7.11 Lubrication Tables

⚠ CAUTION

The table only offers partial information for initial guidance. Refer to the Approved lubricant register (AL001) and Original Equipment Manufacturer manuals for full lubrication and maintenance instructions.

⚠ CAUTION

Do not deviate from the supplier's specification for lubrication and maintenance instructions. It will invalidate machine warranty. The supplier must accept deviation in writing.

⚠ CAUTION

Make sure to have extra lubricant on hand at first fill, especially for the main speed reducer. The reservoir oil level will drop slightly as the pumps initially fill the system components. Check and add lubricant as necessary to maintain the required levels.

7.11.1 Recommended Trunnion Bearing Lubricants (Hydrodynamic and Hydrostatic Bearings)

Table 32. Recommended Trunnion Bearing Lubricants (Hydrodynamic and Hydrostatic Bearings)

Ambient Temperature	5°C to 38°C	Above 38°C
AGMA Viscosity Grade	5EP	6EP
ISO Viscosity Grade	220	320
Viscosity at 38ºC	940 SSU to 1,170 SSU	1,335 SSU to 1,632 SSU
Viscosity at 100ºC	85 SSU to 95 SSU	100 SSU to 115 SSU
Manufacturer	Lubricant	Lubricant
Castrol	Alpha SP 220	Alpha SP 320
Chevron	Ultra Gear ISO 220	Ultra Gear ISO 320
Chevron	Gear Compound ISO 220	Gear Compound ISO 320
Conoco	Hydroclear EP Gear Oil 220	Hydroclear EP Gear Oil 320
Exxon	Spartan EP 220	Spartan EP 320
Fuchs	Renolin Hulbest EP 220	Renolin Hulbest EP 320

Ambient Temperature	5°C to 38°C	Above 38°C
AGMA Viscosity Grade	5EP	6EP
ISO Viscosity Grade	220	320
Viscosity at 38ºC	940 SSU to 1,170 SSU	1,335 SSU to 1,632 SSU
Viscosity at 100ºC	85 SSU to 95 SSU	100 SSU to 115 SSU
Manufacturer	Lubricant	Lubricant
Keystone	Keygear 220 (110)	Keygear 80/140
Mobil	Mobilgear 600 XP 220	Mobilgear 600 XP 320
Mobil	Mobil SHC 630	Mobil SHC 632
Pennzoil	Super Maxol EP 220	Super Maxol EP 320
Petron Corp.	Petro Lube 605	Petro Lube 606
Phillips	Philgear 220	Philgear 320
Royal Purple	Synergy 220	Synergy 320
Royal Purple	Thermyl Glyde 220	Thermyl Glyde 320
Shell	Omala Oil 220	Omala Oil 320
Sunoco	SUNEP 220	SUNEP 320
Swepco	201 Multi-Purpose Gear Lube, VG220	201 Multi-Purpose Gear Lube, VG320
Texaco	Meropa 220	Meropa 320
Union	NL Gear Lube 5 EP	NL Gear Lube 6 EP
Whitmore	Paragon Gold 220	Paragon Gold 320
Whitmore	Decathlon F 220	Decathlon F 320

NOTE: Lubricants listed in this manual are typical products only and should not be construed as exclusive recommendations.

7.11.2 Recommended Grease Lubricants

Table 33. Recommended Grease Lubricants

NGLI Grade	1 or 2
Viscosity at 40ºC	150 cSt - 170 cSt
Viscosity at 100ºC	13 cSt - 16 cSt
Manufacturer	Lubricant
Chevron	Dura-Lith2
Conoco	Conolith EP 2
Exxon	Lidok EP 2
Keystone	81 EP 2
Mobil	MobiluxEP 2
Pennzoil	Pennlith EP #712
Phillips	Philube EP 2
Royal Purple	Ultra-Performance Grease EP2
Shell	AlvaniaEP 2
Sunoco	Sunaplex 992 EP
Texaco	Multifak EP 2
Whitmore	Omnilith 360 EP2

** NLGI Grade No. 1 Grease used only in centralized lube systems having long pipe runs in severe cold weather.

DROPPING POINT ºF:

- NLGI No. 1 = 310 - 360
- NLGI No. 2 = 265 - 295

Lubricants listed in this manual are *typical products only* and should not be construed as exclusive recommendations.

See the attached Mill Lube List which details the types and amounts of lubricants needed for each component within the mill system.

7.11.3 Metso's Minimum Requirements for Mill Drive Open Gearing Lubricants

Table 34. Metso's Minimum Requirements for Mill Drive Open Gearing Lubricants

Metso's Minimum Requirements for Mill Drive Open Gearing Lubricants	
Viscosity (ASTM D445)	
Asphaltics (residual compounds)	≥857 cSt @ 100°C
Oils (mineral and synthetic), Compounds, and base oil of Greases	≥190 cSt @ 100°C
Extreme Pressure (EP) Additives	Required
Solid lubricants:	Required for Grease
Grit and Abrasives	None
U.S. Steel Retention (Time to Line Break)	Report (if available)
FZG Test (ASTM D5182 / DIN 51 354)	≥12 stages
Four Ball LWI (ASTM D2596)	≥45
Four Ball Weld (ASTM D2596)	≥250 kg
Four Ball Wear (ASTM D2266 - grease) (ASTM D4172 – oil)	0.75 mm maximum scar diameter
Timken OK Load (ASTM D2509 / 2782)	≥50 lbs.

A lubricant that meets these minimum requirements does not necessarily mean that it will work satisfactorily for all open gear/pinion applications. Please contact Metso Engineering for lubricants for a specific project.

