

## RENOLIN CLP PLUS

**Long-term approved special gear oils with extremely high ageing stability and excellent detergency (DD) – self-cleaning oils**

### Description

Special lubricants are designed to solve problems and to guarantee trouble-free working at severe ambient conditions. The products of the RENOLIN CLP PLUS series are special industrial gear oils based on high-quality base oils and synergistically acting additives to improve aging resistance, load carrying capacity and wear protection. The RENOLIN CLP PLUS products offer extraordinary wear protection, they surpass the requirements in the standard FZG A/8,3/90 scuffing test as well as the more severe FZG test A/16,6/140 (double velocity - 16.6 m/s - and increased starting oil sump temperature - 140°C). The RENOLIN CLP PLUS oils contain selected detergent / dispersant (DD-) additives which guarantee that contaminants like water, dirt and ageing products are kept in suspension. Even at an increased water content of about 2-5% water dispersed in the oil, the wear protection can be guaranteed.

In our Fuchs test field, the RENOLIN CLP PLUS oils were tested under permanent addition of water, and the test results showed that the gear sets were protected against scuffing and wear also at a high water content (FZG >12). Also ageing products are dissolved reliably in the oil over a long period of time which protects the gear set and avoids the formation of sludge and layers. The RENOLIN CLP PLUS oils have excellent self-cleaning properties due to the high content of DD-additives. The detergency of the additives also guarantees good wetting of metal and non-metal components. Friction is reduced, specific wear is avoided. Testing in the FE8 roller bearing wear test (high load, high temperature, extreme mixed friction) showed low wear rates with the RENOLIN CLP PLUS products.

### Advantages/Benefits

- Very good aging resistance (AO booster)
- Longer lifetime compared with conventional industrial gear oils
- Low friction, reduced oil sump temperature, increased efficiency
- Excellent detergent / dispersant properties (sludge-carrying capacity)
- Excellent micropitting protection
- Excellent bearing wear protection – low wear in the FE8 test
- Excellent load carrying capacity, high EP performance
- Good corrosion protection
- Good elastomer compatibility
- Good air release properties
- Low foaming

### Specifications

The products of the RENOLIN CLP PLUS series fulfil or exceed the requirements according to:

- DIN 51 517-3: CLP
- ISO 6743-6: CKC
- ISO 12925: CKC (CKD)

The products of the RENOLIN CLP PLUS series are approved for example by:

- A. Friedrich Flender AG, 46393 Bocholt



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## Description (continued)

The RENOLIN CLP PLUS products have also a good elastomer compatibility, shown in test results with stressed dynamic and static elastomers and sealings. The products of the RENOLIN CLP PLUS series have a higher anti-oxidant content compared with conventional gear oils. The ageing stability and the lifetime of the products are thus increased. Special DD-additives and selected base oils reduce friction and the oil sump temperature. This effect, together with anti-oxidant-booster systems will increase the lifetime of the lubricant in the unit. The RENOLIN CLP PLUS oils meet the latest industrial standards of well-known OEMs. Service intervals can be prolonged.

## Application

The oils of the RENOLIN CLP PLUS series are used for all applications in industry where a detergent / dispersant oil of the CLP type according to DIN 51 517-3 is recommended. The recommended operating temperature is up to 100°C. For highly stressed bearings, joints, pressure screws, spur gears and worm gears short-term peak temperatures up to 120°C are allowed. Experience in practice shows that because of the synergistic additive combination, low friction, good wetting, a temperature reduction by up to 5-10°C in comparison with standard oils can be achieved. Due to the high oxidation stability a longer lifetime of the oil can be achieved, which helps to reduce service costs. Even for gear sets and bearings with a higher water contamination, the oils guarantee excellent wear protection and avoid specific wear under wet conditions. The RENOLIN CLP PLUS oils are recommended for applications in severe ambient conditions like mining, etc.



