# **Innovative lubricants need**

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.

# experienced application engineers



**FUCHS Industrial Lubricants** 

## An extensive product portfolio



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## **RENOLIN / RENOLIT**

## Lubricants for the paper industry

LUBRICANTS. TECHNOLOGY. PEOPLE.



## OUR LUBRICANTS KEEP THE WORLD MOVING

For more than 80 years, we have been concentrating all our activities and research efforts on the development of innovative lubricants. This specialization means that we are enjoying continuous growth – geographically, technically and in the number of application areas.

Today, FUCHS is a company that offers powerful lubricants and associated specialties worldwide in practically all areas of application and industries.







#### What makes our products more valuable.

We develop lubricants on an application-specific basis and tailored to our partners' processes. Together, we look for the best lubricant for our customers. This type of collaboration is unique in its form, scope and intensity. We call it a development partnership. This ability is based on one key feature: As a true lubricant specialist with its headquarters in Mannheim/Germany, we are the largest independent lubricant specialist, and this independence makes all the difference. We are open to new methods and visionary approaches – a prerequisite for innovations. And innovations are a FUCHS trademark.

Together, we can move more.

## The complete range of lubricants from the specialist.





## **High-tech paper machine lubricants from** the lubricant specialist.

#### **Requirements of paper machine lubricants**

The daily paper requirements of our modern society require huge quantities to be produced by paper and tissue manufacturers. Indeed, according to the Association of German Paper Manufacturers (VDP), around 22.7 million tons of paper and cardboard were produced in Germany alone in 2011. The paper machines used – the central units of any paper mill - therefore clearly need to be extremely reliable. The lubrication of the components employed in the wet end and dryer sections makes a significant contribution to this requisite reliability. Consequently, paper machine lubricants used in the wet end production sections must meet strict requirements in terms of corrosion protection and water resistance, while those used in the dryer sections need to provide both oxidative and thermal resistance. In addition to this, excellent wear protection must generally be guaranteed in all lubricated components.

However, the framework conditions in the paper machine are becoming more complex and the requirements ever stricter. Ever larger working widths (up to 12 m) and production speeds (up to 2,000 m/min), coupled with higher temperatures, inline calendering processes and new kinds of drying systems (boost dryers), are placing ever stricter requirements on the paper machine lubricants used.

FUCHS has developed a complete range of lubricants for this field and offers the right lubricant for every application.

#### **RENOLIN UNISYN CLP PA series – fully synthetic**

RENOLIN UNISYN CLP PA oils are fully synthetic, newly developed high-performance paper machine oils based on polyalphaolefin. They boast excellent demulsibility, high resistance to aging, excellent wear protection and very good corrosion protection. The products possess a high viscosity index, good filterability and do not leave any deposits. They are available in all common ISO VG classes from 100 to 680. Fulfilling and exceeding the requirements of gear oils according to DIN 51517-3: CLP-HC.

RENOLIN UNISYN CLP 220 PA fulfils and even exceeds the requirements of paper machine oils according to the specifications of SKF, FAG, Voith and Metso-Valmet.

#### **RENOLIN UNISYN CLP 220 PA: Development and test results (selected examples)**

Criterion	Test	Results	Test passed
Wear protection	FAG FE 8/7.5/80/80 (DIN 51819-3)	Roller bearing wear <10 mg	~
	FAG FE 8 paper machine test (FAG test at 120°C)	Passed	~
	FZG test A/8.3/90 (DIN ISO 14635-1)	Failure load stage >12	~
Corrosion protection	"Steel Rod" test with distilled water (procedure A) and with synthetic process water (procedure B; acc. to ISO 7120)	Corrosion degree 0 – no corrosion Corrosion degree 0 – no corrosion	~
	Copper corrosion 100 A3 (ISO 2160)	Corrosion degree 1 – no corrosion	~
	SKF Emcor test with process water (mod. ISO 11007; SKF test)	Corrosion degree 1 – no corrosion	<b>v</b>
Aging stability	SKF roller test (in-house SKF test)	Passed	~
	SKF aging test (in-house SKF test)	Passed	<b>v</b>

#### SKF roller test (8 weeks at 140 °C): RENOLIN UNISYN CLP 220 PA displays neither sludge formation, incrustations nor any significant changes in viscosity.