7.11.4 Open Gear Lubricants that Meet Metso's Minimum Requirements

Table 35. Open Gear Lubricants that Meet Metso's Minimum Requirements

Ambient Temperature	<10°C	10°C to 38°C	>38°C	Type
Bel-Ray Molylube Mill Gear Grease Heavy 76992	X	X		Grease
Bel-Ray Molylube Mill Gear Compound 76980	X	X		Compound
Bel-Ray Clear Gear Lubricant Light 21322	X	X		Oil
Bel-Ray Clear Gear Lubricant Medium 21324	X	X		Oil
Bel-Ray Clear Gear Lubricant Heavy 21326		X	X	Oil
Bel-Ray Clear Gear Lubricant Extra Heavy 21328		X	X	Compound
Brugarolas G. Beslux Crown H-3000	X	X	X	Grease
Castrol Optifluid 4EP	X	X	X	Oil
Chevron Open Gear Lubricant 250 NC	X	X		Asphaltic
Chevron Open Gear Lubricant 800 NC		X	X	Asphaltic
ConocoPhillips Open Gear Lube 585 W	X			Asphaltic
ConocoPhillips Open Gear Lube 585 NC	X	X		Asphaltic
ConocoPhillips Open Gear Lube 595 NC		X	X	Asphaltic
ConocoPhillips Gear Shield NC		X	X	Asphaltic
ConocoPhillips Gear Shield NCW	X			Asphaltic
ConocoPhillips Gear Shield P		X	X	Asphaltic
Esso Imperial Gear Guard		X	X	Asphaltic
Esso Imperial Gear Guard HVS	X	X		Oil
Fuchs Lubritech Ceplattyn KG 10 LC		X	X	Grease
*Fuchs Lubritech Ceplattyn SF 10, SF 30, SF 50		X	X	Oil
Kluber Kluberfluid CF-3 Ultra		X	X	Oil
Kluber Kluberfluid CF-3M Ultra		X	X	Oil
Lubrication Engineers Pyroshield 9000 Hvy		X	X	Compound
Lubrication Engineers Pyroshield 9011 XHvy		X	X	Compound
Lubrication Engineers Syn Open Gear Grease 5180		X	X	Grease
Lubrication Engineers Syn Open Gear Grease 5182		X		Grease

Ambient Temperature	<10°C	10°C to 38°C	>38°C	Type
Lubrilog Gear Fluid 550		X	X	Oil
Lubrilog Gear Fluid 550 D	X	X		Oil
Lubrilog Inverta Run HT	X	X	X	Grease
Mobil Mobiltac 325 NC	X			Asphaltic
Mobil Mobiltac 375 NC		X	X	Asphaltic
Mobil Mobilgear SHC 22M	X	X	X	Oil
*Mobil Mobilgear SHC 46M		X	X	Oil
Petron Corporation Gear Shield NC		X	X	Asphaltic
Petron Corporation Gear Shield NCW	X			Asphaltic
Petron Corporation Gear Shield P		X	X	Oil
Petron Corporation Gear Shield Synthetic, Heavy		X	X	Oil
Royal Purple Thermyl Tuff 100	X			Oil
Royal Purple Thermyl Tuff 200		X	X	Oil
Royal Purple Thermyl Tuff 300			X	Oil
Schaeffer Black Beauty Open Gear Lube Heavy 300		X	X	Compound
Schaeffer Black Beauty Open Gear Lube Medium 200	X			Compound
Shell Gadus S4 OG Clear Oil 20000		X	X	Oil
Swepco 222 Sprayable EP Open Gear Lube		X	X	Compound
Whitmore Envirolube Heavy		X	X	Asphaltic
Whitmore Envirolube Medium	X			Asphaltic
Whitmore Decathlon Gold Heavy		X	X	Oil

NOTE: Mobilgear SHC 46M and Fuchs Ceplattyn SF 50 must be used with a drum heater and heat tracing almost regardless of the temperature.

7.11.5 Mill Lubrication Schedule

Table 36. Mill Lubrication Schedule

Component to be Lubricated	Mode of Lubrication	Frequency of Lubrication	Quantity of Lubricant	Type of Lubricant	Task Duration
Trunnion Bearing Assembly	Automatic Lubrication System	Continuous	See Assembly Drawing	ISO VG 220EP Oil to ISO VG 320EP Oil	N/A
Trunnion Bearing Assembly Seals	Manual Grease Lubrication	Monthly	Till fresh grease is observed for the circumference of the seal	EP2 Grease	5 minutes
Trunnion Bearing Lube System LP Motor	Manual Grease Lubrication	Every 4 months	As required to purge	Motor Grease	5 minutes
Trunnion Bearing Lube System HP Motor	Manual Grease Lubrication	Every 12 months	As required to purge	Motor Grease	5 minutes
Gear Set	Automatic Gear Spray System	Continuous	Dependent on lubrication per “Metso’s Minimum Requirements for Mill Drive Open Gearing Lubricants”	See the appendix of this manual	N/A
Pinion Bearing Assembly	Manual Grease Lubrication	Monthly	As required	EP2 Grease	5 minutes
Pinion Bearing Assembly	Automatic Oil Lubrication	Continuous	See Assembly Drawing	See Assembly Drawing	N/A

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Component to be Lubricated	Mode of Lubrication	Frequency of Lubrication	Quantity of Lubricant	Type of Lubricant	Task Duration
Pinion Bearing Seals	Manual Grease Lubrication	Monthly	As required	EP2 Grease	5 minutes
Reducer	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual
Inching Drive	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual	Per Manufacture Recommendation in Manual
Motor Front Bearing	Grease	3,300 hours	75 grams	Per Manufacture Recommendation in Manual	5 minutes
Motor Rear Bearing	Grease	4,500 hours	45 grams	Per Manufacture Recommendation in Manual	5 minutes
Motor Bearings	Oil	Continuous	See Assembly Drawing	See Assembly Drawing	N/A