

## 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 engineers will be glad to advise on products for the application in question and also on our full range of lubricants.



Contact:



## A Complete Product Line



## Hydraulic oils

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FUCHS EUROPE SCHMIERSTOFFE GMBH

# YOUR STRONG GLOBAL PARTNER FOR INDUSTRIAL LUBRICANTS



## HOW WE EXCEL

We are a German company which manufactures and markets a wide range of lubricants and derived specialties. The company, which was founded in 1931 as RUDOLF FUCHS, is located in Mannheim and is a 100 % subsidiary of FUCHS PETROLUB AG, which is the largest independent lubricants manufacturer worldwide.

Our company's degree of specialisation and innovation is way above the industrial average in this field. The full product line includes almost 2,000 lubricants and derived specialties for all walks of life, industrial processes and applications. Our customer's success is also our success. Because partnership to us means passing-on benefits.

The advantage of a strong market presence: FUCHS is the largest independent manufacturer of lubricants in the world. The benefit of premium, innovative products from a full-line manufacturer: With a complete product line as well as tailor-made special solutions, FUCHS has a product for every application. The benefits of reliability: Certified according to DIN EN ISO 9001:2000 and ISO/TS 16949:2002, FUCHS has been continuously upgrading its highly specialised lubricants for decades.

And naturally, partnership for us also means providing our customers with competent support. With comprehensive marketing. With high-performance logistics. With the development of successful service concepts. And qualified consulting. Because together, we can achieve more.

## WHAT INCREASES THE VALUE OF OUR PRODUCTS

**We develop lubricants: application-specific and tailor-made for our customer's processes.** Together we look for the best lubricants for our customers. This cooperation is unique in terms of its form, scope and intensity. **We call it development partnership.** The success of our development partnerships is based on an important fact: FUCHS is not one of the oil-giants.

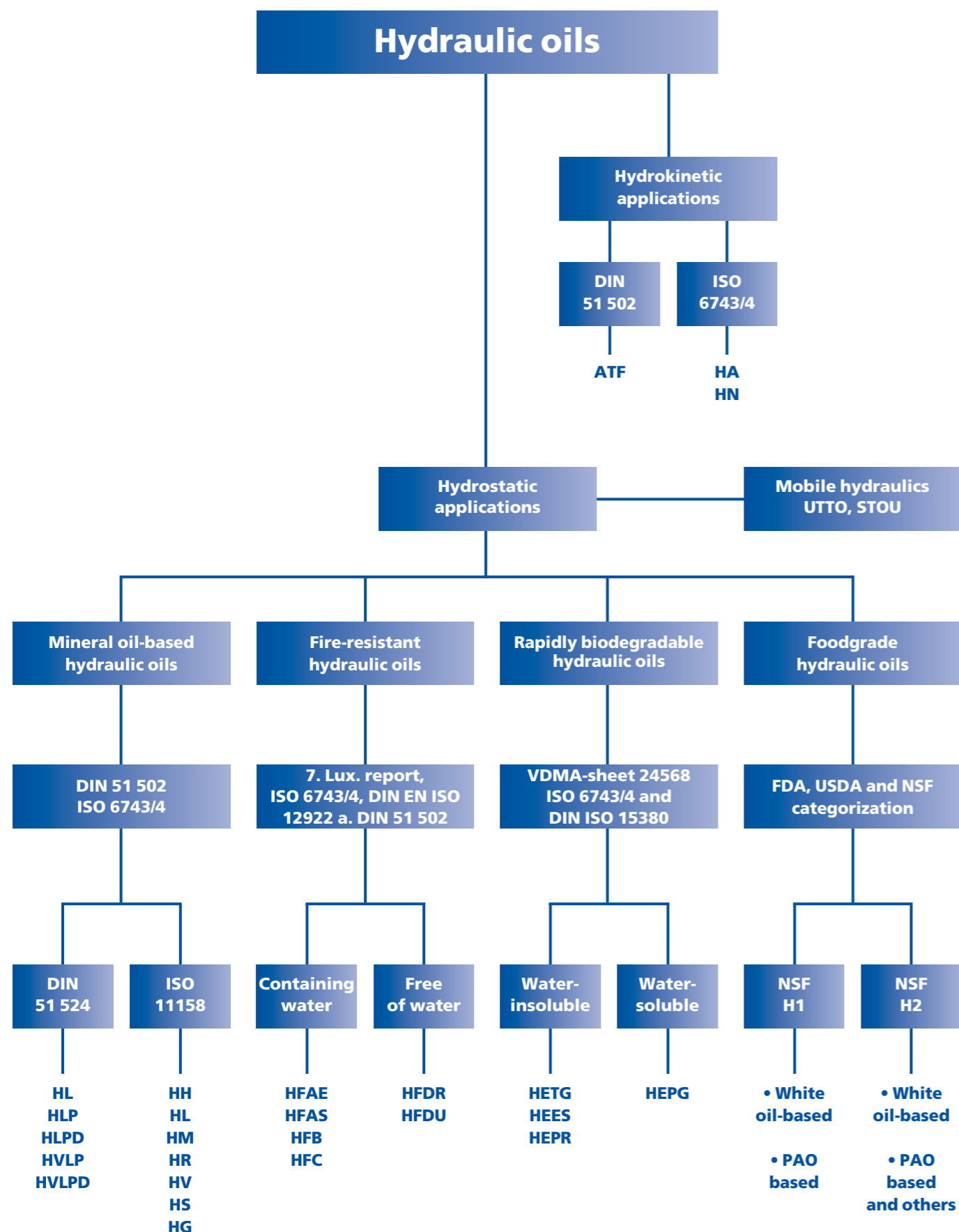
FUCHS is a multinational, independent lubricant manufacturer. Our independence is the difference. We are open to new solutions, open for visions – the prerequisites for innovations. And innovation is the defining characteristic of FUCHS. 70 % of our products are less than five years old and the great majority of our products are individual solutions. Challenge us and see!