**RENOLIN UNISYN** CLP 220 PA: Excellent thermal and oxidative stability



## RENO





**Competitor product** (PAO-based): Poor thermal and oxidative stability



## **High-tech paper machine lubricants from** the lubricant specialist.

#### **RENOLIN PA series – mineral oil**

The products in the RENOLIN PA series are mineral oilbased paper machine oils containing a balanced additive system. Amongst these additives EP/AW active substances (EP = Extreme Pressure, AW = Anti-Wear) play an important role for improved wear protection. The RENOLIN PA series guarantees optimum wear protection, excellent demulsibility, outstanding resistance to aging and good compatibility with the kinds of elastomers typically used in paper machines. The oils exceed the requirements of CLP gear oils according to DIN 51517-3.

#### The benefits for you

- Optimum wear protection in the plant.
- Outstanding resistance to aging and oxidation stability.
- Minimum foaming tendency.
- Good compatibility with seal materials.

#### **Corrosion behaviour acc. to DIN ISO 7120** ("Steel Rod" test): Visual inspection after test



passed

**RENOLIN PA 220** 

poor

moderate

### "Steel Rod" test - results:

RENOLIN PA 220 shows excellent corrosion protection, both with distilled water and synthetic process water: Corrosion degree 0/0 – no corrosion.



## **Special lubricants for applications** in the paper industry.

#### **Steam generation**

The majority of overhead costs in paper mills are due to energy generation in the dryer section. The media used here must comply with strict efficiency and reliability requirements. For example, the steam generated via a combined heat and power system is used to dry the paper web in the dryer section.

#### **RENOLIN ETERNA series**

For the RENOLIN ETERNA series the latest generation of base-oils are chosen for use in gas and steam turbines employed in paper mills. Products of the RENOLIN ETERNA series display outstanding oxidative and thermal stability (>10,000 h in the TOST test acc. to ISO 4263) and possess both a naturally high viscosity index and mild EP additivation. They fulfil and even exceed the requirements of many specifications, e.g. Siemens Power Generation, GE and MAN Turbo AG.

#### **Results of RENOLIN ETERNA:** Aging behaviour in the SKF aging test (at 120 °C)

Evaporation loss in % after 2 weeks compared to competitor product



Evaporation loss in % after 4 weeks compared to competitor pr



MAN HT test (high temperature & filtration test, MAN Oberhausen, Germany) RENOLIN ETERNA 32 fulfils and exceeds the requirements of the MAN HT test with excellent results. RENOLIN ETERNA has excellent wear properties and a high degree of oxidation stability, as well as very good thermal and oxidative resistance.





#### The benefits for you

- Long shelf life of the turbine oil.
- Unique thermal stability.
- Outstanding hydrolytic stability.
- Excellent corrosion protection.
- The formation of deposits is permanently prevented.

arison with t	the competitor pr	oduct		
on loss oduct	25 %	30 % Competitor	34 % product	40 %
evaporatio	on loss in comparis	on with the competito	r product	
6 on loss	25 %	30 %	35 % Competi	40 % tor product



## **Special lubricants for applications** in the paper industry.

#### Surface finishing

Heated steel rollers, so-called calenders, are used in the production of calendered paper. These rollers and corresponding bearings reach temperatures of up to 250 °C and above, which requires high thermal stability of the oils used.

#### **RENOLIN SynGear 220 HT – fully synthetic** (polyalkylene glycol = PAG)

Fully synthetic high-temperature EP industrial gear and calender oil on the basis of selected polyalkylene glycols, offering extreme high-temperature stability, low evaporation loss and a high degree of wear protection (FZG A/8.3/90: >14).

In aging tests, RENOLIN SynGear 220 HT shows high thermal and oxidative resistance. Particularly well-suited for lubricating plain and roller bearings in paper and foil calenders.

