RENOLIN

Product Program Hydraulic Fluids

LUBRICANTS.
TECHNOLOGY.
PEOPLE.

FUCHS

MOVING YOUR WORLD

FUCHS LUBRICANTS GERMANY

We do not just develop lubricants. We develop intelligent solutions for highly complex challenges.

To this end, we have pooled our expertise and experience from a wide range of application areas:
FUCHS SCHMIERSTOFFE and FUCHS LUBRITECH became FUCHS LUBRICANTS GERMANY.
Our goal: to keep our customers' world in motion. Efficient, sustainable, reliable.
Today and tomorrow.

What can we move for you?

FUCHS LUBRICANTS GERMANY

Facts and figures

Company: FUCHS LUBRICANTS GERMANY GmbH, a company of the FUCHS Group

Locations: Based in Mannheim, with sites in Bremen, Dohna, Hamburg, Kaiserslautern, Kiel and Wedel; approx. 1,400 employees

Product range: A full range of more than 3,000 products for all application areas

Certifications i. a.: ISO 9001, IATF 16949, ISO 14001, ISO 45001, ISO 50001, ISO 21469, HALAL, KOSHER (detailed certifications at www.fuchs.com/de/en)

CO_2 neutral production*

Since 1931, we have been pursuing the same goal: to keep the world moving. With innovative and technological lubricant solutions that have a sustainable impact on the future. Unconditional reliability is our top priority, it is the foundation of our company and basis for everything that defines us.

Reliability is both a driver and a demand. And it's a promise to all our customers in the fields of automotive suppliers and OEMs, mechanical engineering, metal processing, mining and exploration, aerospace, energy, construction and transport, agriculture and forestry, as well as the paper, steel, metal, cement, forging and food industries, but also qualified lubricant dealers, car dealerships and workshops.

Long-term experience, high development strength and the fulfillment of far-reaching standards are the basis for the special quality of our world-leading product brands. We deliver solutions that are simply more efficient and therefore more sustainable. We always think in holistic solutions. For the development of individual solutions, we enter into an intensive customer dialog with you. This is the way we live up to our claim of moving your world.

MOVING YOUR WORLD

*Partially also based on compensation

Summary of the various hydraulic oil categories

Hydraulic fluids – RENOLIN

Additive systems, containing Zn

Group I base oil	Group II base oil	Group III base oil
RENOLIN B 15 VG 46 demulsifying, separate water quickly	RENOLIN B 46 Plus demulsifying, separate water quickly Bosch Rexroth RDE 90245 High pressure pump test	RENOLIN MR 46 MC high detergency / dispersancy
RENOLIN D 15 VG 46 detergency / dispersancy properties	RENOLIN B 46 HVI Plus demulsifying, separate water quickly, HVI Öl	RENOLIN Xtreme Temp 46 „high energy efficiency“ Bosch Rexroth RDE 90245
RENOLIN Lift 46 „low friction“, anti stick-slip	RENOLIN MR 15 VG 46 high detergency / dispersancy; high corrosion protection **NEW: Group II base oils**	RENOLIN Xtreme Temp Plus „high energy efficiency – low friction“ and slight detergent / dispersant properties

Additive systems, Zn-free (ZAF) P / S technology

Synthetic base oil	Group I base oil	Group II base oil	Group III base oil
PLANTOHYD 46 S PLANTOSYN 3268 ECO (partly saturated ester – HEES)	RENOLIN ZAF B 46 HT demulsifying, high temperature, separate water quickly	RENOLIN ZAF D 46 HT PLUS emulsifying, high temperature NEW: Schuler Pressshop oil	RENOLIN ZAF 46 MC demulsifying, high temperature Bosch Rexroth RDE 90245
PLANTOSYN 46 HVI PLANTOSYN 3268 (saturated ester– HEES)	RENOLIN ZAF 46 D HT detergency / dispersancy properties		
RENOLIN UNISYN OL 46 (polyalphaolefines – PAO)	RENOLIN ZAF 46 DT high detergency / dispersancy, high Brugger value Daimler approved		
RENOLIN PG 46 (polyglycol – PAG)	RENOLIN MWB 46 high detergency / dispersancy, high Brugger value		
RENOSAFE FIRE PROTECT 46 (synthetic ester – HFDU) ISO 12922	RENOLIN High Press 46 detergency / dispersancy properties, Brugger value, „Oertlinghaus“ VW approved		
PLANTOFLUX AT 46 S (synthetic ester – HFDU) FM approval			
HYDROTHERM 46 M (water / glycol – HFC) ISO 12922			
HYDROTHERM 42 HFC (water/glycol – HFC) improved air release properties			

NEW: RENOLIN HS 32 U
Non-staining hydraulic oil for the aluminium industry

NEW: RENOLIN ZAF 15 LT
RENOLIN ZAF 32 LT
Low-temperature hydraulic oil

Example:
ISO VG 46, kinematic viscosity 46mm²/s at 40°C

New generation base oils for high performance hydraulic oils – RENOLIN

We combine quality with technical properties and sustainability.