DIN EN ISO 9001:2000  
ISO/TS 16949:2002  
DIN EN ISO 14001:2004  
REG.NR. 2476



## Summary of the various hydraulic oil categories.



## We combine technology with ecology.

### Fire-resistant hydraulic fluids.

HYDROTHERM 46 M is a well-known water-glycol fluid which complies with the 7th Luxembourg Report and has been approved by a host of component manufacturers. It offers extraordinarily long life, extremely good wear protection and high chemical stability.

The PLANTOFLUX AT-S series of HFDU fluids based on selected carbonic acid esters is approved by Factory Mutual in the USA and is used with great success in the iron, steel and aluminium industries. The fire-resistant hydraulic fluid range is rounded-off with RENOSAFE TURBO 46 DR (phosphoric acid ester) and the water-based HFAE- and HFAS-SOLCENIC products which are used in mining applications.

### Special fluids

Furthermore, we offer a wide range of special hydraulic fluids which satisfy every conceivable demand.

As one of the pioneers in the area of rapidly biodegradable fluids, our product program includes

PLANTOHYD – Partially saturated esters,  
 PLANTOSYN – Saturated esters,  
 PLANTOHYD S-NWG – Non-water-polluting ester products and  
 PLANTOLUBE POLAR – Low-temperature synthetic ester oils.

The PLANTO ENVIRO product series are newly developed, biodegradable hydraulic fluids based on selected ester oils. The products are awarded with the new European Eco Label ("Euro marguerite") and surpass the highest technical and ecological requirements with regard to excellent biodegradability, low toxicity, excellent performance. The raw materials are based on renewable sources: PLANTO ENVIRO HYD 46 S, PLANTO ENVIRO HYD 46 HVI

**The optimum fluid for every application – and the optimum solution for every problem.**

Please don't hesitate to contact our application engineers.

### RENOLIN Hydraulic oils – containing zinc

Name	Corrosion protection	Ageing stability	EP/AW Antiwear additives	Demulsifying	Detergent	Highly dispersant	High VI
RENOLIN B	●	●	●	●			
RENOLIN B-HVI	●	●	●	●			●
RENOLIN XtremeTemp	●	●!!!	●	●			●!
RENOLIN D	●	●	●				
RENOLIN MR	●!	●!	●		●	●	
RENOLIN MR 310/520	●!	●!	●		●	●	●!
RENOLIN MR-MC	●!	●!!!	●		●	●	●!
RENOLIN LD	●	●	●		●	●!	

