HOW TO USE THIS MANUAL

This manual provides detailed instructions on installation and maintenance of drives and couplings. Use the table of contents below to locate required information.

TABLE OF CONTENTS

INTRODUCTION

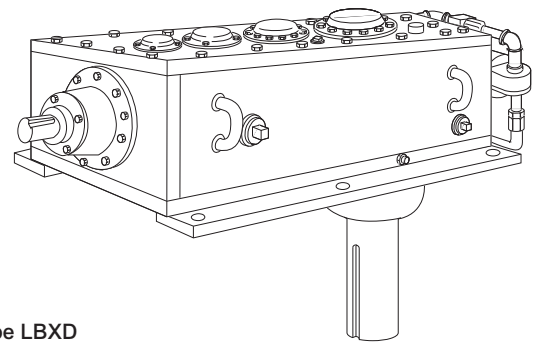
Credit for long service and dependable operation of a gear drive is often given to the engineers who designed it, or the craftsmen who constructed it, or the sales engineer who recommended the type and size. Ultimate credit belongs to the mechanic on the job who worked to make the foundation rigid and level, who accurately aligned the shafts and carefully installed the accessories, and who made sure that the drive received regular lubrication. The details of this important job are the subject of this manual.

VERTICAL OUTPUT — The large RAM drive is available in two configurations; right angle (LBX) or parallel shaft (LHX), with vertical output shafts, integral mounting feet, and an electric motor driven pump lubrication system.

The standard drive is available with solid or hollow output shaft. A low speed shaft drywell is standard on solid shaft extension down and hollow shaft drives. The drywell feature is optional on solid shaft extension up drives. Drives furnished with a drywell have grease lubricated lower low speed bearings.

Solid low speed shaft extensions are drilled and tapped for coupling keeper plates, refer to "COUPLING CONNECTION" on Page 2.

HORIZONTAL OUTPUT — The large RAM drive is available for horizontal output (side entry mixers) with all shafts horizontal in two configurations; right angle (LBR) or parallel shaft (LHR).



Type LBXD

The horizontal output drive is similar to the vertical output drive without the pump lubrication system or low speed shaft drywell feature. All revolving elements are dip or splash lubricated with no grease lubricated bearings.

INSTALLATION INSTRUCTIONS

CAREFULLY FOLLOW THE INSTRUCTION IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

The following instructions apply to all standard Falk Type LBX & LHX vertical output and Type LBR & LHR horizontal output drives. If a drive is furnished with special features, refer to the supplementary instructions shipped with the drive.

WARNING: *Consult applicable local and national safety codes for proper guarding of rotating members.*

Lock out power source and remove all external loads from drive before servicing drive or accessories.

WELDING — Do not weld on the gear drive housing or accessories without prior approval from the Factory. Welding on the drive may cause distortion of the housing or damage to the bearings and gear teeth. Welding without prior approval could void the warranty.

EFFECTS OF SOLAR ENERGY — If the gear drive operates in the sun at ambient temperatures over 100°F (38°C), then special measures should be taken to protect the drive from solar energy. This protection can consist of a canopy over the drive or reflective paint on the drive. If neither is possible, a heat exchanger or other cooling device may be required to prevent the sump temperature from exceeding the allowable maximum.

NAMEPLATE — Operate drive only at horsepower, speed and ratio shown on nameplate. Before changing any one of these, submit complete nameplate data and new application conditions to the Factory for correct oil level, parts and application approval.

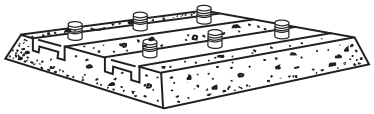
MOUNTING — ***CAUTION:*** *Mount drive only in the position for which it was ordered, i.e., base horizontal (LBX & LHX) or base vertical (LBR & LHR) unless it was specifically ordered for mounting in another position. If it is necessary to mount the drive in a different position from that for which it was ordered, consult Factory for changes necessary to provide proper lubrication.*

CAUTION: *Use Grade 5 fasteners for diameters through 1.50". For larger diameter fasteners, use ASTM A-354 Grade BC.*

FOUNDATION, GENERAL — To facilitate oil drainage, elevate the drive foundation above the surrounding floor level. If desired, replace the drive oil drain plug with a valve, but provide a guard to protect the valve from accidental opening or breakage.