Technical requirements on hydraulic oils have toughly raised: pressure level is increasing, and simultaneously hydraulic oil tank volume is decreasing due to reduced installation space. As effect, oil circulation ratio also increases and the oil dwell time in the tank is shorter. Thereby, oxidation stability and thermal stability properties are getting more important. Machine constructors, end users and customers ask for better robustness, longer lifetime, reduced service cost, better filterability and universally application of modern hydraulic fluids.

FUCHS has met these stricter requirements by developing new products which are based on modern, high quality hydrated base oils – API group II. These base oils stand out by lower sulfur content, higher degree of saturation, higher viscosity index, good cleanliness, and excellent air release properties. In combination with synergistic acting and finely balanced additive systems, these new hydraulic oils of the RENOLIN PLUS series offer significant technical advantages, compared to conventional hydraulic oils, formulated on API group I base oils (so called solvent neutrals).

Advantages of the new products, produced with modern, globally available group II base oils, are:

- Excellent lifetime during operation
- Lower service costs
- Better air release properties
- Excellent thermal and oxidative stability in combination with superior wear protection

With the products of the RENOLIN PLUS series, high performance hydraulic oils of modern concept and base oils are available, combined with up-to-date and sustainable additive systems. RENOLIN PLUS series is applicable in stationary hydraulic systems, as well as in mobile equipment. They guarantee reliable, robust and universal operation of the machines at high circulation ratio and even at high temperature.

Name/ characteristic	Corrosion protection	Aging stability	EP/AW Anti-wear additives	Demul-sifying	Detergent/ dispersent properties	Air release properties	High VI
RENOLIN hydraulic oils – containing zinc							
RENOLIN B	●	●	●	●		●	
RENOLIN B PLUS	●	● !	●	●		● !!	
RENOLIN B-HVI	●	●	●	●		●	●
RENOLIN B HVI PLUS	●	● !	●	●		● !	●
RENOLIN XTREME TEMP / PLUS	●	● !	●	●		●	● !
RENOLIN D	●	●	●		●	●	
RENOLIN MR	● !	● !	●		●	● !!	
RENOLIN MR 310 / 520	● !	● !	●		●	●	● !
RENOLIN MR-MC	● !	● !!	●		●	●	● !
RENOLIN LD	●	●	●		●		
RENOLIN hydraulic oils – zinc-free and ash-free							
RENOLIN DTA	●	●	●	●	●		
RENOLIN ZAF B HT	●	●	●	●	●	●	
RENOLIN ZAF D HT	●	●	●		●	●	
RENOLIN ZAF D HT PLUS	●	● !!	●	●	●	● !	
RENOLIN MWB	●	● !	●		●	● !	
RENOLIN ZAF DT	●	● !	● !		●	● !	
RENOLIN ZAF MC	●	● !!	●	●		● !!	● !

! = Dominant characteristic (special additive reserves) 1) = Brugger Anti Wear > 50 Nmm² 2) = FE8-Roller Bearing Wear test = pass, excellent

RENOLIN Hydraulic oils – an overview

RENOLIN DTA – demulsifying circulating, spindle and hydraulic oils

HL/CL-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN DTA 2	Spindle, hydraulic and lubricating oils (machine oils) on the basis of selected base oils with additives for improved aging properties and corrosion protection. All RENOLIN DTA products are DIN 51 524-1 (HL) hydraulic oils and DIN 51 517-2 (CL) circulating oils based on mineral oil, demulsifying (water-repellent) and free of zinc. ISO 6743/64: 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. General lubrication without specific wear protection requirements (without AW/EP). (Refer to PI* 4-1292 for further details) Mineral oil basis
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	
RENOLIN DTA 15		856	195	15	3.4	98	–27	
RENOLIN DTA 22		865	210	22	4.2	94	–27	
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 circulating oils, Denison HF0 approved

HLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN B 3 VG 10	General lubricating and hydraulic oils with good aging resistance and additives for improved corrosion protection. Good viscosity-temperature behavior, good wear protection, demulsifying (water-repellent), air release, contain zinc. The RENOLIN B range meets and exceeds the minimum requirements of HLP hydraulic oils as per DIN 51 524-2. ISO 6743/4: HM, ISO 6743/6: CKC and ISO 11158: HM	850	178	10	2.6	95	–42	As lubricating oils, particularly as hydraulic oils if good resistance to aging, wear protection and demulsifying properties are required. Universal hydraulic oils for all hydraulic systems, even if thermally stressed. Excellent filtration behavior. (Refer to PI* 4-1207 for further details) Approval: Denison HF0, HF1, HF2
RENOLIN B 5 VG 22		863	200	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		883	232	100	11.1	96	–18	
RENOLIN B 40 VG 150		887	224	150	14.5	94	–15	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN B Plus – high-performance demulsifying AW/EP hydraulic and circulating oils, Bosch Rexroth RDE 90245 and Denison HF0 approved

HLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN B 10 PLUS	**Range RENOLIN B PLUS** Hydraulic oils, based on high-quality, hydrated base oils group II. Contains additives for excellent aging and oxidation stability, the zinc-containing AW/EP additive system protects against wear at high pressure and load. Extended oil drain intervals are possible. Hydraulic oils according to DIN 51524-2: HLP and ISO 6743/4: HM	840	170	10	2.7	104	–54	Suitable for all hydraulics especially if an approval according to BOSCH Rexroth RD 90235/ RDE 90245 is required. Group II base oil (Hydrogenated base oil), for HP-high-pressure application. (Demulsifying type) Approvals: Denison HF0, HF1, HF2 Bosch Rexroth RDE 90245
RENOLIN B 15 PLUS		840	195	15	3.5	108	–48	
RENOLIN B 22 PLUS		845	220	22	4.4	108	–45	
RENOLIN B 32 PLUS		862	220	32	5.5	108	–39	
RENOLIN B 46 PLUS		865	230	46	6.9	107	–36	
RENOLIN B 68 PLUS		867	230	68	9.0	108	–33	
RENOLIN B 100 PLUS		870	270	100	11.6	104	–27	

RENOLIN B HVI – high-performance demulsifying AW/EP hydraulic oils with a high viscosity index, Denison HF0 approved

HVLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN B 15 HVI	**Range RENOLIN B HVI** Hydraulic and lubricating oils (machine oils) with a high viscosity index and additives to improve aging 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 and ISO 11158: HV	859	180	15	3.8	151	–45	RENOLIN B HVI oils are suitable for all hydraulic systems, especially when a high viscosity index is required, reduced viscosity during cold start-up, high viscosity at operating temperature. High VI provides multigrade characteristics. Energy saving through high volumetric efficiency. Demulsifying type Approval: Denison HF0, HF1, HF2
RENOLIN B 22 HVI		866	178	22	4.9	151	–45	
RENOLIN B 32 HVI		871	178	32	6.3	152	–48	
RENOLIN B 46 HVI		879	186	46	8.1	150	–45	
RENOLIN B 68 HVI		868	240	68	11.0	153	–36	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN Hydraulic oils – an overview

RENOLIN B HVI Plus – high-performance demulsifying AW/EP hydraulic oils with a high viscosity index, Denison HF0 approved

HVLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN B 15 HVI Plus	**Range RENOLIN B HVI Plus** Hydraulic and lubricating oils based on hiqhquality hydrated base oils (Group II). High viscosity index and excellent shear stability, in combination with extraordinaire 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 and ISO 11158: HV	844	190	15	3.8	148	–48	RENOLIN B HVI Plus oils are suitable for all stationary and mobile hydraulic systems when a high viscosity index and low cold-temperature viscosity is required. Extended oil change interval possible. High pressure applications are possible due to excellent AW/EP additive system. Approval: Denison HF0, HF1, HF2
RENOLIN B 22 HVI Plus		845	210	22	4.9	152	–48	
RENOLIN B 32 HVI Plus		846	230	32	6.3	151	–42	
RENOLIN B 46 HVI Plus		856	240	46	8.2	152	–42	
RENOLIN B 68 HVI Plus		854	260	66,5	10.8	153	–33	
RENOLIN B 100 HVI Plus		837	260	102	14.0	139	–36	
RENOLIN B 150 HVI Plus		876	260	151	18.0	132	–33	

RENOLIN XtremeTemp – high-performance multigrade hydraulic oils based on new generation of base oils – shear stable, long lifetime, Bosch Rexroth RDE 90245 and Denison HF0 approved

HVLP-Oils (demulsifying)

Markenbezeichnung	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN XTREME TEMP 32	**Range RENOLIN XtremeTemp** Universal, high-performance hydraulic oils with high viscosity index and excellent shear stability (VI ≥ 180). Based on special hydrogenated base oils, very good ageing behaviour, long lifetime, excellent corrosion protection and very good zinc-containing wear protection for high pressure – good demulsifying properties. Fulfills and surpasses: DIN 51524-3: HVLP, ISO 6743/4: HV and ISO 11158: HV	845	216	32	6.9	180	–33	Universal high-performance multigrade hydraulic oils for stationary and mobile hydraulic systems, improved efficiency, increasing oil change intervals. Multigrade characteristics through high, shear-stable viscosity index. Energy and fuel saving through high volumetric efficiency. Approvals: Denison HF0, HF1, HF2 Bosch Rexroth RDE 90245
RENOLIN XTREME TEMP 46		853	230	48	9.3	180	–34	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN XtremeTemp Plus – high-performance multigrade hydraulic oils based on new generation of base oils – shear stable, long lifetime

HVLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN XTREME TEMP 32 PLUS	**Range RENOLIN XtremeTemp Plus** As RENOLIN XtremeTemp, but with additives which help to avoid stick-slip phenomena. For high-pressure applications; reduce friction especially in mixed friction conditions DIN 51524-3: HVLP(D) ISO 6743-4: HV ISO 11158: HV According Denison and Bosch Rexroth requirements	861	216	32	6.9	183	–33	Slightly detergent, HVLP (D) high performance multigrade hydraulic oils for stationary and mobile hydraulic systems surpass HVLP(D) acc. to DIN 51524-3, wide temperature window, excellent shear stability. Help to avoid stick-slip problems, especially at low speed and high load. Energy and fuel saving through high volumetric efficiency.
RENOLIN XTREME TEMP 46 PLUS		855	234	48	9.3	181	–34	

RENOLIN D – detergent AW / EP hydraulic and circulating oils

HLPD-Oils (detergent)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN D 2 VG 7	Detergent hydraulic and general lubricating oils with additives to improve aging resistance, corrosion protection and wear protection. Favorable viscosity-temperature behavior. Contains zinc. The RENOLIN D range meets and exceeds the minimum requirements of HLPD hydraulic oils. HLPD according to DIN 51524-2. ISO 6743/4: HM with DD-properties	844	155	7,2	2.2	99	–27	RENOLIN D oils are used as lubricating oils but especially as hydraulic oils when good aging resistance, good wear protection, detergency and dispersive properties are required. Universal hydraulic oils for all hydraulic systems, even if thermally stressed. (Refer to PI* 4-1010 for further details)
RENOLIN D 3 VG 10		852	178	10	4.8	96	–30	
RENOLIN D 5 VG 22		871	200	22	4.3	96	–27	
RENOLIN D 10 VG 32		875	210	32	5.4	99	–24	
RENOLIN D 15 VG 46		879	224	46	6.8	100	–27	
RENOLIN D 20 VG 48		883	232	68	8.7	99	–24	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN Hydraulic oils – an overview

RENOLIN MR – high detergent AW / EP circulating and hydraulic oils with excellent corrosion protection

HLPD-Oils (detergent/dispersive) based on highquality hydrated base oils (Group II)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN MR 0 VG 2	**Range RENOLIN MR** RENOLIN MR products are special HLPD lubricating and hydraulic fluids according to DIN 51502 with outstanding corrosion protection and powerful cleaning and dirt carrying capacity. Zinc containing, detergent and dispersant. RENOLIN MR oils are used in many hydraulic systems as problem solvers, especially when standard oils cannot fulfil all requirements. Excellent oxidation stability based on highquality hydrated base oils (Group II). RENOLIN MR oils fulfil and surpass the requirements on hydraulic oils according to: DIN 51524-2: HLPD and ISO 6743/4: HM with high DD-performance	823	75	2,2	–	–	–54	**RENOLIN MR 0,1 and 3:** For machine tool spindles and roller bearing spindles in the textile industry.
RENOLIN MR 1 VG 5		834	135	4,6	1.7	–	–54	
RENOLIN MR 3 VG 10		840	170	10	2.7	106	–54	
RENOLIN MR 5 VG 22		846	210	22	4.5	118	–45	**RENOLIN MR 5, 10, 15 and 20:** Universal hydraulic oils with outstanding corrosion protection up to continuous temperatures of 100°C. For smaller gear boxes, in particular with electrical multi-plate clutches. High DD-performance
RENOLIN MR 10 VG 32		866	220	32	5.5	109	–39	
RENOLIN MR 15 VG 46		868	230	46	7.0	107	–36	
RENOLIN MR 20 VG 68		871	230	68	9.0	107	–33	
RENOLIN MR 30 VG 100		874	270	100	11.6	104	–33	**RENOLIN MR 30, 40:** For larger gear boxes. As running- in and anticorrosion oil. Allows oil changes to be extended.
RENOLIN MR 40 VG 150		881	280	150	15.1	101	–18	
RENOLIN MR 310	Hydraulic and lubricating oils with extremely high viscosity index as well as outstanding cleaning properties and sludge carrying capacity. HVLPD according to DIN 51502 together with DIN 51524: HVLPD and ISO 6743/4: HV	855	118	15	5.4	360	–48	**MR 310, 520 and 1030:** For all hydraulic systems which are subject to a wide temperature range or which are operated outdoors, e.g. in flood gates, machines or for low application temperatures.
RENOLIN MR 520		886	154	32	8.0	270	–60	
RENOLIN MR 1030		873	214	68	11.0	154	–36	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN MR MC – high-performance shear-stable AW / EP hydraulic and lubricating oils containing special base oils with high viscosity index