### RENOLIN Hydraulic oils – zinc- and ash-free

Name	Corrosion protection	Ageing stability	EP/AW Antiwear additives	Demulsifying	Detergent	Highly dispersant	High VI
RENOLIN DTA	●	●		●			
RENOLIN ZAF-B	●	●	●	●			
RENOLIN ZAF-D	●	●	●		●		
RENOLIN MWB	●	●!	●!!! 1), 2)		●	●!	
RENOLIN ZAF-DT	●	●!	●!		●	●!	
RENOLIN ZAF-MC	●	●!!!	●	●			●!
RENOLIN ZAF 46 HT	●	●!	●	●			

! = Dominant characteristic (special additive reserves) 1) = Brugger Anti Wear > 50 Nmm<sup>2</sup> 2) = FE8-Roller Bearing Wear test = pass, excellent



## Specialties for the specialist – an overview.

### RENOLIN DTA – DTA – demulsifying general lubricating, spindle and hydraulic oils



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN DTA 2	Spindle, hydraulic and general lubricating oils (machine oils) containing selected base oils and additives to improve ageing stability and corrosion-protection. All RENOLIN DTA products are DIN 51524-1 (HL) hydraulic oils and DIN 51517-2 (CL) general lubricating oils, based on mineral oils, demulsifying (water-repellent) and free of zinc.  ISO 6743/4, HL, ISO 6743-6 and ISO 12925-1: CKB.	805	100	2,2	–	–	-27	For thermally-stressed bearings and hydraulic systems with peak temperatures of approx. 120 °C.
RENOLIN DTA 5		837	120	4,6	1,6	106	-40	
RENOLIN DTA 7		839	155	7,4	2,2	103	-27	
RENOLIN DTA 10		851	174	10	2,6	92	-27	General lubrication without specific wear protection demands (without AW/EP).
RENOLIN DTA 15		856	195	15	3,4	98	-27	
RENOLIN DTA 22		865	210	22	4,2	94	-27	(Consult product information 4-1292 for further details)
RENOLIN DTA 32		874	222	32	5,4	102	-24	
RENOLIN DTA 46		874	228	46	6,8	101	-24	
RENOLIN DTA 68		882	250	68	8,7	99	-18	
RENOLIN DTA 100		881	248	100	11,2	97	-18	
RENOLIN DTA 150		889	266	150	15,5	94	-15	
RENOLIN DTA 220		893	280	220	18,8	95	-12	
RENOLIN DTA 320		898	280	320	24,0	95	-12	
RENOLIN DTA 460	904	315	460	30,4	95	-12		
RENOLIN DTA 680	913	302	680	37,9	92	-12		

### RENOLIN B – high performance demulsifying AW/EP hydraulic and general lubricating oils, Denison HFO approved



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN B 3 VG 10	General lubricating and hydraulic oils with good ageing resistance and additives to improve corrosion protection. Good viscosity temperature behaviour, good wear protection, demulsifying, good air release, contain zinc. The RENOLIN B series fulfil and surpass the minimum demands on HLP hydraulic oils according to DIN 51 524-2.  ISO 6743/4, HM ISO 11158, HM Denison HFO, HF1, HF2	856	178	10	2,6	96	-30	As lubricating oils but also as hydraulic oils if good ageing resistance, wear protection and demulsifying properties are required. Universal hydraulic oils for all systems, even if thermally-stressed. Excellent filtration behaviour.
RENOLIN B 5 VG 22		863	180	22	4,4	107	-27	
RENOLIN B 10 VG 32		876	205	32	5,5	109	-24	
RENOLIN B 15 VG 46		875	210	46	6,9	105	-24	
RENOLIN B 20 VG 68		881	224	68	8,8	100	-24	
RENOLIN B 30 VG 100		881	232	100	11,1	96	-18	(Consult product information 4-1207 for further details)
RENOLIN B 40 VG 150	887	224	150	14,5	94	-15		

### RENOLIN B HVI – high performance emulsifying AW/EP hydraulic oils with a high Viscosity Index, Denison HFO approved



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN B 15 HVI	Hydraulic and general lubricating oils (machine oils) with a high Viscosity Index and additives to improve ageing resistance, corrosion protection and wear protection. Mineral oil-base and containing zinc. RENOLINB-HVI oils are HVLV hydraulic and general lubricating oils according to DIN 51 524-3.  ISO 6743/4, HV ISO 11158, HV Denison HFO, 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 specified or if excess viscosity during start-ups or insufficient viscosity at operating temperatures is a problem. High VI provides multigrade characteristics. "Energy-saving fluids", high-efficiency fluids.  (Consult product information 4-1222 for further details)
RENOLIN B 32 HVI		871	178	32	6,3	152	-48	
RENOLIN B 46 HVI		879	186	46	8,1	149	-45	
RENOLIN B 68 HVI		882	210	68	11,0	154	-42	

