

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.

Advantages

- **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**

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Description (continued)

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. 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.

Specifications

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

- DIN 51517-3: CLP
- ISO 6743-6 and ISO 12925-1: CKC / CKD / CKSMP
- AGMA 9005/E02: EP

The products of the RENOLIN CLP PLUS series are approved for example by:
Flender, Bocholt, Germany, Flender BA 7300, table A

RENOLIN CLP 320 PLUS is approved by Bucyrus/Caterpillar Inc. (Enclosed Gearcase Lubricants for Bucyrus, Marion and Ransomes-Rapier Draglines).

RENOLIN CLP 320 PLUS is approved by CAT for Electric Rope Shovels (Enclosed Gearcase Lubricants).

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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 51517-3 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.

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Typical data

Product name		RENOLIN CLP PLUS				
		46	68	100	150	
Properties	Unit					Test method
ISO VG		46	68	100	150	DIN 51519
Kinematic viscosity at 40 °C	mm ² /s	46	68	100	150	DIN EN ISO 3104
at 100 °C	mm ² /s	6.8	8.7	11.2	14.8	
Viscosity index	-	102	100	97	97	DIN ISO 2909
Density at 15 °C	kg/m ³	882	884	887	892	DIN 51757
Colour	ASTM	1.0	1.0	1.5	2.0	DIN ISO 2049
Flashpoint, Cleveland open cup	°C	200	236	240	250	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 51558-1
Demulsibility at 54 °C/82 °C	min.	detergent / dispersant				DIN ISO 6614
Sludge-carrying capacity (80 °C)	mm	103	93	86	74	DBL 6571-4
Copper corrosion 3 h, 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		0	0	0	0	
Foaming						ASTM D 892
Seq. I: 24 °C	ml	0/0	0/0	0/0	0/0	
Seq. II: 93.5 °C	ml	0/0	0/0	0/0	0/0	
Seq. III: 24 °C after 93.5 °C	ml	0/0	0/0	0/0	0/0	

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Product name		RENOLIN CLP PLUS				
		46	68	100	150	
Properties	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	failure load stage	-	-	GFT high	GFT high	FVA-Info Sheet No. 54/I-IV
FZG GFT*-Test GT-C/8.3/90 Endurance test	failure load stage	-	-	GFT high	GFT high	FVA-Info 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 51819-3
Testing in mixed friction area according to Brugger	N/mm ²	≥ 55	≥ 55	≥ 55	≥ 55	DIN 51347-2
Timken OK load	lbs	-	85	95	95	ASTM D 2782
4-Ball EP test	N			≥ 2400		DIN 51350-2
Weld load	kg			≥ 250		ASTM D 2783-88
Elastomer compatibility - dynamic and static:						Fuchs Inhouse Test according to DIN ISO 1817 and according to Flender
• 72NBR902 (1000 h, 80 °C – dynamic)				pass		
• 75FPM585 (1000 h, 90 °C – dynamic)				pass		
• 75FKM17055 (1000 h, 90 °C – dynamic)				pass		
• 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

