

## LUBRICATION

### General

Depending on the type of the speed reducer and the running conditions, four different methods of lubrication can be used. The correct method is stated on the manual accompanying the speed reducer.

**Grease lubrication** is used for small gear units with peripheral velocities slower than 5 m/s. Grease lubrication is ideal for gear units in occasional service undergoing frequent starts: the grease remains on the tooth surface and in the bearings during stoppages thus ensuring immediate lubrication upon restarting of the unit.

**Oil bath lubrication** is used for large gear units with peripheral velocities slower than 4 m/s. This method provides efficient lubrication for the bearings and the sliding tooth surfaces and because of the slow velocity there is no excessive rise in the oil temperature.

**Splash lubrication** is used for gear units with peripheral velocities of 2 - 12 m/s. It is extremely important to ensure that a correct quantity of oil is used, as an insufficient quantity may lead to inadequate lubrication and an excessive quantity to overheating.

**Pressure lubrication** is used for gear units with peripheral velocities higher than 12 m/s. Utmost care should be taken to ensure a continuous flow of oil onto the mesh point of the gear. Pressure lubrication can also be used for gear units with slower velocities if adequate lubrication cannot be obtained through other methods.

### Oil and Grease Quantities

The exact oil quantity is given on the specification plate attached to the gear unit or in the technical specification KQ-17.

*Notice!* The oil level must always be checked by an oil sight glass, an oil level sight glass, an oil level plug or a dipstick.

In case of grease lubrication, the required amount of grease is given on the lubrication plate attached to the gear unit.

### Facts to be Considered in Lubrication:

*All of our gear units are delivered from the factory without any oil in the gear housing.*

1. Prior to starting the gear unit, the gear housing should be filled either with oil conforming to the recommendations stated in the adjoining table or to those stated in the lubricant specification plate. Grease lubricated gear units can also be delivered filled with grease, if required.

2. The oil quality is determined by the size of the gear unit, the speed of the shafts (peripheral velocity of gears), the ambient temperature and the operating conditions.

3. The oil quantity is checked by

- **an oil sight glass**, oil is filled until the oil level is seen to rise to the middle of the oil sight glass
- **an oil level sight glass**, oil is filled between the marks
- **an oil level plug**, oil is filled until it begins to flow out from the opened oil level plug hole
- **a dipstick**, oil is filled between the marks

4. The oil level should occasionally be checked when the gear unit is stopped and the oil has cooled off. The oil level should never fall below the minimum mark.

5. The first oil change should be made after 300 - 500 hours of operation. Subsequent oil changes should then be made once a year or after each 5,000 hours of operation. If the gear unit is grease lubricated, the grease should be completely changed after each 8,000 hours of operation. In special cases and when special oil is used, we suggest contacting the oil supplier or our factory for recommendations on the length of the oil change intervals. If the lubrication system includes a filter, it must always be replaced by a new one when the oil is changed.

6. If the gear unit is equipped with grease nipples to lubricate the bearings, it is advisable to add about 10 - 20 grams of grease at about 6 month intervals.

7. The breather plug must be replaced by a new one twice a year or when the oil is changed. If the plug gets blocked, pressure may arise in the gear housing resulting in oil leakage.

## Recommended Lubricants

### Lubrication Groups

Ambient Temperature °C	Ambient Temperature °F	Lubrication Method	ISO VG	AGMA
- 30 ... + 5	-22...+41	Pressure lubrication Splash lubrication Oil bath lubrication	68 150 150	2 EP 4 EP 4 EP
- 5 ... + 25	+23...+77	Pressure lubrication Splash lubrication Oil bath lubrication	150 220 220	4 EP 5 EP 5 EP
+ 15 ... + 45	+68...+113	Pressure lubrication Splash lubrication Oil bath lubrication	150 320 320	4 EP 6 EP 6 EP
+ 35 ... + 60	+104...+140	Pressure lubrication Splash lubrication Oil bath lubrication	220 460 460	5 EP 7 EP 7 EP