### RENOLIN XtremeTemp – high performance multigrade hydraulic fluid based on "New Generation" of base oils, shear stable, extended lifetime



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN XtremeTemp 32	Universal, high performance hydraulic fluids with high Viscosity Index and excellent shear stability (VI ≥ 180), based on selected hydro-treated base oils, high ageing stability, excellent corrosion protection, extended lifetime, excellent wear protection, fulfil and surpass DIN 51 524-3, HVLV, ISO 6743/4, HV, ISO 11158, HV, Denison HFO, HF1, HF2	861	216	32	6,9	185	-33	Universal high performance multigrade hydraulic fluids for stationary and mobile hydraulic systems, improvement of efficiency. "Energy-saving fluids", high-efficiency fluids, shear-stable viscosity index.  (Consult Product Information 4-1088 for further details).
RENOLIN XtremeTemp 46		865	234	49	9,3	180	-34	

\* PI = Product information  
EP = Extreme pressure additives, to avoid wear seizures and scuffing at high pressures and loads  
AW = Anti wear additives, to avoid wear in boundary friction conditions

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HL/CL oils (demulsifying)

HVLV oils (demulsifying)

HLP oils (demulsifying)

HVLV oils (demulsifying)

## Specialties for the specialist – an overview.

### RENOLIN D – detergent AW/EP hydraulic and general lubricating oils



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN D 2	Detergent hydraulic and general lubricating oils with additives to improve ageing resistance, corrosion protection and wear protection. Favourable viscosity-temperature behaviour. Contain zinc.  RENOLIN D products fulfil and surpass the minimum demands on HLPD hydraulic oils according to DIN 51 524-2.  ISO 6743/4-HM with DD-performance.	844	155	7,2	2,2	97	-27	RENOLIN D oils are used as lubricating oils but especially as hydraulic oils when good ageing resistance, good wear protection, detergency and demulsifying properties are required. Universal hydraulic oils for all systems, even if thermally-stressed.  (Consult Product Information 4-1010 for further details)
RENOLIN D 3		852	178	10	2,8	96	-30	
RENOLIN D 5		870	200	22	4,3	100	-27	
RENOLIN D 10		872	210	32	5,4	102	-24	
RENOLIN D 15		875	224	46	6,8	101	-27	
RENOLIN D 20		878	232	68	8,7	99	-24	
RENOLIN D 30	882	253	100	11,3	99	-21		

### RENOLIN MR 310/520/1030 – detergent AW/EP hydraulic and lubricating oils with an extremely high Viscosity Index



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN MR 310	Hydraulic and lubricating oils with extremely high Viscosity Index and outstanding cleaning and sludge transportation properties.  HVLDP according to DIN 51 502 together with DIN 51 524. ISO 6743/4, HV	855	120	15	5,4	360	-48	RENOLIN MR 310, 520 and 1030: For all hydraulic systems which are subject to larger temperature fluctuations or which are operated outdoors (e.g. canal locks and weir machinery).  (Consult Product Information 4-1054 for further details)
RENOLIN MR 520		867	170	32	9,0	270	-56	
RENOLIN MR 1030		873	214	68	11,0	154	-36	

### RENOLIN MR – high detergent AW/EP general lubricating and hydraulic oils with excellent corrosion protection



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN MR 0 VG 2	RENOLIN MR products are special HLPD lubricating and hydraulic fluids according to DIN 51 502 with outstanding corrosion protection, powerful cleaning and sludge transportation properties. Contain zinc as well as being detergent and dispersant. RENOLIN MR oils are used in a number of hydraulic systems as problem solvers, especially when standard oils cannot fulfil all the requirements. RENOLIN MR products fulfil and surpass the minimum demands on HLPD hydraulic oils according to DIN 51 524-2.  ISO 6743/4-HM with high DD-performance.	807	75	2,2	–	–	-42	RENOLIN MR 3: For machine tool spindles and bobbin bearings in the textile industry. RENOLIN MR 5, 10 and 20: Heavy-duty hydraulic oils with good corrosion protection up to continuous temperatures of 100 °C. RENOLIN 5, 10 and 20: For smaller gearboxes, especially when fitted with electromagnetic clutches. RENOLIN MR 30: For larger gearboxes. Running-in and corrosion protection oil. RENOLIN MR series allows oil changes to be extended.  (Consult Product Information 4-1249 for further details)
RENOLIN MR 1 VG 5		837	85	5	1,7	83	-36	
RENOLIN MR 3 VG 10		852	166	10	2,6	91	-30	
RENOLIN MR 5 VG 22		868	165	22	4,3	105	-30	
RENOLIN MR 10 VG 32		875	210	32	5,4	102	-30	
RENOLIN MR 15 VG 46		877	220	46	6,9	105	-27	
RENOLIN MR 20 VG 68		881	225	68	8,9	105	-24	
RENOLIN MR 30 VG 100		883	248	100	11,4	100	-18	
RENOLIN MR 40 VG 150		889	250	150	14,8	98	-18	
RENOLIN MR 90 VG 320		903	265	320	24,8	99	-12	
RENOLIN MR 140 VG 460		907	297	460	31,0	95	-9	