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Typical data

Product name	RENOLIN CLP PLUS					
		220	320	460	680	
Properties	Unit					Test method
ISO VG		220	320	460	680	DIN 51519
Kinematic viscosity at 40 °C	mm²/s	220	320	460	680	DIN EN ISO 3104
at 100 °C	mm²/s	18.9	24.0	30.2	39.6	
Viscosity index	-	96	95	94	95	DIN ISO 2909
Density at 15 °C	kg/m³	895	898	902	902	DIN 51757
Colour	ASTM	2.5	3.0	3.0	3.0	DIN ISO 2049
Flashpoint, Cleveland open cup	°C	260	255	270	270	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 51558-1
Demulsibility at 54 °C/82 °C	min.	detergent / dispersant				DIN ISO 6614
Sludge-carrying capacity (80 °C)	mm	64	47	39	38	DBL 6571-4
Copper corrosion 3 h, 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		0	0	0	0	
Foaming						ASTM D 892
Seq. I: 24 °C	ml	0/0	0/0	0/0	0/0	
Seq. II: 93.5 °C	ml	0/0	0/0	0/0	0/0	
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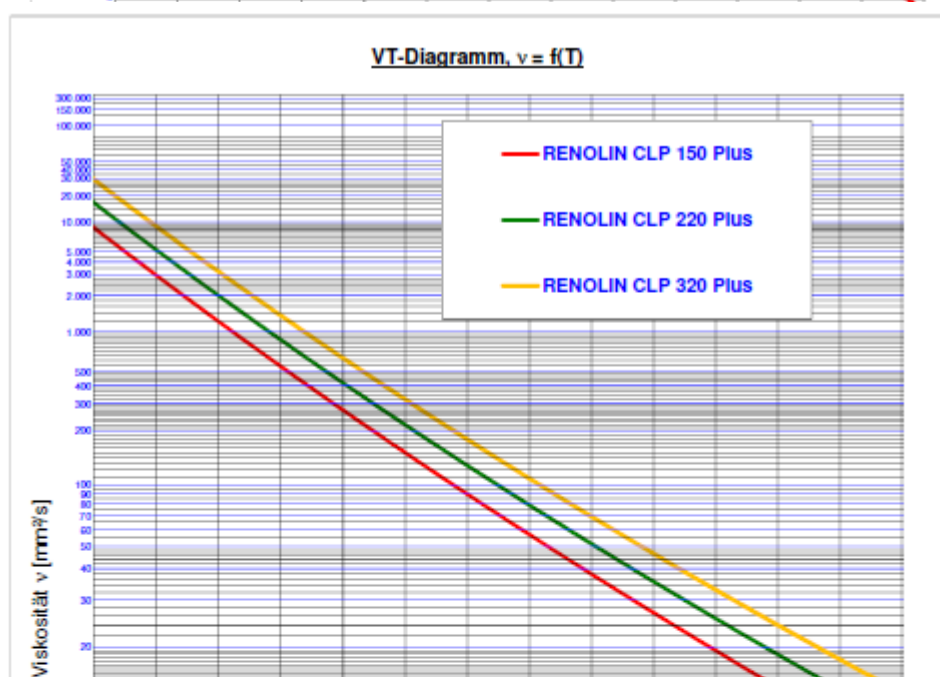
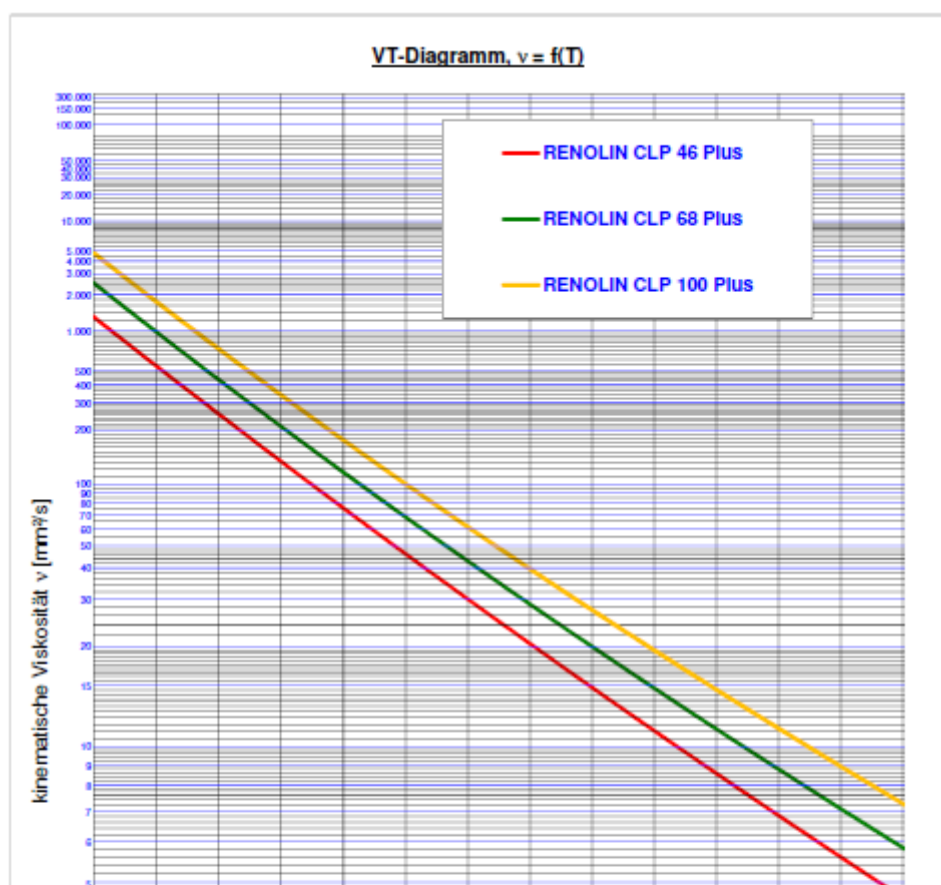
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FZG A/16.6/140 gear test rig, Start temperature: 140 °C	failure load stage	> 12	> 12	> 12	> 12	DIN ISO 14635-1
FZG-GFT*-Test GT-C/8.3/90 Load stage test	failure load stage	GFT high	GFT high	GFT high	GFT high	FVA-Info Sheet No. 54/I-IV
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Timken OK load	lbs	95	95	95	95	ASTM D 2782
4-Ball EP test	N			≥ 2400		DIN 51350-2
Weld load	kg			≥ 250		ASTM D 2783-88
Elastomer compatibility - dynamic and static:						Fuchs Inhouse Test according to DIN ISO 1817 and according to Flender
• 72NBR902 (1000 h, 80 °C – dynamic)				pass		
• 75FPM585 (1000 h, 90 °C – dynamic)				pass		
• 75FKM17055 (1000 h, 90 °C – dynamic)				pass		
• 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