FOUNDATION, STEEL — When mounting drive on structural steel, it is recommended that an engineered design be utilized for a pedestal, adapter base or bed to provide sufficient rigidity, to prevent induced loads from distorting the housing and causing gear misalignment. In the absence of an engineered design, it is recommended that a baseplate, with thickness equal to or greater than the thickness of the drive base, be securely bolted to steel supports and extend under the entire drive. Refer to "TIGHTENING TORQUES" on Page 3.

FOUNDATION, CONCRETE — If a concrete foundation is used, allow the concrete to set firmly before bolting down the drive. For the best type of mounting, grout structural steel mounting pads into the mounting base, as illustrated, rather than grouting the drive directly into the concrete.



Motors and other components mounted on motor plates or motor brackets may become misaligned during shipment. ALWAYS check alignment after installation. Refer to "SHAFT CONNECTIONS" for coupling alignment instructions.

DRIVE ALIGNMENT — Align drive with driven equipment by placing broad, flat shims under all mounting pads. Start at the low speed shaft end and level across the length and then the width of the drive. Check with a feeler gauge to make certain that all pads are supported to prevent distortion of housing when drive is bolted down. After drive is aligned with driven machine and bolted down, align prime mover to drive input shaft. Refer to "SHAFT CONNECTIONS" for coupling alignment.

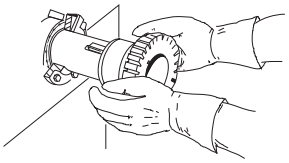
If equipment is received from Factory mounted on a bedplate, the components were accurately aligned at the Factory with the bedplate mounted on a large, flat assembly plate. Shim under the bedplate foot pads until the drive is level and all feet are in the same plane.

Check the high speed shaft coupling alignment. If the coupling is misaligned, the bedplate is shimmed incorrectly. Re-shim bedplate and recheck high speed coupling alignment. If necessary, realign motor.

MOTOR BRACKETS — The weight, location and starting torque of the motor will cause some brackets to deflect downward and to twist. This movement is within allowable engineered limits for motor-drive selections from the Rexnord bulletin. If the customer considers the movement excessive, jackscrew supports for the bracket extension are available from the Facotyr whether the motor was mounted by the Factory or the customer. To compensate for deflection caused by heavy motors AND to get CORRECT COUPLING ALIGNMENT, use more shims under the rear motor feet than the front feet.

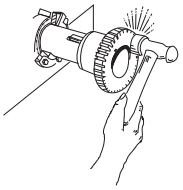
SHAFT CONNECTIONS

COUPLING CONNECTION — The performance and life of any coupling depends largely upon how well the coupling is installed and serviced. Refer to the coupling manufacturer's manual for specific instructions.



CORRECT METHOD

Heat interference fitted coupling hubs, pinions, sprockets or pulleys to a maximum of 275°F (135°C) and slide onto drive shaft.



INCORRECT METHOD

DO NOT drive coupling hub, pinion, sprocket or pulley onto the shaft. An endwise blow on the shaft may damage gears and bearings.

WARNING: *Provide suitable guards in accordance with OSHA standards.*

Flanged type rigid couplings are typically used on mixer drive low speed shafts. The low speed shaft extension ends of the solid shaft drives are drilled and tapped to accommodate coupling keeper plates. Keeper plate fastener data, bolt circle and tightening torques are shown in Table 1.

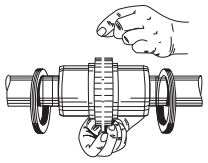
REXNORD COUPLINGS — (Except fluid type) Detailed installation manuals are available from Factory and your local Rexnord Representative or Distributor—just provide size and type designations stamped on the coupling. Refer to Manual 428-010 for couplings and Manual 458-010 for gear couplings for lubricant requirements and a listing of typical lubricants meeting Rexnord specifications.