### RENOLIN MR MC – high performance shear-stable AW/EP hydraulic and lubricating oils containing special base oils – high Viscosity Index



Product name	Description	Density at 15°C kg/m <sup>3</sup>	Flash point Cleveland °C	Kinematic viscosity at 40°C mm <sup>2</sup> /s	Kinematic viscosity at 100°C mm <sup>2</sup> /s	Viscosity index VI	Pour-point °C	Main application area
RENOLIN MR 22 MC	Universal lubricating and hydraulic oils containing high Viscosity Index (shear-stable) MC base oils. Excellent oxidation stability and powerful cleaning and sludge-transportation properties. HVLDP according to DIN 51 524-3.  MR 22 MC: HVL (HV) 22 MR 32 MC: HVL (HV) 32 MR 46 MC: HVL (HV) 46 MR 68 MC: HVL (HV) 68 ISO 6743/4, HV	856	200	22	4,9	153	-54	RENOLIN MR MC: The same applications as for RENOLIN MR in addition to those which require detergent oils with very high shear stability. Allow oil change intervals to be extended, grades to be rationalized. Multigrade characteristics. Very wide temperature range. "Energy-saving fluids", high-efficiency fluids.  (Consult Product Information 4-1249 for further details)
RENOLIN MR 32 MC		858	220	32	6,4	152	-48	
RENOLIN MR 46 MC		864	234	46	8,3	154	-48	
RENOLIN MR 68 MC		870	253	68	11,2	157	-42	

\* PI = Product information  
EP = Extreme pressure additives, to avoid wear seizures and scuffing at high pressures and loads  
AW = Anti wear additives, to avoid wear in boundary friction conditions

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## Specialties for the specialist – an overview.

### RENOLIN LD – universal functional fluid with cleaning and flushing properties



Product name	Description	Density at 15 °C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40 °C mm²/s	Kinematic viscosity at 100 °C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>RENOLIN LD 10</b>	Specially refined oil with additives to increase ageing resistance, corrosion protection, EP performance and wear protection. Excellent cleaning and sludge transportation.	877	220	46	6,9	105	-27	A functional fluid with cleaning and flushing properties for general lubrication and hydraulic systems. Eliminates gumming caused by dragged-in cutting fluids. Machines can continue to run normally during cleaning and flushing. However, an oil change is recommended as soon as all contaminants are dislodged.

### RENOLIN ZAF MC – zinc- and ash-free, shear-stable, AW/EP high performance hydraulic oils containing selected base oils, excellent oxidation stability and a high Viscosity Index



Product name	Description	Density at 15 °C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40 °C mm²/s	Kinematic viscosity at 100 °C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>RENOLIN ZAF 32 MC</b>	Lubricating and hydraulic oils containing MC base oils and selected additives. Very good oxidation and ageing stability, very good corrosion protection and good wear protection. High Viscosity Index (shear-stable). Fulfil and surpass DIN 51524-3; ISO 11158, HV ZAF 32 MC; HVLV 32; ZAF 46 MC; HVLV 46; ZAF 68 MC; HVLV 68	840	246	35	6,7	149	-45	Shear stable, zinc- and ash-free hydraulic and general lubricating oils with a high Viscosity Index. These products contain MC base oils. Allow oil change intervals to be extended and grades to be rationalized (multi-grade characteristics). <b>"Energy-saving-fluids", high-efficiency fluids.</b>  (Consult Product Information 4-1055 for further details)
<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 ZAF B – demulsifying, AW/EP, zinc- and ash-free hydraulic oils