#### The benefits for you

- Longer oil change intervals thanks to high aging stability and low evaporation tendency.
- Increased efficiency.
- Reduced temperatures.
- Reliable prevention of deposits.

For additional information on oil changes and compatibility, please contact FUCHS application engineers.

#### **Results of RENOLIN SynGear 220 HT**

Wear protection in the FAG FE 8 test D 7.5 / 80-80 (acc. to DIN 51819-3) compared to limit value DIN 51517-3: roller wear max. 30 mg



Aging stability of RENOLIN SynGear 220 HT in the S-200 oxidation test (312 h/150 °C) (acc. to ASTM D 2893/ DIN EN ISO 4263-4) compared to limit value ISO 12925-1: viscosity increase (V100): max. 6 % (limit values for industrial gear oils)





When compared with other PAG-based lubricating oils, RENOLIN SynGear 220 HT offers more than twice the service life. Unlike mineral oil-based lubricants, polyalkylene glycols initially display a decrease in viscosity when exposed to high thermal stress levels. This reduction in viscosity can cause issues with the formation of lubricating films. A lower viscosity limit of 198 mm<sup>2</sup>/s was therefore specified for the aging test (ISO VG 220 - 10 % = 198 mm<sup>2</sup>/s) to guarantee unimpaired lubrication of the machine elements.

## **FUCHS lubricating and gear oils** for paper mills.

	Brand name	Description	Areas of application
	RENOLIN PA ISO VG 150, 220	EP mineral oil-based gear oils guarantee optimum wear protection, excellent demulsibility and outstanding aging stability.	For bearing and gear lubrication in paper machines.
	RENOLIN UNISYN CLP PA series ISO VG 150 to 320	Newly developed lubricating and gear oils with synthetic basis (polyalphaolefin). For the strictest corrosion and wear protection requirements. Special formula for reducing oil aging and formation of deposits, even in applications with high levels of thermal stress.	For bearing and gear lubrication in paper machines. RENOLIN UNISYN CLP 220 PA fulfils and exceeds the requirements described in the specifications of SKF, FAG, Voith and Metso.
	RENOLIN DTA series ISO VG 2 to 320	Spindle, hydraulic and lubricating oils on the basis of selected base oils with active substances for improved aging properties and wear protection. The products of the RENOLIN DTA series are HL hydraulic oils acc. to DIN 51524-1 and CL lubricating oils acc. to DIN 51517-2.	For bearings, gears and hydraulics subjected to high levels of thermal stress with peak temperatures of around 120°C. Also suitable for use in hydro- dynamic drives.
	RENOLIN CLP series ISO VG 68 to 680	High-performance EP industrial gear and lubricating oils with high resistance to aging and active substances for improved corrosion protection. These oils fulfil and exceed the requirements of gear oils CLP oils according to DIN 51517-3.	Suitable for bearings and joints, as well as helical, bevel and worm gears. Approved by well-known gear manu- facturers, such as Flender.
	RENOLIN 500 series ISO VG 68 to 150	Solvent-refined oils with high resistance to aging with "ash-free" active substances to increase both the resistance to aging and corrosion protection. The oils in the RENOLIN 500 series correspond to the VDL lubri- cating oil group acc. to DIN 51506.	As highly aging-resistant lubricating oils with very low residue formation (in- crease in coke residue after aging) and very low carbon residue of the 20 % vol. residue during distillation, particularly for air compressors with final tempera- tures up to 220 °C. Also suitable for other thermally stressed lubricant circu- lation systems.
	RENOLIN PG series ISO VG 32 to 1000	Fully synthetic gear and lubricating oils based on special polyalkylene glycols, for high level of thermal stress. These oils exceed the requirements of CLP-PG lubricating oils according to DIN 51517-3.	For gears with highest mechanical and thermal stress, such as worm gears.
reciliology	<b>RENOLIN SynGear 220 HT</b> ISO VG 220	Fully synthetic high-temperature EP industrial gear and calender oil on the basis of selected polyalkylene glycols. For extreme high-temperature application, low evaporation loss and a high degree of wear protection. Exceeds the requirements of CLP-PG lubricating oils according to DIN 51517-3.	For gears and calenders with maximum thermal stress. For reliable wear protec- tion and prevention of deposits.
	PLANTOGEAR S series ISO VG 100 to 1000	Rapidly biodegradable high-performance gear oils on the basis of special, saturated esters. Extremely high tem- perature and aging stability, high viscosity index, high cleaning capacity thanks to polar ester structure, reduc- tion in friction, excellent wear protection, high FZG load carrying capacity, high micro-pitting resistance, excellent FE8 performance. "Self-cleaning oils". The oils in the PLANTOGEAR S series exceed the requirements of CLP-E lubricating oils acc. to DIN 51517-3.	For helical, bevel, planetary and worm gears subjected to high stresses, above all in areas where leakages could present a hazard to soil and the ground or surface water. For high and low application temperatures. Can also be used as clean- ing fluids.