HVLPD-Oils (detergent/dispersive)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN MR 22 MC	**Range RENOLIN MR MC** Universal lubricating and hydraulic oils based on MC base oils with high viscosity index (shear-stable). Excellent oxidation stability and outstanding cleaning properties and sludge carrying capacity. HVLPD according to DIN 51524-3 and ISO 6743/4: HV (with DD-properties)	847	210	22	4.9	150	–48	Same application as for RENOLIN MR in addition to those which require oils with high viscosity index. Allow oil change intervals to be extended, grades to be rationalized. Multi-grade characteristics. Very wide operating temperature window. Energy saving through high volumetric efficiency. MC base oils = hydrotreated base oils (group III)
RENOLIN MR 32 MC		848	230	32	6.3	150	–45	
RENOLIN MR 46 MC		854	240	46	8.1	150	–42	
RENOLIN MR 68 MC		856	260	68	10.9	150	–39	

RENOLIN LD – universal functional fluid with cleaning and flushing properties

HLPD-Fluid/Jetting liquid

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN LD 10	Specially refined oil with additives to increase aging resistance, corrosion protection and load-carrying capacity and reduce wear. Excellent cleaning properties and sludge carrying capacity.	877	220	46	6.9	105	–36	A functional fluid with cleaning and flushing properties for circulation lubrication and hydraulic systems. Eliminates gumming caused by infiltrating cooling lubricants. Machines can continue to run normally during cleaning and flushing. However, an oil change is recommended as soon as all contaminants are dislodged.

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN Hydraulic oils – an overview

RENOLIN HS 32 U – fully synthetic non-staining hydraulic fluid for the aluminium industry

HLPD-Fluid – hydraulic fluid and lubricating oil especially for the aluminium industry

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN HS 32 U	RENOLIN HS 32 U is a special fully synthetic hydraulic oil for the aluminium industry. It is classified as non-staining hydraulic fluid.	945	> 240	32	6.14	143	–57	Universally applicable fully synthetic, non-staining hydraulic fluid for the aluminium industry, recommended in rolling mills for highly stressed hydraulic equipment.

RENOLIN ZAF LT – demulsifying zinc- and ash-free hydraulic fluids with extreme high VI, low temperature hydraulic fluids

Low temperature hydraulic oil – zinc-free and ash-free

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN ZAF 15 LT	Range RENOLIN ZAF 15 LT and 32 LT have an extremely high VI > 281 and a very low pour-point < –60°C. They are low temperature hydraulic fluids and surpass DIN 51524-3: HVLP and ISO 6743/4: HV	873	> 90	14	5.3	387	< –60	Universally applicable zinc- and ash-free low temperature hydraulic and circulating oils. For all kind of hydraulic mobile and stationary hydraulic application. Kinematic viscosity at –40°C: - RENOLIN ZAF 15 LT = 2,380 mm²/s - RENOLIN ZAF 32 LT = 2,150 mm²/s
RENOLIN ZAF 32 LT		853	135	32	9.5	300	< –54	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN ZAF MC – zinc-free and ash-free, shear stable, AW / EP high-performance hydraulic oils containing selected base oils, excellent oxidation stability, Bosch Rexroth RDE 90245 and Denison HF0 approved

Zinc-free and ash-free, HVLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN ZAF 32 MC	**Range RENOLIN ZAF MC** Lubricating and hydraulic oils based on group III base oils with selected additives. Very good oxidation and aging stability, very good corrosion protection and high wear protection. High viscosity index (shear stable). Fulfil and surpass DIN 51524-2: HLP, DIN 51524-3: HVLP, ISO 6743/4: HM, ISO 6743/4: HV, DIN 51517-3: CLP, ISO 6743/6: CKC and DBL 6713: HLP, HVLP	840	246	35	6.7	149	–45	Shear stable, zinc- and ash-free hydraulic and circulating oils with high viscosity index. Based on MC hydrogenated group III base oils. Oil drain intervals might be extended and grades can be rationalized (multigrade characteristics). Energy saving through high efficiency. Approvals: Deniso HF0, HF1 and HF2 Bosch Rexroth RDE 90245 and RD 90235
RENOLIN ZAF 46 MC		843	238	46	8.0	148	–45	
RENOLIN ZAF 68 MC		854	238	68	10.6	146	–42	