Product name	Description	Density at 15 °C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40 °C mm²/s	Kinematic viscosity at 100 °C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>RENOLIN ZAF 5 B</b>	Zinc- and ash-free lubricating and hydraulic oils with good ageing resistance. They contain additives which reduce wear and inhibit corrosion.	847	160	4,6	1,6	95	-39	Demulsifying, zinc- and ash-free hydraulic and general lubricating oils with good ageing resistance for all hydraulic drives even if thermally stressed. Reduce environmental pollution and waste water-treatment costs.
<b>RENOLIN ZAF 10 B</b>		851	170	10	2,6	94	-30	
<b>RENOLIN ZAF 22 B</b>		865	212	22	4,3	100	-30	
<b>RENOLIN ZAF 32 B</b>	HLP according to DIN 51524-2 HM according to ISO 6743/4 HM according to ISO 11158	872	215	32	5,4	102	-30	
<b>RENOLIN ZAF 46 B</b>		875	234	46	6,8	101	-27	
<b>RENOLIN ZAF 68 B</b>		879	230	68	8,7	102	-21	
<b>RENOLIN ZAF 100 B</b>		882	240	100	11,3	99	-18	
<b>RENOLIN ZAF 150 BB</b>		886	225	150	14,6	94	-21	
<b>RENOLIN ZAF 220 BB</b>	894	240	220	18,6	94	-9		

\* PI = Product information  
EP = Extreme pressure additives, to avoid wear seizures and scuffing at high pressures and loads  
AW = Anti wear additives, to avoid wear in boundary friction conditions

### RENOLIN ZAF D – detergent, AW/EP, zinc- and ash-free hydraulic oils



Product name	Description	Density at 15 °C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40 °C mm²/s	Kinematic viscosity at 100 °C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>RENOLIN ZAF 22 D</b>	Zinc- and ash-free lubricating and hydraulic oils with detergent and dispersant additives. Good ageing resistance. Reduce wear and inhibit corrosion. HLPD according to DIN 51 524-2 HM according to ISO 6743/4 (Except demulsifying properties)	866	204	22	4,4	98	-30	Detergent, zinc- and ash-free hydraulic and general lubricating oils for all hydraulic drives even if thermally stressed. Reduce environmental pollution and waste water-treatment costs.
<b>RENOLIN ZAF 32 D</b>		874	210	32	5,3	98	-27	
<b>RENOLIN ZAF 46 D</b>		876	230	46	7,1	106	-24	
<b>RENOLIN ZAF 68 D</b>		883	226	68	8,7	97	-19	

### RENOLIN MBW – zinc- and ash-free, EP/AW hydraulic oils with excellent wear protection (high Bruggen values) and good oxidation stability



Product name	Description	Density at 15 °C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40 °C mm²/s	Kinematic viscosity at 100 °C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>RENOLIN MWB 46</b>	Selected solvent extracts with additives to improve oxidation and ageing resistance. Excellent corrosion and wear protection, good EP performance, lower coefficient of friction. Excellent protection against wear. High performance reserves. HLPD according to DIN 51 524-2 (except demulsifying properties) CLP according to DIN 51 517-3 CKC according to ISO 6743/6	882	218	46	6,9	105	-24	Heavy-duty, hydraulic and lubricating oils for all highly-stressed hydraulics. Excellent wear protection. Good EP performance. High Bruggen values (> 50 N/mm²).
<b>RENOLIN MWB 68</b>		879	224	68	8,7	99	-18	

### RENOLIN ZAF DT – highly detergent, zinc- and ash-free, EP/AW hydraulic oils with excellent wear protection



Product name	Description	Density at 15 °C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40 °C mm²/s	Kinematic viscosity at 100 °C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>RENOLIN ZAF 5 DT</b>	Selected solvent extracts with special additives to improve corrosion and wear protection. Good EP and Bruggen performance. Detergent and dispersant formulations. Fulfil and surpass DIN 51 524-2 (except demulsifying properties) ISO 11158, HM CLP according to DIN 51 517-3 CKC according to ISO 6743/6	847	116	5	1,7	99	-40	Heavy-duty, hydraulic and lubricating oils with outstanding detergent and dispersant properties. Very good ageing resistance, good corrosion protection and excellent EP performance.  (Consult Product Information 4-1125 for further details)
<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	

\* PI = Product information  
EP = Extreme pressure additives, to avoid wear seizures and scuffing at high pressures and loads  
AW = Anti wear additives, to avoid wear in boundary friction conditions