# FUCHS hydraulic oils for paper mills.

Brand name	Description	Areas of application
<b>RENOLIN B series</b> ISO VG 10 to 100	Demulsifying lubricating and hydraulic oils containing zinc with high resistance to aging and active substances for improved corrosion protection. The oils exceed the requirements of HLP hydraulic oils acc. to DIN 51524-2.	As lubricating oils, particularly as hydrau- lic oils when high levels of resistance to aging, wear protection and demulsibility ability are required. Universal hydraulic oils for all hydrostatic and hydrodynamic hydraulic applications.
RENOLIN ZAF B series ISO VG 5 to 220	Zinc- and ash-free, demulsifying lubricating and hydraulic oils with high resistance to aging and active substances that prevent wear and protect against corrosion. The oils exceed the requirements of HLP hydraulic oils acc. to DIN 51524-2.	Suitable for all hydraulic drives, including those exposed to thermal stress. For reducing the environmental impact and costs associated with sewage treatment (zinc- and ash-free formula).
RENOLIN MR series ISO VG 2 to 460	Highly detergent AW/EP lubricating and hydraulic oils containing zinc and with pronounced corrosion protection, as well as high cleaning and dirt-carrying capacity. The oils exceed the requirements of HLPD hydraulic oils acc. to DIN 51502.	As problem solvers in hydraulic systems or circulation systems which are exposed to high levels of contamination due to dirt or water. For small gearboxes, in particular with electrical multi-plate clutches. As running-in and anticorrosion oils for large gearboxes.
<b>RENOLIN MR MC series</b> ISO VG 22 to 68	Shear-resistant, detergent universal lubricating and hydraulic oils, created on the basis of MC base oils with high viscosity index. The multigrade characteristic allows types to be rationalized. Products in the RENOLIN MR MC series fulfil the requirements of HVLPD hydraulic oils acc. to DIN 51502.	For all hydraulic systems which require use of detergent hydraulic oils with high shear resistance. Suitable for extending oil change intervals and type rationalization.
<b>PLANTOHYD S series</b> ISO VG 15 to 68	Ester-based synthetic hydraulic oils with active substances to increase resistance to aging. Rapidly biodegradable > 60 % acc. to OECD 301. The oils in the PLANTOHYD S series exceed the requirements of HVLP-HEES hydraulic oils acc. to ISO 15380.	Universally deployable as lubricating and hydraulic oils, especially in areas with strict environmental protection require- ments. Please observe the oil changeover guidelines.
PLANTOSYN HVI series ISO VG 46 and 68	Environmentally friendly hydraulic and lubricating oils based on selected, saturated esters. Rapidly biodegrad- able. High degree of wear protection, good seal and non-ferrous metal compatibility. These oils exceeds the requirements of HEES hydraulic oils acc. to ISO 15380.	Universally deployable in all hydraulic and circulation systems. Can be used where unsaturated, synthetic esters have failed. Extended oil drain intervals possible. Approved by Mannesmann Rexroth and Sauer Sundstrand. Observe ISO 15380 when making oil changeovers.

