

## Product Program Hydraulic Fluids



# LUBRICANTS. TECHNOLOGY. PEOPLE.

We concentrate solely on high-quality lubricants and related specialties.

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

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



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### Facts and figures

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

**Headquarters:** Mannheim

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

**Certifications:** DIN EN ISO 9001:2008, ISO/TS 16949:2009, DIN EN ISO 14001:2004 BS OHSAS 18001:2007, KTA 1401

**References:** Leading lubricant OEM for the German automotive industry

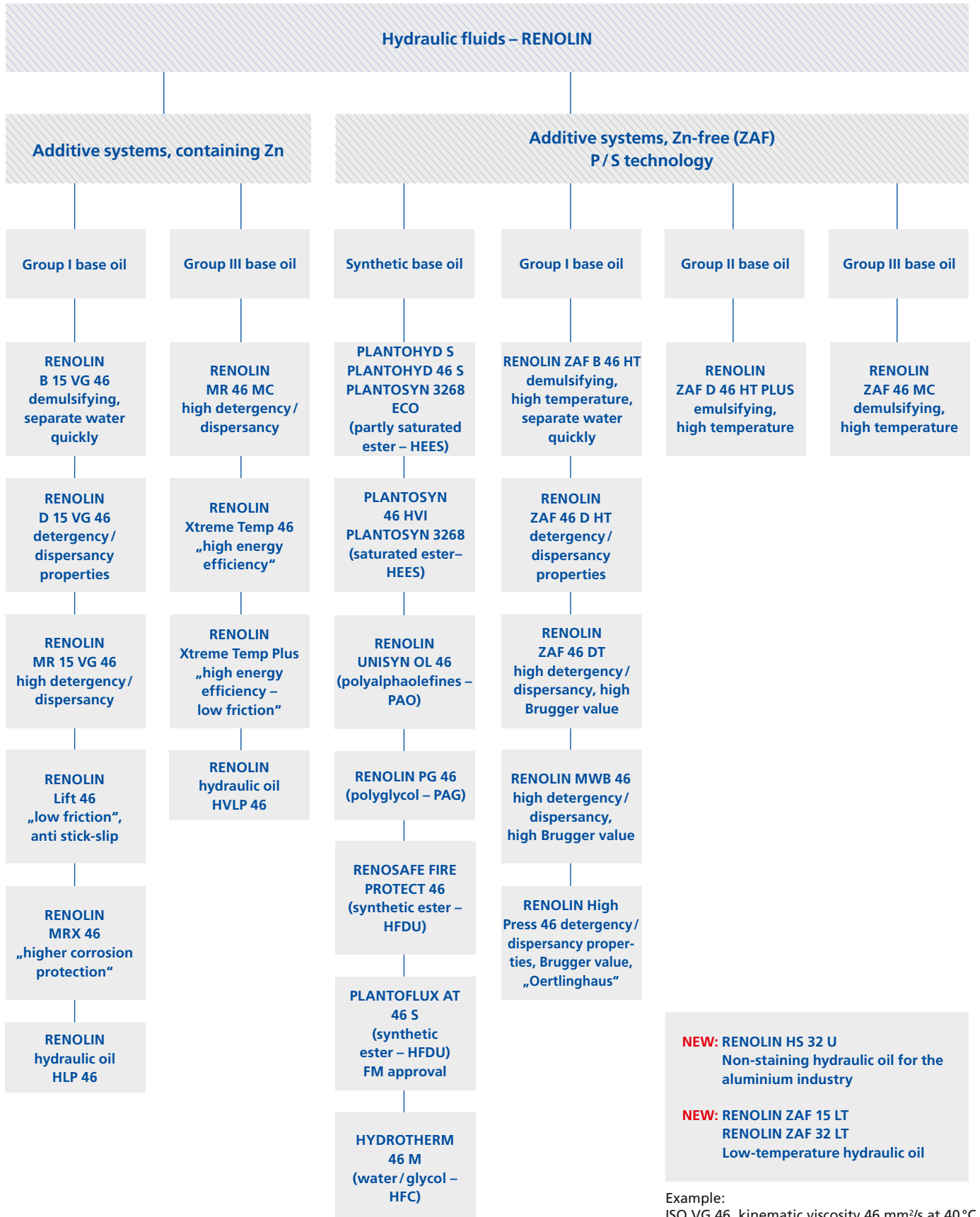
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FUCHS has developed, produced and sold high-quality lubricants and related specialties for more than 85 years – for virtually all areas of application and sectors. With over 100,000 customers and 60 companies worldwide, the FUCHS Group is the leading independent supplier of lubricants.