## CHARACTERISTICS: RENOLIN CLP PLUS

RENOLIN CLP PLUS.....		46	68	100	150	
Characteristics	Unit					Test Method
ISO VG	-	46	68	100	150	DIN 51 519
AGMA Grade	-		2EP	3EP	4EP	DIN 51 519
Kinematic Viscosity	at 40°C	46	68	100	150	DIN EN ISO 3104
	at 100°C	6.8	8.8	11.2	14.8	
Viscosity Index	-	102	100	97	97	DIN ISO 2909
Density at 15°C	kg/m <sup>3</sup>	885	888	891	895	DIN 51 757
Colour	ASTM	1.0	1.0	1.5	2.0	DIN ISO 2049
Flashpoint Cleveland open cup	°C	200	220	220	220	DIN ISO 2592
Pourpoint	°C	-27	-27	-24	-24	DIN ISO 3016
Neutralisation number	mgKOH/g	0.7	0.7	0.7	0.7	DIN 51 558-1
Demulsibility at 54°C/82°C	min.		detergent / dispersant			DIN ISO 6614
Sludge-carrying capacity (80°C)		103	93	86	74	DBL 6571-4
Copper corrosion 3h, 100°C (100 A3)	Degree of corrosion	1	1	1	1	DIN EN ISO 2160
Corrosion protection – steel procedure A: dist. water	Degree of corrosion	0	0	0	0	DIN ISO 7120
procedure B: sea water						
Foaming						ASTM D 892
Seq. I	ml	0/0	0/0	0/0	0/0	
Seq. II	ml	0/0	0/0	0/0	0/0	
Seq. III	ml	0/0	0/0	0/0	0/0	

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Characteristics	Unit					Test Method
FZG A/8,3/90 gear test rig Start temperature: 90°C	failure load stage	12	>12	>12	>12	DIN ISO 14635-1
FZG A/16,6/140 gear test rig Start temperature: 140°C	failure load stage	-	12	>12	>12	DIN ISO 14635-1
FZG-GFT* test GT-C/8,3/90 Load stage test	GF Class	-	-	GFT high	GFT high	FVA-Information Sheet No. 54/I-IV
FZG-GFT* test GT-C/8,3/90 Endurance test	GF Class	-	-	GFT high	GFT high	FVA-Information Sheet No. 54/I-IV
FE8 roller bearing wear test rig, D/7,5/80-80 (80°C, 80 kN) Roller wear	mg	<5	<5	<5	<5	DIN 51 819-3
Testing in mixed friction area according to Brugger	N/mm <sup>2</sup>	≥55	≥55	≥55	≥55	DIN 51 347-2
Timken OK load	lbs	-	85	95	95	ASTM D 2782
4-Ball EP test	N			≥2400		DIN 51 350-2
Weld load	kg			≥250		ASTM D 2783-88
Elastomer compatibility - dynamic and static: 72NBR902 (1000 h, 80°C – dynamic) 75FPM585 (1000 h, 90°C – dynamic) 75FKM17055 (1000 h, 90°C – dynamic)				pass pass pass		Fuchs In-house Test according to DIN ISO 1817 and according to Flender
SRE-NBR 28/SX according to DIN ISO 13226 (100°C, 7 d – static)				pass		DIN ISO 1817

GFT = micropitting test (grey discoloration test), GFT high = load stage > 10



## CHARACTERISTICS: RENOLIN CLP PLUS

RENOLIN CLP PLUS.....		220	320	460	680	
Characteristics	Unit					Test Method
ISO VG	-	220	320	460	680	DIN 51 519
AGMA Grade	-	5EP	6EP	7EP	8EP	DIN 51 519
Kinematic Viscosity	at 40°C	220	320	460	680	DIN EN ISO 3104
	at 100°C	18.9	24	30.2	39.6	
Viscosity Index	-	96	95	94	95	DIN ISO 2909
Density at 15°C	kg/m <sup>3</sup>	899	904	908	908	DIN 51 757
Colour	ASTM	2.5	3.0	3.0	3.0	DIN ISO 2049
Flashpoint Cleveland open cup	°C	220	220	230	230	DIN ISO 2592
Pourpoint	°C	-24	-18	-14	-17	DIN ISO 3016
Neutralisation number	mgKOH/g	0.7	0.7	0.7	0.7	DIN 51 558-1
Demulsibility at 54°C/82°C	min.	detergent / dispersant				DIN ISO 6614
Sludge-carrying capacity (80°C)		64	47	39	38	DBL 6571-4
Copper corrosion 3h, 100°C (100 A3)	Degree of corrosion	1	1	1	1	DIN EN ISO 2160
Corrosion protection – steel procedure A: dist. water procedure B: sea water	Degree of corrosion	0	0	0	0	DIN ISO 7120
		0	0	0	0	
Foaming						ASTM D 892
Seq. I	ml	0/0	0/0	0/0	0/0	
Seq. II	ml	0/0	0/0	0/0	0/0	
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FZG-GFT* test GT-C/8,3/90 Load stage test	GF Class	GFT high	GFT high	GFT high	GFT high	FVA-Information Sheet No. 54/I-IV
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