RENOLIN ZAF B HT – demulsifying, AW / EP, zinc-free and ash-free hydraulic oils

Zinc-free and ash-free, HVLP-Oils (demulsifying)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN ZAF B 5 HT	Zinc-free and ash-free lubricating and hydraulic oils with good aging resistance. They contain a newly developed additive system which reduces wear and inhibits corrosion. HLP according to DIN 51524-2, HM according to ISO 6743/4 and HM according to ISO 11158	824	130	4,6	1.6	105	<–54	Demulsifying, zinc-free and ash-free hydraulic and circulating oils with good aging resistance for all hydraulic drives even if thermally stressed. For reducing the environmental impact and costs associated with waste water processing. (Refer to PI* 4-1366 for further details)
RENOLIN ZAF B 10 HT		848	170	10	2.7	100	<–54	
RENOLIN ZAF B 22 HT		863	210	22	4.4	106	–33	
RENOLIN ZAF B 32 HT		875	220	32	5.4	99	–33	
RENOLIN ZAF B 46 HT		876	230	46	6.8	101	–24	
RENOLIN ZAF B 68 HT		882	242	68	8.7	100	–21	
RENOLIN ZAF B 100 HT		882	240	100	11.3	99	–18	
RENOLIN ZAF 150 BB		893	225	150	14.6	94	–21	
RENOLIN ZAF 220 BB		894	240	220	13.6	94	–9	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

RENOLIN Hydraulic oils – an overview

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

Zinc-free and ash-free, HLPD-Oils (detergent)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN ZAF D 22 HT	Zinc-free and ash-free lubricating and hydraulic oils with detergent and dispersant additives. Good aging resistance. Reduce wear and inhibit corrosion. HLPD according to DIN 51524-2	860	206	22	4.3	103	–33	Detergent, zinc-free and ashfree hydraulic and circulating oils for all hydraulic drives even if thermally stressed. For reducing the environmental impact and costs associated with waste water processing.
RENOLIN ZAF D 32 HT		870	220	32	5.3	97	–33	
RENOLIN ZAF D 46 HT		880	230	46	6.8	100	–27	
RENOLIN ZAF D 68 HT		880	>230	68	8.8	100	–27	
RENOLIN ZAF D 46 HT PLUS	Innovative high-performance hydraulic oil , detergent, ZAF, with excellent air release properties and long lifetime Schuler approved HLPD according to DIN 51524-2	866	230	46	6.9	106	–39	Detergent zinc- and ash-free hydraulic oil based on group II with improved aging stability caused by high thermal stresses.

RENOLIN MWB – zinc-free and ash-free AW / EP hydraulic oils with excellent wear protection (high Brugger values) and good oxidation stability

Zinc-free and ash-free, HVLP-Oils (detergent)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN MWB 46	Selected solvent extracts with additives to improve oxidation and aging resistance. Excellent corrosion and wear protection, good load-carrying capacity and good friction behavior. High performance reserves. HLPD according to DIN 51524-2, CLP according to DIN 51517-3 and CKC according to ISO 6743/6	882	218	46	6.9	105	–24	Heavy-duty hydraulic and circulating oils for all highly stressed hydraulics. Excellent wear protection. High load-carrying capacity. High load capacity according to Brugger of >50 N/mm², e.g. presses in the automotive industry. (Refer to PI* 4-1059 for further details)
RENOLIN MWB 68		879	224	68	8.7	99	–18	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

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

Zinc-free and ash-free, HLPD-Oils (detergent)

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN ZAF 5 DT	Selected solvent extracts with special additives to improve protection against corrosion and wear. High load capacity according to Brugger. Detergent and dispersant formulations. Fulfill and surpass DIN 51524-2. ISO 11158: HM, CLP according to DIN 51517-3 and CKC according to ISO 6743/6 Exception: demulsifying properties	847	116	5	1.7	99	–40	Heavy-duty hydraulic and circulating oils with outstanding detergent and dispersant properties. Very good aging resistance, good corrosion protection and excellent load-carrying capacity. Complies with Daimler specification DBL 6721 for machine tools and presses. (Refer to PI* 4-1125 for further details)
RENOLIN ZAF 10 DT		848	154	10	2.7	108	–30	
RENOLIN ZAF 15 DT		865	190	15	3.3	86	–27	
RENOLIN ZAF 22 DT		866	198	22	4.4	109	–27	
RENOLIN ZAF 32 DT		876	210	32	5.4	102	–24	
RENOLIN ZAF 46 DT		876	218	46	6.8	101	–24	
RENOLIN ZAF 68 DT		879	224	68	8.9	104	–18	
RENOLIN ZAF 100 DT		882	220	100	11.3	99	–18	
RENOLIN ZAF 150 DT		887	222	150	14.6	96	–15	

