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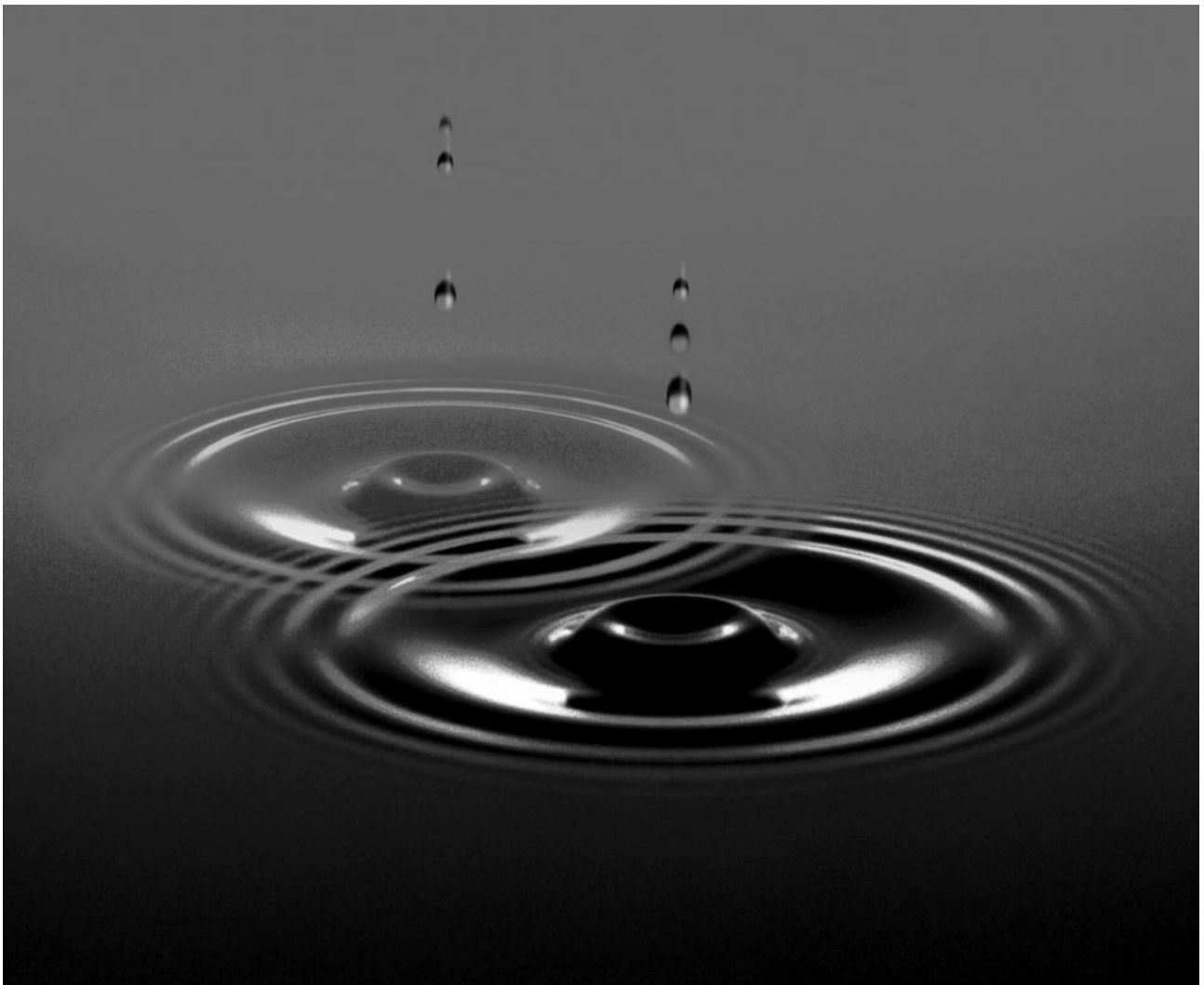
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Recommended Lubricants

For Gearboxes



Impressum

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1. Introduction

This document provides information for:

- The scope of this document
- The quality characteristics of recommended lubricants
- The recommended groups of lubricants
- The temperature ranges of different lubricant groups
- The recommended service lives for different lubricant groups
- The required cleanliness for lubricants
- The contact information
- The recommended lubricants and manufacturers

2. Scope

This document is valid for gearboxes made by FLSmidth MAAG Gear AG.

