. Load-carrying capacity and wear protection are particularly outstanding.	PLANTOLUBE CGLP 68 / 220 S are designed for use in combination with PLANTOCOOL and PLANTOCUT. For use in modern machine tools.
<b>PLANTOLUBE CGLP 220 S</b>		
<b>Synthetically based compressor oils / circulating oils</b>		
<b>PLANTOLUBE SC 46 S</b>	Fully synthetic, rapidly bio-degradable compressor oil; high aging stability; good air release properties; low evaporation tendency.	Based on saturated esters.



## PLANTO

Product name	Description	Applications
<b>Environmentally friendly industrial and hydraulic oils</b>		
<b>PLANTOGEAR 100 HVI*</b> EU Ecolabel DE / 027 / 177	Quickly biodegradable high-performance gear oils on the basis of special, saturated esters. Extremely high thermal and aging stability, high viscosity index, good viscosity-temperature behavior, for low-temperature applications, excellent 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, self-cleaning oils. The PLANTOGEAR S series of oils surpass the minimum requirements of CLP-E lubricating oils according to DIN 51517-3 together with DIN 51502, ISO 6743-6 and ISO 12925-1: CKC, CKD, CKE. The PLANTOGEAR HVI range and PLANTOGEAR S range have been awarded the EU Ecolabel.	For highly stressed spur, bevel, planetary and worm gears, above all in areas where leakage could present a hazard to soil and the ground or surface water. For both high and low application temperatures. High, shear-stable viscosity index. Can be used as a cleaning fluid.
<b>PLANTOGEAR 150 HVI*</b> EU Ecolabel DE / 027 / 178		
<b>PLANTOGEAR 220 S*</b> EU Ecolabel DE / 027 / 102		
<b>PLANTOGEAR 320 S*</b> EU Ecolabel DE / 027 / 103		
<b>PLANTOGEAR 460 S*</b> EU Ecolabel DE / 027 / 107		
<b>PLANTOGEAR 680 S*</b> EU Ecolabel DE / 027 / 108		
<b>Adhesive oils, machine oils</b>		
<b>PLANTOTAC HV 220 N</b>	High-quality adhesive oils based on vegetable oil, environmentally friendly and rapidly biodegradable. Adhesive oils from the PLANTOTAC HV range offer very good VT behavior and adhesive properties and excellent wear protection together with very high lubricating film strength. FZG test run A / 3.3 / 90, failure load stage > 12- 220 N: CG 220, 320 N: CG 320, 460 N: CG 460, 100S: CG 100 equivalent to PLANTOTAC HV-N only on the basis of aging-stable synthetic esters.	Predominantly for so-called point of loss lubrication, such as on non-oil-tight sealed bearings, saw frames, guide ways, joints, bolts, etc.
<b>PLANTOTAC HV 320 N</b>		
<b>PLANTOTAC HV 460 N</b>		
<b>PLANTOTAC HV 680 N</b>		
<b>PLANTOTAC HV 100 S</b>		
<b>Forming and mold release oils</b>		
<b>PLANTO Schaltungsöl N*</b> EU Ecolabel DE / 027 / 150	Based on vegetable oil, rapidly biodegradable. Synthetic ester oil with additives to increase aging stability. Awarded the EU Ecolabel.	Primarily used for steel shutterings in the concrete products and plastics industry. Flattening the cement surface. Special attention must be paid to compatibility with varnish and elastomers.
<b>Air line lubricant</b>		
<b>PLANTO DRILLSAFE 100</b>	Rapidly biodegradable air line lubricant for use with pneumatic tools.	Planto Drillsafe 100 was developed as an air line lubricant for use on pneumatic tools, and more specifically to reduce the health risks associated with the inhalation by workers of mineral lubricating oil-based aerosols, mists and vapours that are emitted in the equipment exhausts.
<b>PLANTO DRILLSAFE 150</b>	Readily biodegradable heavy-duty rock drill and hammer lubricant. Derived from harvestable raw materials. Environmentally harmless.	Planto Drillsafe 150 has been formulated to enable free flow through air line lubricators or integral oilers at the low temperatures which may be encountered.
<b>PLANTO DRILLSAFE 320</b>	Readily biodegradable heavy-duty rock drill and hammer lubricant.	PLANTO DRILLSAFE 320 is recommended for use in medium to large pneumatic hammers.



Product name	Description	Applications
<b>Saw chain oil</b>		
<b>PLANTO TAC 68*</b> EU Ecolabel DE / 027 / 177	Rapidly biodegradable, highly viscous and strongly adhesive chainsaw oil based on renewable raw materials. Awarded the EU Ecolabel.	PLANTO TAC 68 was developed specially for all lubricated saw chains which are used in the toughest conditions in environmentally sensitive areas such as protected water zones, forests, tree nurseries etc. PLANTO TAC 68 can also be used in all other areas in which an excellent chain lubricating oil is required. REXROTH SUNDSTRAND
<b>Automotive</b>		
<b>PLANTO MOT SAE 5W-40</b>	Super high-performance SAE class 5W-40 diesel engine oil. Rapidly biodegradable and particularly recommended for use with alternative diesel fuels.	For deployment in machines and commercial vehicles, e.g. construction machines, buses, forestry and agricultural equipment or piste maintenance machinery as well as passenger vehicles. When using diesel or biodiesel, engines can be changed over to PLANTO MOT without flushing, regardless of their mileage.  FUCHS recommendations: ACEA E3 / B3 API CG-4 KUBOTA SISU ZETOR
<b>PLANTO HYTRAC PLUS</b>	Special fluid (UTTO) for farming tractor gears / hydrostatic units with and without wet brakes.	PLANTO HYTRAC PLUS is deployed in manual transmissions and gear / hydraulic systems with and without integrated oil bath brakes. In the event of spillages or oil loss PLANTO HYTRAC PLUS remains in the upper layers of the earth to a large degree and is biologically degraded there.  Specifications: SAE 10W-30, SAE 80, FUCHS recommendations: Various tractor types
<b>Greases</b>		
<b>PLANTOGEL ECO 2 N*</b> (based on rape oil) EU Ecolabel DE / 027 / 113	Calcium soap, light brown, also available in NLGI 1. Awarded the EU Ecolabel.	Lubricating grease for lock gates, sewage plants, agriculture and forestry.
<b>PLANTOGEL ECO 2 S*</b> (based on synthetic esters) EU Ecolabel DE / 027 / 114	Lithium soap Awarded the EU Ecolabel.	For lubricating roller and plain bearings, e.g. in water turbines, agriculture and forestry.

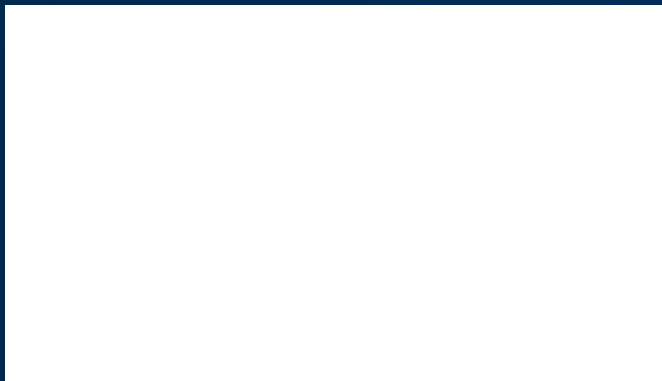







## Innovative lubricants need experienced application engineers

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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