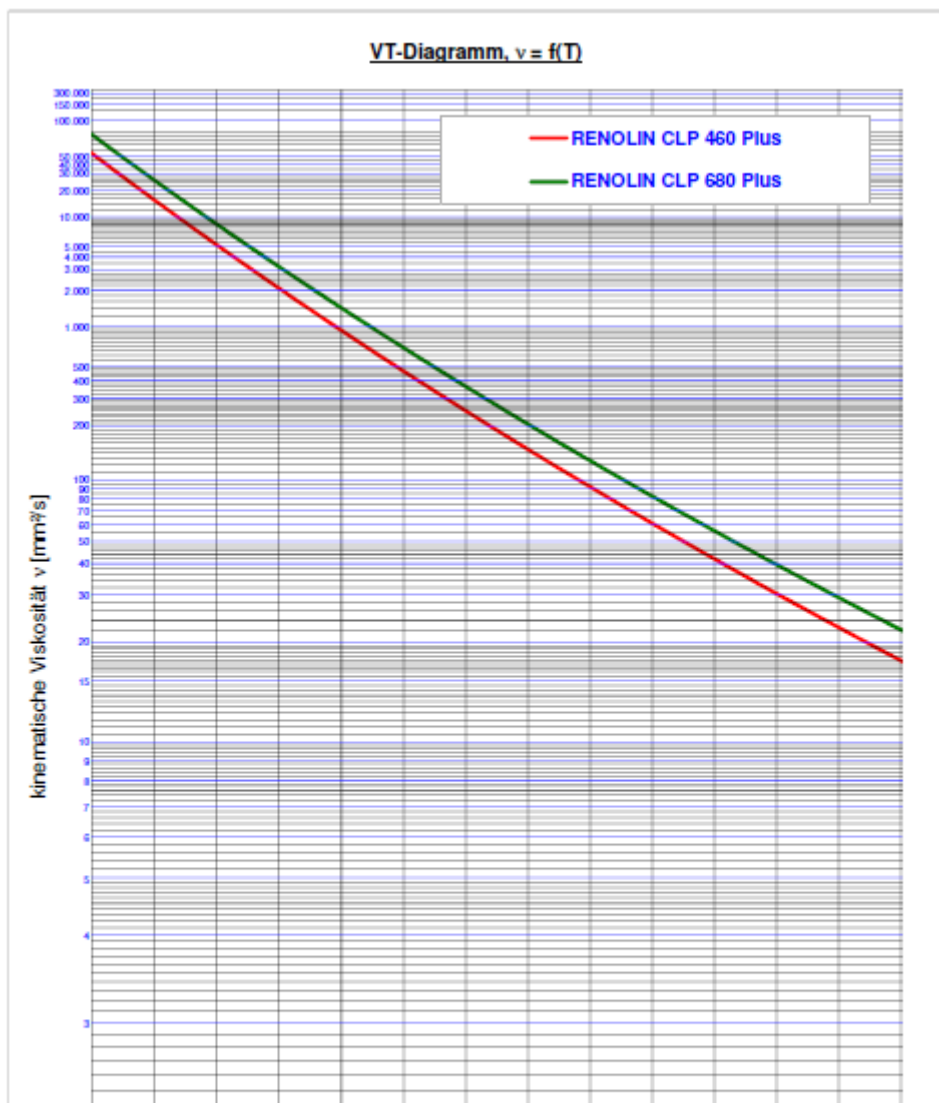
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