A team of more than 800 specialists across Germany works to guarantee the satisfaction of our customers. Whatever their requirements, we have the ideal lubricant for their specific applications and processes. In our technology center 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.

FUCHS lubricants stand for performance and sustainability, for safety and reliability, for efficiency and cost savings. They represent a promise: technology that pays off.

## Summary of the various hydraulic oil categories



## We combine technology with ecology

### Fire-resistant hydraulic fluids

HYDROTHERM 46 M is a proven water-glycol fluid which complies with the 7th Luxembourg Report and has been approved by a host of component manufacturers. It offers an extraordinarily long service 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. RENOSAFE FIRE PROTECT was developed and tested on the basis of these experiences and has already been used successfully as a high-performance alternative.

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.

### Quickly biodegradable hydraulic fluids

As one of the pioneers in the area of rapidly biodegradable fluids, we have a comprehensive product range including:

- PLANTOSYN HVI based on saturated esters,
- PLANTOHYD S ISO VG 15-46 – non-water-polluting products and
- PLANTOLUBE POLAR – low-temperature synthetic ester oils.

Name/ characteristic	Corrosion protection	Ageing stability	EP/AW Anti- wear additives	Demul- sifying	Detergent	Highly dispersant	High VI
RENOLIN hydraulic oils – containing zinc							
RENOLIN B	●	●	●	●			
RENOLIN B-HVI	●	●	●	●			●
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 MWB	●	●!	●!! 1), 2)		●	●!	
RENOLIN ZAF DT	●	●!	●!		●	●!	
RENOLIN ZAF MC	●	●!!	●	●			●!
RENOLIN ZAF D HT PLUS	●	●!!	●	●	●	●	

! = Dominant characteristic (special additive reserves)

1) = Brugger Anti Wear > 50 Nmm<sup>2</sup>

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.	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.	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)
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	
		ISO 6743/4, HM ISO 6743/6, CKC ISO 11 158, HM Denison HF0, HF1, HF2						

\* 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 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/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40°C [mm <sup>2</sup> /s]	Kin.Visc. at 100°C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN B 15 HVI</b>	Hydraulic and general lubricating oils (machine oils) with a high viscosity index and additives to improve aging behavior, corrosion protection and wear protection. The products of the RENOLIN B HVI range are HVLP hydraulic and circulating oils according to DIN 51 524-3, mineral oilbased, demulsifying (water-repellent) and contain zinc.  ISO 6743/4, HV ISO 11158, HV Denison HF0, HF1, HF2	859	180	15	3,8	151	-45	RENOLIN B HVI oils are suitable for all hydraulic systems, especially when a high viscosity index is specified or if excess viscosity during start-up or insufficient viscosity at operating temperature is a problem. High VI provides multigrade characteristics. Energy saving through high efficiency.  (Refer to PI* 4-1222 for further details)
<b>RENOLIN B 32 HVI</b>		871	178	32	6,3	152	-48	
<b>RENOLIN B 46 HVI</b>		879	186	46	8,1	150	-45	
<b>RENOLIN B 68 HVI</b>		868	240	68	11,0	153	-36	
<b>RENOLIN B 100 HVI</b>		871	240	100	13,5	140	-24	