## Specialties for the specialist – an overview.

### PLANTO ENVIRO – new developed biodegradable hydraulic fluids according the new European Eco Label “Euro Marguerite”

**NEW**



Product name	Description	Density at 15°C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40°C mm²/s	Kinematic viscosity at 100°C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>PLANTO ENVIRO HYD 46 S</b>	PLANTO ENVIRO HYD 46 S is a rapidly biodegradable and environmentally friendly high-performance hydraulic fluid based on synthetic esters, type HEES. It has been awarded the European Eco-Label EEL. ISO 15380: Type HEES, EEL 2005/360/EC The changeover-guidelines set out in ISO 15380 should be observed.	920	280	46	9,1	185	-46	PLANTO ENVIRO HYD 46 S was specially developed for mobile agricultural, forestry and construction equipment for which ISO 15380 hydraulic fluids are specified. PLANTO ENVIRO HYD 46 S is the ideal product for machinery working in environmentally sensitive areas such as Protected Water Zones and for earthworks in general. Application: -35°C to 90°C ISO 15380: Type HEES, EEL 2005/360/EC
<b>PLANTO ENVIRO HYD 46 HVI</b>	PLANTO ENVIRO HYD 46 HVI is an environmentally friendly, rapidly biodegradable hydraulic fluid offering the highest performance, type fully saturated ester. It can be used in all hydraulic systems, even the most highly stressed. PLANTO ENVIRO HYD 46 HVI exceeds the requirements of ISO 15380 and has been awarded the European Eco-Label EEL.  ISO 15380 : Type HEES, EEL 2005/350/EC	906	280	46	8,0	147	-36	PLANTO ENVIRO HYD 46 HVI is fully compatible with all materials commonly used in hydraulic machinery and is a perfect substitute for mineral oil-based and synthetic hydraulic fluids. It is perfectly suitable for all applications in mobile and stationary hydraulic systems for which a rapidly biodegradable hydraulic oil according to ISO 15380: HEES is recommended and particularly when spillages can cause pollution to soil, groundwater or rivers and when a hydraulic oil is required with outstanding thermal and ageing stability as well as material compatibility. The changeover guidelines set out in ISO 15380 should be observed.

### PLANTO HYD N – vegetable oil-based, environmentally harmless hydraulic fluids

Product name	Description	Density at 15°C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40°C mm²/s	Kinematic viscosity at 100°C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>PLANTO HYD 40 N</b>	Vegetable oil-based hydraulic fluid with additives to increase oxidation and ageing stability. Rapidly biodegradable, > 90 % in 14 days.  40N; HETG46 according to ISO 15380	922	> 306	44	9,6	223	-36	Universally applicable in hydraulic systems from -27 °C to 70 °C.  Changeover guidelines ISO 15380 should be observed.  (Consult Product Information 4-1102 for further details)

### PLANTO HYD S und PLANTO SYN HVI – ester-based, environmentally harmless hydraulic fluids

Product name	Description	Density at 15°C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40°C mm²/s	Kinematic viscosity at 100°C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>PLANTO HYD 15 S</b>	Synthetic ester oils with additives to increase ageing stability. Rapidly biodegradable, > 90 % in 14 days. PLANTO HYD S and PLANTO SYN offer excellent natural wear protection (FZG Stage 12).  15 S: HEES 15 22 S: HEES 22 32 S: HEES 32 46 S: HEES 46 68 S: HEES 68 according to ISO 15380	927	225	15	4,0	161	-51	Universally applicable as hydraulic or general lubricating oils. Especially in situations where environmental protection is a priority. Temperature range: -35 °C to 90 °C.  Changeover guidelines ISO 15380 should be observed.
<b>PLANTO HYD 22 S</b>		926	240	22	5,4	191	-36	
<b>PLANTO HYD 32 S</b>	Synthetic ester oils which are not classified as water-polluting according to German law.	921	246	32	7,1	188	-51	PLANTO SYN HVI products are recommended when temperature range, ageing stability and material compatibility are priorities. PLANTO HYD and PLANTO SYN oils outperform mineral oil-based hydraulic oils in a number of areas.  (Consult Product Information 4-1101 for further details)
<b>PLANTO HYD 46 S</b>		921	304	49	9,6	186	-42	
<b>PLANTO HYD 68 S</b>		927	304	68	12,2	177	-48	
<b>PLANTO HYD 22 S NWG</b>		905	195	22	5,5	191	-36	
<b>PLANTO HYD 46 S NWG</b>	Fully-saturated synthetic ester oil offering the highest performance. HEES 46 according to ISO 15380.	922	290	46	9,6	192	-39	
<b>PLANTO SYN 46 HVI</b>		905	290	46	8,1	150	-33	