* PI = Product-information
EP = Extreme pressure additives, to avoid wear and scuffing at high pressures and loads
AW = Anti-wear additives, to avoid wear in mixed friction areas

PLANTO Hydraulic oils – an overview

PLANTOHYD S – ester-based, environmentally friendly hydraulic fluids

Biological-Oils HEES

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
PLANTOHYD 15 S*	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". Awarded the EU Ecolabel.	893	200	15	4.1	191	–33	Universally deployable as a lubricating and hydraulic oil, especially in areas with strict environmental protection requirements / goals. Container temperature: –30°C to +90°C. Changeover guideline DIN ISO 15380 must be observed! Schwedish Standard SS 15 54 34
PLANTOHYD 22 S*		901	200	22	5.4	198	–33	
PLANTOHYD 32 S*		910	206	32	7.1	194	–36	
PLANTOHYD 46 S*		920	300	46	9.2	187	–45	
PLANTOHYD 68 S*		924	300	68	12.3	181	–36	

PLANTOLUBE POLAR S – ester-based, environmentally friendly, low-temperature hydraulic fluids

Biological-Oils HEES

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
PLANTOLUBE POLAR 15 S	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 51524-3. Exception: „TOST test". Miscible and compatible with mineral oil. POLAR 15 S: HVLP 15, HEES 15 POLAR 22 S: HVLP 22, HEES 22 Designation according to DIN ISO 15380.	899	156	15	4.1	199	<–48	PLANTOLUBE POLAR S oils are recommended for gearboxes, bearings and actuators which are subject to extremely low temperatures (e.g. in polar regions, refrigerated warehouses, etc.) and for hydraulic systems operated in similar conditions. Changeover guideline DIN ISO 15380 must be observed!
PLANTOLUBE POLAR 22 S		908	166	22	5.7	200	<–51	

* EU Ecolabel

PLANTOHYD N – vegetable oil-based, environmentally friendly hydraulic fluid

Biological-Oils HETG

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
PLANTOHYD 40 N*	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.	922	300	42	9.3	215	–39	Universally deployable in hydraulic systems from –27°C to +70°C (container temperature). The changeover guidelines according to DIN ISO 15380 must be observed.

PLANTOSYN HVI und PLANTOSYN 3268 – products in line with the latest requirements of the EU Ecolabel

Biological-Oils HEES

Product name	Description	Density at 15 °C [kg/m³]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm²/s]	Kin.Visc. at 100 °C [mm²/s]	VI Viscosity index	Pour-point [°C]	Main application area
PLANTOSYN 32 HVI*	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.	915	220	32	6.2	148	–46	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. **Approvals:** Mannesmann, Rexroth, Sundstrand, Schwedish Standard SS 15 54 34
PLANTOSYN 46 HVI*		913	280	46	8.2	150	–36	
PLANTOSYN 68 HVI*		916	280	68	10.6	143	–27	
PLANTOSYN 3268*	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.	913	280	46	8.2	150	–36	**FUCHS recommendations:** Bosch Rexroth AG, CAT BF-1, Kramer Allrad, Palfinger, Sauer Danfos, Timberjack, Valmet/ Komatsu Forest, Ponsse **Approvals:** Fendt, O&K, construction equipment, Schwedish Standard SS 15 54 34
PLANTOSYN 3268 ECO*	Environmentally friendly, universally deployable HVI multigrade hydraulic oil based on synthetic esters (HEES), > 60% rapidly biodegradable according to OECD 301 B. Awarded the EU Ecolabel.	920	300	47	9.5	191	-45	**Approvals:** Fendt KDM, Schwedish Standard SS 15 54 34

Further specialties

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

RENOLIN LIFT-series
Friction-reducing fluids. Mineral-based hydraulic oils containing special additives to avoid stickslip.
Low coefficients of friction, good detergency, good dirt holding capacity.

RENOLIN DO 22 HV
Special hydraulic oil based on selected base oils with extremely high viscosity index (VI = 359).
RENOLIN DO 22 HV reduces friction, has excellent low-temperature behavior and high aging stability.

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

RENOLIN MRX-series
Cleaning and anticorrosion oils. Special hydraulic oils with improved cleaning and anticorrosive properties.

HYDROTHERM 46 M
Fire-resistant, water/glycol, type HFC hydraulic oil. Conforms to the requirements of the 7th Luxembourg Report. Excellent corrosion and wear protection.
Bosch Rexroth approved for high-pressure applications (flushing and preserving oil – Hydrotherm PK).

HYDROTHERM 68 LW
Fire-resistant hydraulic oil, type HFCE – water/glycol – conforms to the requirements of the 7th Luxembourg Report. Approved by DSK – Deutsche Steinkohle AG, higher temperature stability than HFC oils, good AW/EP wear protection (FZG failure load stage > 12), water content approx. 20% = HFCE.