## RENOLIN XtremeTemp – 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/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40°C [mm <sup>2</sup> /s]	Kin.Visc. at 100°C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN XTREME TEMP 32</b>	Universal, high-performance hydraulic oils with high viscosity index and increased shear stability (VI 180). Based on special hydrogenated base oils, very good aging behavior, long lifetime, excellent corrosion protection and very good wear protection, fulfill and surpass DIN 51524-3, HVLP ISO 6743/4, HV ISO 11158, HV Denison HF0, HF1, HF2. RENOLIN XtremeTemp Plus with additional additives for prevention of stick-slip.	845	216	32	6,9	180	-33	Universal high-performance multigrade hydraulic oil for stationary and mobile hydraulic systems, improvement of efficiency, increasing change intervals. Multigrade characteristics through high, shear-stable viscosity index. Energy and fuel saving through high efficiency.  (Refer to PI* 4-1088 for further details)
<b>RENOLIN XTREME TEMP 46</b>		853	230	48	9,3	180	-34	
<b>RENOLIN XTREME TEMP 32 PLUS</b>		861	216	32	6,9	183	-33	
<b>RENOLIN XTREME TEMP 46 PLUS</b>		855	234	48	9,3	181	-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 Hydraulic oils – an overview

## RENOLIN D – detergent AW / EP hydraulic and circulating oils

### HLPD-Oils (detergent)

Product name	Description	Density at 15°C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40°C [mm <sup>2</sup> /s]	Kin.Visc. at 100°C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN D 2 VG 7</b>	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)
<b>RENOLIN D 3 VG 10</b>		852	178	10	4.8	96	-30	
<b>RENOLIN D 5 VG 22</b>		871	200	22	4.3	96	-27	
<b>RENOLIN D 10 VG 32</b>		875	210	32	5.4	99	-24	
<b>RENOLIN D 15 VG 46</b>		879	224	46	6.8	100	-27	
<b>RENOLIN D 20 VG 48</b>		883	232	68	8.7	99	-24	

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

### HLPD-Oils (detergent/dispersive)

Product name	Description	Density at 15°C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40°C [mm <sup>2</sup> /s]	Kin.Visc. at 100°C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN MR 0 VG 2</b>	RENOLIN MR products are special HLPD lubricating and hydraulic fluids according to DIN 51 502 with outstanding corrosion protection and powerful cleaning and dirt holding capacity. Contain zinc as well as being detergent and dispersant. RENOLIN MR oils are used in many hydraulic systems as problem solvers, especially when standard oils cannot fulfill all requirements. RENOLIN MR oils fulfill and surpass the requirements of 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 roller bearing spindles in the textile industry.
<b>RENOLIN MR 1 VG 5</b>		837	85	5	1.7	83	-36	RENOLIN MR 5, 10 and 20: Heavy-duty hydraulic oils with outstanding corrosion protection up to continuous temperatures of 100°C.
<b>RENOLIN MR 3 VG 10</b>		852	166	10	2.6	91	-30	
<b>RENOLIN MR 5 VG 22</b>		868	165	22	4.3	105	-30	
<b>RENOLIN MR 10 VG 32</b>		875	210	32	5.4	102	-30	RENOLIN MR 5, 10 and 20: For smaller gearboxes, in particular with electrical multi-plate clutches.
<b>RENOLIN MR 15 VG 46</b>		877	220	46	6.9	105	-27	
<b>RENOLIN MR 20 VG 68</b>		881	225	68	8.9	105	-24	RENOLIN MR 30, 40, 90: For larger gearboxes. As running-in and anticorrosion oil. Allows oil changes to be extended.
<b>RENOLIN MR 30 VG 100</b>		883	248	100	11.4	100	-18	
<b>RENOLIN MR 40 VG 150</b>		889	250	150	14.8	98	-18	
<b>RENOLIN MR 90 VG 320</b>		903	265	320	24.8	99	-12	(Refer to PI* 4-1249 for further details)
<b>RENOLIN MR 140 VG 460</b>	907	297	460	31.0	95	-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 MR 310/ 520/ 1030 – detergent AW/ EP hydraulic and lubricating oils with extremely high viscosity index

HVLPD-Oils (detergent/dispersive)

Product name	Description	Density at 15°C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40°C [mm <sup>2</sup> /s]	Kin.Visc. at 100°C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN MR 310</b>	Hydraulic and lubricating oils with extremely high viscosity index as well as outstanding cleaning properties and sludge carrying capacity.  HVLPD according to DIN 51 502 together with DIN 51 524. ISO 6743/4, HV	855	118	15	5.4	360	-48	RENOLIN MR 310, 520 and 1030: For all hydraulic systems which are subject to large temperature fluctuations or which are operated outdoors, e.g. in canal locks, weir machinery, machines or at particularly low application temperatures.  (Refer to PI* 4-1054 for further details)
<b>RENOLIN MR 520</b>		886	154	32	8.0	270	-57	
<b>RENOLIN MR 1030</b>		873	214	68	11.0	154	-36	