### PLANTOLUBE POLAR – ester-based, environmentally harmless, low-temperature hydraulic fluids

Product name	Description	Density at 15°C kg/m³	Flash point Cleveland °C	Kinematic viscosity at 40°C mm²/s	Kinematic viscosity at 100°C mm²/s	Viscosity index VI	Pour-point °C	Main application area
<b>PLANTOLUBE POLAR 15 S</b>	PLANTOLUBE POLAR S oils are environmentally harmless, rapidly biodegradable and have an extremely low pourpoint. With their very high VI, they cover a wide range of temperatures and can be used as all-season oils.  PLANTOLUBE POLAR S oils offer outstanding corrosion- and wear-protection.  HEES15 HEES22 according ISO 15380, changeover guidelines ISO 15380 should be observed	899	156	15	4,1	199	<-48	PLANTOLUBE POLAR S oils are recommended for gearboxes, bearings and adjusting mechanisms which are subject to extremely low temperatures (e.g. in polar regions, refrigerated warehouses, etc.) and for hydraulic systems operated in similar conditions.  (Consult Product Information 4-1098 for further details)
<b>PLANTOLUBE POLAR 22 S</b>		908	166	22	5,7	200	<-51	

\* PI = Product information  
EP = Extreme pressure additives, to avoid wear seizures and scuffing at high pressures and loads  
AW = Anti wear additives, to avoid wear in boundary friction conditions

\* PI = Product information  
EP = Extreme pressure additives, to avoid wear seizures and scuffing at high pressures and loads  
AW = Anti wear additives, to avoid wear in boundary friction conditions

## Further specialties.

**RENOLIN UNISYN OL-series** – Fully-synthetic compressor and hydraulic oils based on PAO (polyalphaolefins) with excellent hydraulic performance. Multigrade characteristics, high natural VI (shear-stable), outstanding low temperature properties, good ageing stability, good wear protection.

**RENOLIN LIFT-series** – Friction-reducing fluids. Mineral-based hydraulic oils containing special additives to avoid stick-slip. Low coefficients of friction, good detergency and good sludge transportation.

**RENOLIN DO 22 HV** – Special hydraulic fluid based on selected base oils with extreme high Viscosity Index (VI = 359). RENOLIN DO 22 HV has a low friction coefficient, has excellent low temperature properties and high ageing stability.

**RENOLIN HLP 46 ALU** – Special, synthetic hydraulic oil with excellent aluminium compatibility. Non-staining oil, good wear protection, good ageing stability.

**RENOLIN MRX-series** – Cleaning and corrosion protection oils. Special hydraulic oils with improved cleaning and corrosion protection characteristics.

**RENOLIN ZAF 46 HT** – Zinc- and ash-free, high-temperature HLP hydraulic oil. Good demulsification (water-separation) and good oxidation stability.

**HYDROTHERM 46 M** – Fire-resistant, water-glycol, Type HFC hydraulic oil. Conforms to the demands of the 7th Luxembourg Report. Excellent corrosion and wear protection. BOSCH REXROTH approved for high-pressure applications. (Flushing and protection oil – Hydrotherm PK).

**HYDROTHERM 68 LW** – Fire-resistant hydraulic fluid, type HFCE – water/glycol, according 7th Luxembourg Report, excellent corrosion protection, excellent anti wear properties. (Water content 20% =HFCE)

**RENOSAFE DU 46** – Fire-resistant, water-free hydraulic oil. Type HFDU, polyol ester, suitable for use in VOITH converters.

**PLANTOFLUX AT-S-series** – Fire-resistant, water-free hydraulic oils. Type HFDU, polyol ester, rapidly biodegradable, Factory Mutual Approved (USA). Conforms to the demands of the 7th Luxembourg Report.

**RENOSAFE TURBO 46 DR** – Fire-resistant, water-free hydraulic oil. Type HFDR, phosphoric acid ester, hydrolytically-stable. Control circuit fluid for steam and gas turbines.

**FUCHS – Lubricants and hydraulic oils for the foodstuff and pharmaceutical industries (NSF-H1 approved).**  
A comprehensive range of hydraulic and lubricating oils based on special white oils or synthetic components (PAO). Just call us!

## Viscosity-temperature diagram.