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

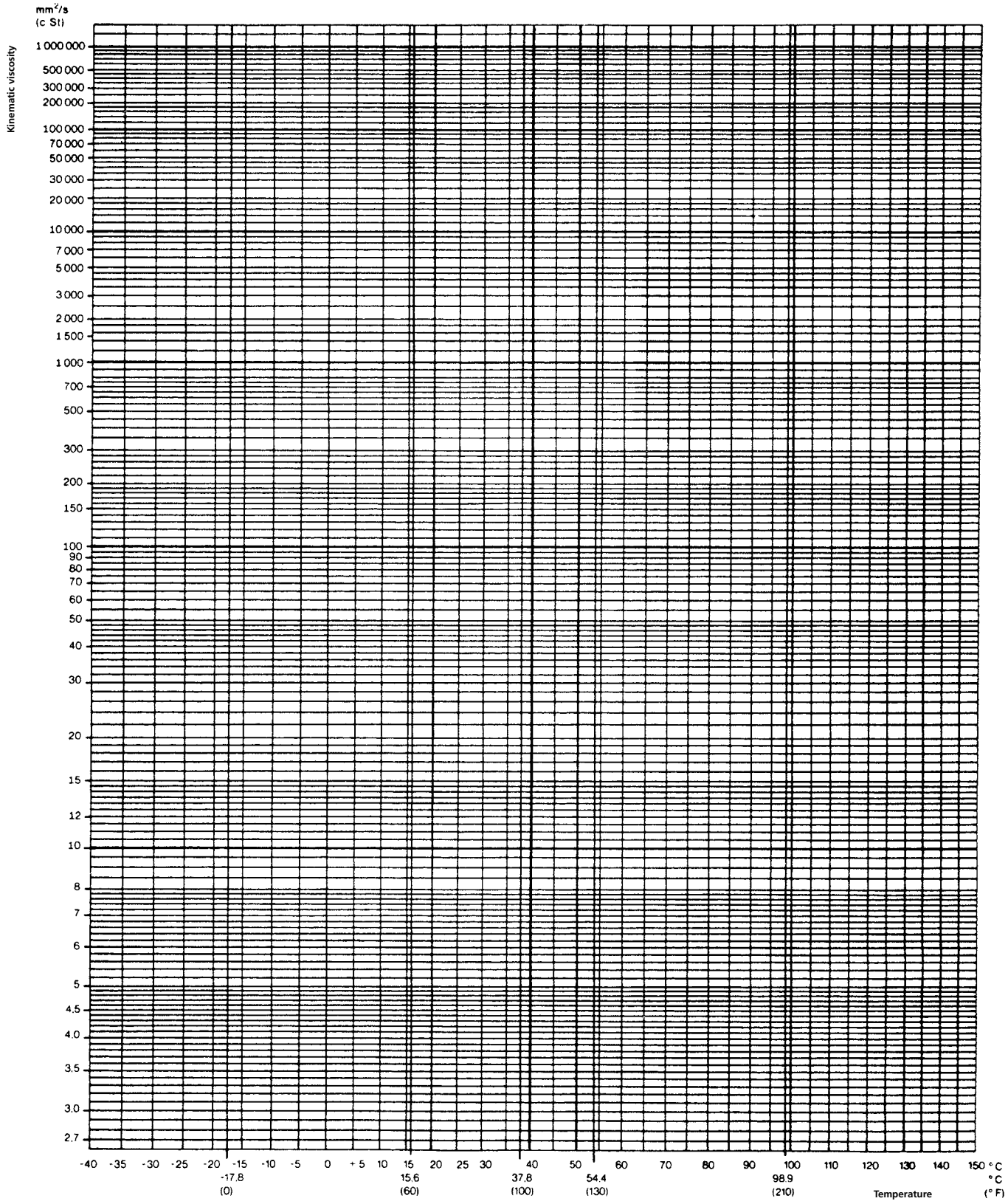
PLANTOFLUX AT-S-series
Fire-resistant, water-free hydraulic oils. Type HFDU, polyol ester, rapidly biodegradable, Factory Mutual Approved (USA). Conforms to the requirements of the 7th Luxembourg Report.

RENOSAFE FIRE PROTECT
Fire-resistant, water-free hydraulic oil. Type HFDU, rapidly biodegradable. Conforms to the requirements of the 7th Luxembourg Report. Fulfills and surpasses all requirements acc. to ISO 12922.

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

RENOLIN PENTOPOL
Non-staining hydraulic oils to avoid stains in the aluminium industry.

Viscosity-temperature diagram.



FUCHS Lubricants

Innovative lubricants need experienced application engineers

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

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