## 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/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40°C [mm <sup>2</sup> /s]	Kin.Visc. at 100°C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN MR 22 MC</b>	Universal lubricating and hydraulic oils containing MC base oils with high viscosity index (shear-stable). Excellent oxidation stability and outstanding cleaning properties and sludge carrying capacity.	856	200	22	4.9	153	-54	RENOLIN MR MC: Same application 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. Multi-grade characteristics. Very wide operating temperature range. Energy saving through high efficiency.  (Refer to PI* 4-1249 for further details)
<b>RENOLIN MR 32 MC</b>		858	220	32	6.4	152	-48	
<b>RENOLIN MR 46 MC</b>		864	234	46	8.3	154	-48	
<b>RENOLIN MR 68 MC</b>	HVLP according to DIN 51524-3 MR 22 MC: HVLP (HV) 22 MR 32 MC: HVLP (HV) 32 MR 46 MC: HVLP (HV) 46 MR 68 MC: HVLP (HV) 68 ISO 6743/4, HV	870	253	68	11.2	157	-42	

\* 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 LD – universal functional fluid with cleaning and flushing properties

HLPD-Fluid/Jetting liquid

Product name	Description	Density at 15 °C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm <sup>2</sup> /s]	Kin.Visc. at 100 °C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN LD 10</b>	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	-27	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.

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

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

Product name	Description	Density at 15 °C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm <sup>2</sup> /s]	Kin.Visc. at 100 °C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN HS 32 U</b>	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 fluid with extreme high VI, low temperature hydraulic fluid

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

Product name	Description	Density at 15 °C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin.Visc. at 40 °C [mm <sup>2</sup> /s]	Kin.Visc. at 100 °C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
<b>RENOLIN ZAF 15 LT</b>	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-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.
<b>RENOLIN ZAF 32 LT</b>		869	155	31	8,7	281	± -60	

\* 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

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

Product name	Description	Density at 15 °C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin. Visc. at 40 °C [mm <sup>2</sup> /s]	Kin. Visc. at 100 °C [mm <sup>2</sup> /s]	VI Viscosity index	Pour-point [°C]	Main application area
RENOLIN ZAF 32 MC	Lubricating and hydraulic oils containing MC base oils and selected additives. Very good oxidation and aging stability, very good corrosion protection and good wear protection. High viscosity index (shear-stable).  Fulfill and surpass DIN 51 524-3; ISO DIN 51524-3 ISO 11158, HV ZAF 32 MC: HVLP 32 ZAF 46 MC: HVLP 46 ZAF 68 MC: HVLP 68	840	246	35	6.7	149	-45	Shear-stable, zinc-free and ash-free hydraulic and circulating oils with a high viscosity index. For all mobile and stationary hydraulic systems. Allow oil change intervals to be extended and grades to be rationalized (multigrade characteristics). Energy saving through high efficiency.  Refer to PI* 4-1055 for further details)
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/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin. Visc. at 40 °C [mm <sup>2</sup> /s]	Kin. Visc. at 100 °C [mm <sup>2</sup> /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.	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	HLP according to DIN 51 524-2	876	230	46	6.8	101	-24	
RENOLIN ZAF B 68 HT	HM according to ISO 6743/4	882	242	68	8.7	100	-21	
RENOLIN ZAF B 100 HT	HM according to ISO 11158	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 ZAF D HT – detergent, zinc-free and ash-free AW / EP hydraulic oils

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 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		866	230	46	6.9	106	-39	Detergent zinc- and ash-free hydraulic oil based on group II with improved oxidation 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 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, HVLP-Oils (detergent)