# FUCHS high-tech greases for paper mills.

RENOLIN

Brand name	Description	Areas of application
RENOLIT CSX 15	Calcium sulphonate complex high-temperature grease based on mineral oil with excellent corrosion and wear protection, high resistance to aging and good pumpability. NLGI 1/2, operating temperature range -20°C to +160°C.	Multipurpose paper machine grease for lubrication in either wet and dry section, and for heavy duty applications such as construction machinery.
RENOLIT HI-TEMP series	Lithium complex high performance grease based on fully synthetic oils (various levels of base oil viscosity from 100 to 460 mm <sup>2</sup> /s at 40 °C) with wide operating tempera- ture range and excellent corrosion protection. NLGI 2, operating temperature range –50 °C/–40 °C to +140 °C.	Special greases for lubrication in the wet section (RENOLIT HI-TEMP 220) and in the dry section (RENOLIT HI-TEMP 460), as well as plain and roller bearings in electric motors, belt rollers of conveyors, wheel bearings and cardan shafts.
RENOLIT CX-TOM 15	Calcium sulphonate complex special grease based on semi-synthetic oil with excellent corrosion and wear protection as well as high aging and media resistance. NLGI 1/2, operating temperature range –40 °C to +160 °C.	Special grease for lubrication in the wet section, as well as plain and roller bearings subjected to high loads over a wide temperature range.
RENOLIT LX-NHU 2	Lithium complex high-performance grease based on semi-synthetic oil with low oil separation as well as good wear, aging and corrosion protection. NLGI 1/2, operating temperature range –30 °C to +160 °C.	High-performance grease for lubrication in the dry section, and for thermally stressed plain and roller bearings, e.g. commercial vehicle wheel bearings. Approvals: MAN, ZF, Volvo, Daimler
RENOLIT LX-PEP series	Lithium complex special greases based on mineral oil with high mechanical resistance as well as good aging, corrosion, and wear protection. Available in NLGI 1/2, 2, 2/3 and 3. Operating temperature range –30°C to +150°C.	Universal greases for lubrication in the wet section, as well as plain and roller bearings, wheel bearings, electric motors, fans and cardan shafts. Approvals: VW, Daimler, MAN, ZF
RENOLIT DURAPLEX series	Lithium complex special greases based on mineral oil with high mechanical resistance and good wear protection. Available in NLGI 1, 2 and 3. Operating temperature range –30 °C to +160 °C.	High-grade multipurpose greases for lubrication of plain and roller bearings over a wide temperature range, e.g. in electric motors and construction machinery. Approval: Daimler
RENOLIT LZR 2H	Lithium grease based on with good corrosion protection, high water resistance (also salt water) and excellent pumpability. NLGI 2, operating temperature range –30°C to +140°C.	Multipurpose grease for lubrication in the wet section, as well as for plain and roller bearings, electric motors, conveyor systems and construction machinery. Approvals: Lincoln, SKF
RENOLIT CX-EP- and FO series	Calcium complex greases based on mineral oil with good wear protection, high resistance to weak acids and alkalis as well as excellent pumpability. NLGI 0, 1, 2 and 3, operating temperature range –30 °C to +140 °C/+150 °C.	Multipurpose greases for lubrication in the wet section. Approvals: Voest, ZF Lenksysteme, VW



## **Everything from one single source.**

Due to strict requirements in terms of their reliability, paper machines oils require intensive monitoring. FUCHS application engineers support the use of lubricants through lubricant analyses and evaluations of the results produced.

In addition to this, experienced application engineers provide you with regular recommendations for your oil filling.

#### The complete package

- Lubricants from the specialists.
- R&D expertise.
- Regular used oil monitoring processed with recommendations from engineers.
- On request, concepts for cleaning/rinsing/refilling.
- On request, coordination of refilling processes for your systems.





#### Note

The information contained in this product information is based on the experience and know-how of FUCHS EUROPE 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 pretreatment, possible external contamination, etc. For this reason, universally valid statements about the function of our products are not possible. 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 EUROPE 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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- Viscosities
- Undissolved substances
- Neutralization number
- Water content
- Foaming characteristics
- Demulsibility
- Other specific lubricant tests



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