3. Quality characteristics

For our gearboxes, we recommend to use only oils as listed under Chp. 9. "Recommended lubricants". Should you decide to use any other oil, the oil should meet at least the quality characteristics as listed below. Polyglycol and Poly- α -Olefin oils may only be used after the written approval from us, except if specifically prescribed.

Criterion	Quality characteristics	Standard
Corrosion protection, aging resistance	CLP-quality with additives for increased corrosion protection, increased aging resistance and reduced wear in mixed-friction areas.	DIN 51517-3
Scuffing resistance	Failure load stage >12	FZG Test DIN 51354-2 A/8.3/90
Roller bearing wear	Rolling element wear, less than 30 mg Cage wear to be reported	FE-8 Roller bearing test DIN 51819-3 D-7.5/80-80
Grey-staining resistance	GFT load stage ≥ 10 or GF class high	Grey-staining test FVA 54
Compatibility with other materials	Compatible with elastomeric materials of O-rings and shaft seals. Compatible with the paints used for gear-unit interiors. Compatible with residues of corrosion-protection agent and test run oils. Compatible with liquid seals between joint surfaces.	
Foaming	The oil should have low foaming characteristics.	

4. Oil groups

Principally, a distinction is made between the following oil groups:

- Mineral oils (MIN oil)
- Polyglycols (PG oil)
- Poly- α -olefins (PAO oil)

Our gearboxes are normally intended for operation with mineral oil.

Polyglycol and poly- α -olefin oils **can** be used, provided that MAAG Gear has agreed to such use in writing.

Polyglycol and poly- α -olefin oils **must** be used, when this is expressly prescribed for a gearbox or a special application.

5. Temperature range

Compared with mineral oils, polyglycol and poly- α -olefin oils have a greater temperature range:

- Mineral oils -10°C to +90°C
- Polyglycol und Poly- α -Olefine oils -20°C to +100°C

For exact values see the data sheet from the respective oil manufacturer.

6. Oil service life

Like other parts in a gearbox, the oil is also affected by aging and wear.

The following values may be used as a guideline for the service life of the lube oils used for the lubrication in our gearboxes.

Oil	Recommended service life
Mineral oil	2 years or 10'000 operating hours
Polyglycols	4 years or 20'000 operating hours
Poly- α -Olefins	

For large amounts of oil we recommend to determine the right moment for an oil change by regular analysis of the oil.

Please refer also to the operating instructions of your gearbox to find the specific values recommended.

7. Purity of oils

The reliability and the life time of the gearbox, the oil supply unit and the lube oil, largely depend on the cleanliness of the oil.
Therefore, keep the oil clean.

When exchanging the oil, use the same oil from the same manufacturer, and keep the remaining oil inside the gearbox and the oil supply unit as small as possible.
Small amounts of old oil mixed with new oil will normally not cause any problems.

Do not mix oils from different manufacturers.

When changing to very different type of oil, especially from mineral- to polyglycol oils or vice versa, the gearbox and the oil supply unit must be flushed very well with the new oil. In this case, very small amounts of the other oil can lead to unexpected problems.

8. Contact

If you have any questions, we will be glad to help you.

You can reach us as follows:

By Phone

Switchboard: +41 (0)52 260 35 00
Field service (24/7): +800 357 643 84
Spare parts: +41 (0)52 260 35 51

By Fax




Switchboard: +41 (0)52 260 35 35
Field service: +41 (0)52 260 35 55
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By E-Mail


Switchboard: info@FLSmidthMaagGear.com
Field service: service@FLSmidthMaagGear.com
Spare parts: aftersales@FLSmidthMaagGear.com




9. Recommended Lubricants




Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)	 ANDEROL [®] Specialty Lubricants	 ARAL	 AVIA
Mineral oil	VG 460		Degol BG 460 Plus	GEAR RSX 460
	VG 320		Degol BG 320 Plus	GEAR RSX 320
	VG 220		Degol BG 220 Plus	GEAR RSX 220
	VG 150		Degol BG 150 Plus	GEAR RSX 150
	VG 100		Degol BG 100 Plus	GEAR RSX 100
Polyglycols	VG 460		Degol GS 460	GEAR VSG 460
	VG 320		Degol GS 320	GEAR VSG 320
	VG 220		Degol GS 220	GEAR VSG 220
	VG 150		Degol GS 150	GEAR VSG 150
	VG 100			GEAR VSG 100
Poly-α-Olefins	VG 460		Degol PAS 460	SYNTOGEAR PE 460
	VG 320	ANDEROL 5320 XEP	Degol PAS 320	SYNTOGEAR PE 320
	VG 220		Degol PAS 220	SYNTOGEAR PE 220
	VG 150		Degol PAS 150	SYNTOGEAR PE 150
	VG 100			



Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)			
Mineral oil	VG 460	MAK AMOCAM PLUS 460	Energol GR-XP 460	BESLUX XP-460
	VG 320	MAK AMOCAM PLUS 320	Energol GR-XP 320	BESLUX XP-320
	VG 220	MAK AMOCAM PLUS 220	Energol GR-XP 220	BESLUX XP-220
	VG 150	MAK AMOCAM PLUS 150	Energol GR-XP 150	
	VG 100	MAK AMOCAM PLUS 100	Energol GR-XP 100	
Polyglycols	VG 460		Enersyn SG-XP 460	BESLUX SINCART 460 W
	VG 320		Enersyn SG-XP 320	BESLUX SINCART 320 W
	VG 220		Enersyn SG-XP 220	BESLUX SINCART 220 W
	VG 150		Enersyn SG-XP 150	BESLUX SINCART 150 W
	VG 100		Enersyn SG-XP 100	
Poly-α-Olefins	VG 460	MAK Syngear 460	Enersyn EP-XF 460	BESLUX GEARSYNT XP-460
	VG 320	MAK Syngear 320	Enersyn EP-XF 320	BESLUX GEARSYNT XP-320
	VG 220	MAK Syngear 220	Enersyn EP-XF 220	BESLUX GEARSYNT XP-220
	VG 150	MAK Syngear 150	Enersyn EP-XF 150	BESLUX GEARSYNT XP-150
	VG 100	MAK Syngear 100	Enersyn EP-XF 100	

Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)			
Mineral oil	VG 460		Alpha SP 460 Optigear BM 460 Tribol 1100 / 460	Meropa WM 460
	VG 320		Alpha SP 320 Optigear BM 320 Tribol 1100 / 320	Meropa WM 320
	VG 220		Alpha SP 220 Optigear BM 220 Tribol 1100 / 220	Meropa WM 220
	VG 150		Alpha SP 150 Optigear BM 150 Tribol 1100 / 150	Meropa WM 150
	VG 100		Optigear BM 100 Tribol 1100 / 100	Meropa WM 100
Polyglycols	VG 460	BERUSYNTH EP 460	Tribol 1300 / 460	Synlube WS 460
	VG 320	BERUSYNTH EP 320	Tribol 1300 / 320	Synlube WS 320
	VG 220	BERUSYNTH EP 220	Tribol 1300 / 220	Synlube WS 220
	VG 150	BERUSYNTH EP 150	Tribol 1300 / 150	
	VG 100	BERUSYNTH EP 100	Tribol 1300 / 100	
Poly-α-Olefins	VG 460		Optigear synthetic X 460	
	VG 320		Optigear synthetic X 320	
	VG 220		Optigear synthetic X 220	
	VG 150		Optigear synthetic X 150	
	VG 100		Optigear synthetic X 100	

Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)			
Mineral oil	VG 460	RENOLIN CLP 460 RENOLIN CLP PLUS 460	GEARMASTER CLP 460	
	VG 320	RENOLIN CLP 320 RENOLIN CLP PLUS 320	GEARMASTER CLP 320	
	VG 220	RENOLIN CLP 220 RENOLIN CLP PLUS 220	GEARMASTER CLP 220	
	VG 150	RENOLIN CLP 150 RENOLIN CLP PLUS 150	GEARMASTER CLP 150	
	VG 100	RENOLIN CLP 100 RENOLIN CLP PLUS 100	GEARMASTER CLP 100	
Polyglycols	VG 460	RENOLIN PG 460	GEARMASTER PGP 460	
	VG 320	RENOLIN PG 320	GEARMASTER PGP 320	
	VG 220	RENOLIN PG 220	GEARMASTER PGP 220	
	VG 150	RENOLIN PG 150	GEARMASTER PGP 150	
	VG 100	RENOLIN PG 100	GEARMASTER PGP 100	
Poly-α-Olefins	VG 460	RENOLIN UNISYN CLP 460	GEARMASTER SYN 460	Servosyn gear AMP 460 Servosyn gear Plus 460
	VG 320	RENOLIN UNISYN CLP 320	GEARMASTER SYN 320	Servosyn gear AMP 320 Servosyn gear Plus 320
	VG 220	RENOLIN UNISYN CLP 220	GEARMASTER SYN 220	Servosyn gear AMP 220 Servosyn gear Plus 220
	VG 150	RENOLIN UNISYN CLP 150	GEARMASTER SYN 150	Servosyn gear AMP 150
	VG 100	RENOLIN UNISYN CLP 100	GEARMASTER SYN 100	

Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)			
Mineral oil	VG 460	Klüberöl GEM 1 – 460 N	Mobilgear XMP 460 Mobilgear 600 XP 460	GEAR COMPOUND PLUS 460
	VG 320	Klüberöl GEM 1 – 320 N	Mobilgear XMP 320 Mobilgear 600 XP 320	GEAR COMPOUND PLUS 320
	VG 220	Klüberöl GEM 1 – 220 N	Mobilgear XMP 220 Mobilgear 600 XP 220	GEAR COMPOUND PLUS 220
	VG 150	Klüberöl GEM 1 – 150 N	Mobilgear XMP 150 Mobilgear 600 XP 150	GEAR COMPOUND PLUS 150
	VG 100	Klüberöl GEM 1 – 100 N	Mobilgear XMP 100 Mobilgear 600 XP 100	GEAR COMPOUND PLUS 100
Polyglycols	VG 460	Klübersynth GH 6 - 460	Glygoyle 460	GEARSYNT 460
	VG 320	Klübersynth GH 6 - 320	Glygoyle 320	GEARSYNT 320
	VG 220	Klübersynth GH 6 - 220	Glygoyle 220	GEARSYNT 220
	VG 150	Klübersynth GH 6 - 150	Glygoyle 150	GEARSYNT 150
	VG 100		Glygoyle 100	GEARSYNT 100
Poly-α-Olefins	VG 460	Klübersynth GEM 4 – 460 N	Mobilgear SHC XMP 460 Mobil SHC 634 Mobil SHC Gear 460	GEAR SYNTEC CLP 460
	VG 320	Klübersynth GEM 4 – 320 N	Mobilgear SHC XMP 320 Mobil SHC 632 Mobil SHC Gear 320	GEAR SYNTEC CLP 320
	VG 220	Klübersynth GEM 4 – 220 N	Mobilgear SHC XMP 220 Mobil SHC 630 Mobil SHC Gear 220	GEAR SYNTEC CLP 220
	VG 150	Klübersynth GEM 4 – 150 N	Mobilgear SHC XMP 150 Mobil SHC Gear 150	GEAR SYNTEC CLP 150
	VG 100			

Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)			
Mineral oil	VG 460		Q8 Goya NT 460	Shell Omala F 460
	VG 320		Q8 Goya NT 320	Shell Omala F 320
	VG 220		Q8 Goya NT 220	Shell Omala F 220
	VG 150		Q8 Goya NT 150	
	VG 100			
Polyglycols	VG 460			Omala S4 WE 460 Cassida WG 460
	VG 320			Omala S4 WE 320 Cassida WG 320
	VG 220			Omala S4 WE 220 Cassida WG 220
	VG 150			Omala S4 WE 150 Cassida WG 150
	VG 100			
Poly-α-Olefins	VG 460	Enduratex Synthetic EP 460	Q8 El Greco 460	Shell Omala S4 GX 460
	VG 320	Enduratex Synthetic EP 320	Q8 El Greco 320	Shell Omala S4 GX 320
	VG 220	Enduratex Synthetic EP 220	Q8 El Greco 220	Shell Omala S4 GX 220
	VG 150	Enduratex Synthetic EP 150	Q8 El Greco 150	Shell Omala S4 GX 150
	VG 100			

Lubricant group	Viscosity ISO-VG / DIN 51519 at 40°C (mm ² /s)			
Mineral oil	VG 460	LoadWay EP 460	KASSILA GMP 460 CARTER EP 460 CARTER XEP 460	
	VG 320	LoadWay EP 320	KASSILA GMP 320 CARTER EP 320 CARTER XEP 320	
	VG 220	LoadWay EP 220	KASSILA GMP 220 CARTER EP 220 CARTER XEP 220	
	VG 150	LoadWay EP 150	CARTER XEP 150	
	VG 100			
Polyglycols	VG 460			
	VG 320			
	VG 220			
	VG 150			
	VG 100			
Poly-α-Olefins	VG 460		CARTER SH 460	
	VG 320	MERETA 320	CARTER SH 320	
	VG 220	MERETA 220	CARTER SH 220	
	VG 150	MERETA 150	CARTER SH 150	
	VG 100			