Product name	Description	Density at 15°C [kg/m <sup>3</sup> ]	FLP. Cleveland [°C]	Kin. Visc. at 40°C [mm <sup>2</sup> /s]	Kin. Visc. at 100°C [mm <sup>2</sup> /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 Brügger. Detergent and dispersant formulations. Fulfill and surpass DIN 51 524-2.	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	ISO 11158, HM CLP according to DIN 51 517-3 CKC according to ISO 6743/6	876	210	32	5.4	102	-24	
RENOLIN ZAF 46 DT		876	218	46	6.8	101	-24	
RENOLIN ZAF 68 DT	Exception: demulsifying properties	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
<b>PLANTOHYD 15 S*</b> EU Ecolabel DE/027/154	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.	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!
<b>PLANTOHYD 22 S*</b> EU Ecolabel DE/027/155		901	200	22	5.4	198	-33	
<b>PLANTOHYD 32 S*</b> EU Ecolabel DE/027/156		910	206	32	7.1	194	-36	
<b>PLANTOHYD 46 S*</b> EU Ecolabel DE/027/157		920	300	46	9.2	187	-45	
<b>PLANTOHYD 68 S*</b> EU Ecolabel DE/027/158		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
<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 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!
<b>PLANTOLUBE POLAR 22 S</b>		908	166	22	5.7	200	<-51	



## 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
<b>PLANTOHYD 40 N*</b> EU Ecolabel DE/027/159	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
<b>PLANTOSYN 32 HVI*</b> EU Ecolabel DE/027/104	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.
<b>PLANTOSYN 46 HVI*</b> EU Ecolabel DE/027/105	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.	913	280	46	8.2	150	-36	Extension of changing intervals possible. Container temperature: -30°C to 100°C. Observe DIN ISO 15380 when making changeovers.
<b>PLANTOSYN 68 HVI*</b> EU Ecolabel DE/027/106	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.	916	280	68	10.6	143	-27	<b>Approvals:</b> MANNESMANN, REXROTH und SUNDSTRAND.
<b>PLANTOSYN 3268*</b> EU Ecolabel DE/027/149	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	<b>FUCHS recommendations:</b> BOSCH REXROTH AG, CAT BF-1, KRAMER ALLRAD, PALFINGER, SAUER DANFOS, TIMBERJACK, VALMET/ KOMATSU FOREST, PONSSE  <b>Approvals:</b> FENDT, O&K,
<b>PLANTOSYN 3268 ECO*</b> EU Ecolabel DE/027/160	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	<b>Approvals:</b> FENDT KDM

## 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 reduced 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 DR

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.

#### Note

The information contained in this product information is based on the experience and know-how of FUCHS SCHMIERSTOFFE GMBH in the development and manufacturing of lubricants and represents the current state-of-the-art. The performance of our products can be influenced by a series of factors, especially the specific use, the method of application, the operational environment, component pre-treatment, possible external contamination, etc. For this reason, universally-valid statements about the function of our products are not possible. Our products must not be used in aircrafts/spacecrafts or their components, unless such products are removed before the components are assembled into the aircraft / spacecraft. The information given in this product information represents general, non-binding guidelines. No warranty expressed or implied is given concerning the properties of the product or its suitability for any given application.