### Mineral Oils

DIN 51517-CLP, EP (Extreme Pressure) oil

ISO VG AGMA	68 2 EP	150 4 EP	220 5 EP	320 6 EP	460 7 EP	680 8 EP
MOBIL	Mobilgear XMP 68	Mobilgear XMP 150	Mobilgear XMP 220	Mobilgear XMP 320	Mobilgear XMP 460	Mobilgear XMP 680
ESSO	Spartan EP 68	Spartan EP 150	Spartan EP 220	Spartan EP 320	Spartan EP 460	Spartan EP 680
SHELL		Shell Omala F 150	Shell Omala F 150	Shell Omala F 150	Shell Omala F 150	Shell Omala F 150
LE		604 Almasol Vari-Purpose Gear Lub	607 Almasol Vari-Purpose Gear Lub	605 Almasol Vari-Purpose Gear Lub	608 Almasol Vari-Purpose Gear Lub	609 Almasol Vari-Purpose Gear Lub
BP		Energol GR-XF 150	Energol GR-XF 220	Energol GR-XF 320	Energol GR-XF 460	Energol GR-XF 680
CHEVRON TEXACO	Meropa 68	Meropa 150	Meropa 220	Meropa 320	Meropa 460	Meropa 680
CASTROL		Alpha Max 150	Alpha Max 220	Alpha Max 320	Alpha Max 460	Alpha Max 680
NESTE	Vaihteisto 68 EP	Vaihteisto 150 EP	Vaihteisto 220 EP	Vaihteisto 320 EP	Vaihteisto 460 EP	Vaihteisto 680 EP
TEBOIL	Pressure Oil 68	Pressure Oil 150	Pressure Oil 220	Pressure Oil 320	Pressure Oil 460	
ARAL		Degol BG 150 Plus	Degol BG 220 Plus	Degol BG 320 Plus	Degol BG 460 Plus	Degol BG 680 Plus

### Synthetic Oils

DIN 51517-CLP, EP (Extreme Pressure) oil

ISO VG AGMA	68 2 EP	150 4 EP	220 5 EP	320 6 EP	460 7 EP	680 8 EP
MOBIL		Mobilgear SHC XMP 150	Mobilgear SHC XMP 220	Mobilgear SHC XMP 320	Mobilgear SHC XMP 460	Mobilgear SHC XMP 680
SHELL		Omala HD 150	Omala HD 220	Omala HD 320	Omala HD 460	Omala HD 680
BP		Enersyn EP-XF 150	Enersyn EP-XF 220	Enersyn EP-XF 320	Enersyn EP-XF 460	Enersyn EP-XF 680
NESTE	Vaihteisto S 68 EP	Vaihteisto S 150 EP	Vaihteisto S 220 EP	Vaihteisto S 320 EP	Vaihteisto S 460 EP	Vaihteisto S 680 EP
KLUEBER		Synth EG-4 150	Synth EG-4 220	Synth EG-4 320	Synth EG-4 460	Synth EG-4 680

### Synthetic Lubricants

Synthetic lubricants can be used in gear units which operate in unusually high or low temperatures or whose oil change intervals are for other reasons longer than usually.

The viscosity of synthetic oil should correspond to that of mineral oil which otherwise is used in these circumstances. When synthetic lubricants other than those listed in the adjoining table are used, the durability of the sealing material should be checked.

Greases	Grease lubricated gear units	Grease lubricated bearings
MOBIL	Mobilux EP 0	Mobilux EP 2
ESSO	Fibrax 370 EP	Beacon 2
SHELL	Alvania Grease EP 0	Alvania Grease RL 2
ARAL	Aralub FDP 0	Aralub HL2
BP	Energrease LS EP 0	Energrease LS EP 2
TEBOIL	CLS Grease	Multi-Purpose Grease