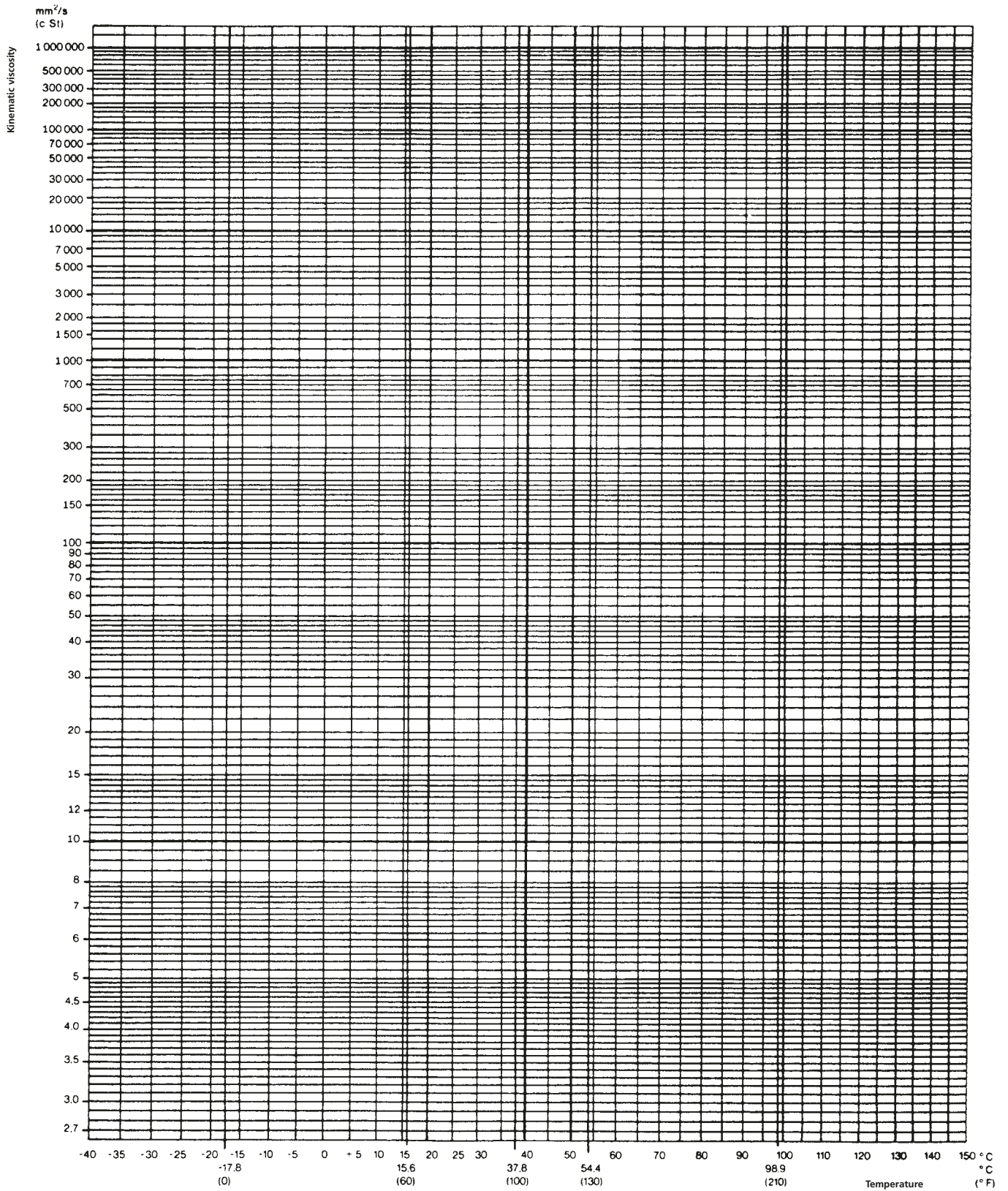
We therefore recommend that you consult a FUCHS SCHMIERSTOFFE GMBH application engineer to discuss application conditions and the performance criteria of the products before the product is used. It is the responsibility of the user to test the functional suitability of the product and to use it with the corresponding care.

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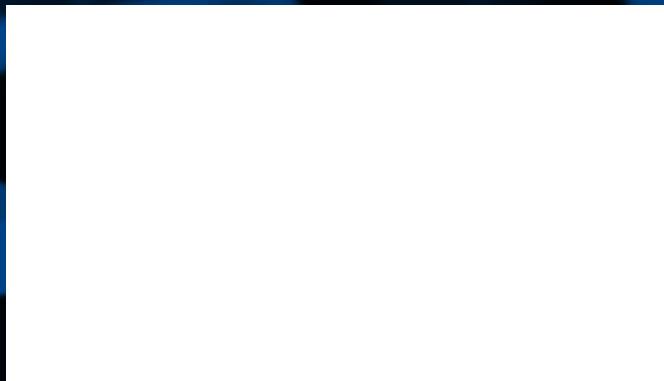
## Viscosity-temperature diagram.



## 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:**



**FUCHS SCHMIERSTOFFE GMBH**  
Friesenheimer Straße 19  
68169 Mannheim/Germany  
Phone: +49 621 3701-0  
Fax: +49 621 3701-570  
zentrale@fuchs-schmierstoffe.de  
www.fuchs.com/de/en

**Export Division**  
Friesenheimer Straße 19  
68169 Mannheim/Germany  
Phone: +49 621 3701-1713  
Fax: +49 621 3701-7713  
export@fuchs-schmierstoffe.de  
www.fuchs.com/de/en