TABLE 1 — Coupling Keeper Plate Fastener Data

Drive Size	Fastener Data (Grade 5)		Tightening Torque lb-ft ±5%
	Dia-UNC & Qty.	Bolt Circle	
1100	1.125-7UNC (2)	4.500	740
1200	1.125-7UNC (3)	5.250	740
1300	1.250-7UNC (3)	6.500	1060
1400	1.250-7UNC (3)	7.500	1060
1500	1.500-6UNC (3)	8.500	1840
1600	1.500-6UNC (3)	9.000	1840
1750	1.500-6UNC (3)	10.000	1840
1850	1.750-5UNC (3)	11.250	3900

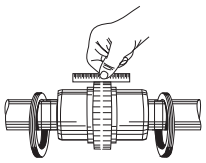
The following instructions apply to coupling alignment:

GAP AND ANGULAR ALIGNMENT — If possible, after mounting coupling hubs, position the driving and driven drives so that the distance between shaft ends is equal to the coupling gap. Align the shafts by placing a spacer block, equal in thickness to required gap, between hub faces, as shown above, and also at 90° intervals around the hub. Check with feelers.



STEELFLEX® ILLUSTRATED

OFFSET ALIGNMENT — Align shafts of driving and driven drives so that a straight edge will rest squarely on the right and also at 90° intervals. Tighten foundation bolts of the connected equipment and recheck alignment and gap.



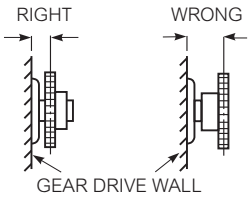
STEELFLEX ILLUSTRATED

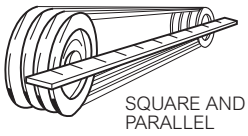
Rexnord
3001 W. Canal St., Milwaukee, WI 53208-4200 USA
Telephone: 414-342-3131 Fax: 414-937-4359 www.rexnord.com

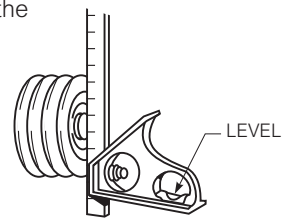
REXNORD FLUID COUPLINGS — Refer to the installation manual furnished with the fluid coupling for installation, alignment and startup instructions.

SPROCKET, PULLEY OR SHEAVE CONNECTION — Mount power take-offs as close to the drive housing as possible to avoid undue bearing load and shaft deflection.

Align the output shaft of the drive square and parallel with the driven shaft by placing a straightedge across the face of the sprockets or sheaves as illustrated. Check horizontal shaft alignment by placing one leg of a square against the face of the sheave or sprocket with the spirit level on the horizontal leg of the square.







DO NOT overtighten belts or chains. Adjust chains to manufacturers' specifications. Adjust belts as follows:

The ideal tension is the lowest tension at which the belt will not slip under peak load conditions. Check the belt tension frequently during the first 24 to 48 hours of run-in operation. Overtightening belts shortens belt and bearing life. Keep belts free from foreign material which may cause slippage. Inspect the V–belt periodically; tighten the belts if they are slipping.

TIGHTENING TORQUES

Use the values specified in Table 2 below for fastening motors and Rexnord drives and accessories to their mounting surfaces with SAE Grade 5 non-lubricated fasteners. DO NOT use these values for "torque locking" fasteners or for fastening components with aluminum feet or with soft gaskets or vibration dampers on the mounting surface. If the tightening torque exceeds the capacity of the torque wrench, use a torque multiplier. Use Grade 5 fasteners for diameters through 1.50", for larger diameter fasteners, use ASTM A-354 Grade BC.

TABLE 2 — Tightening Torques (lb-ft ±5%) —
DO NOT Lubricate Fasteners

Thread Dia-UNC	Metal to Metal	Metal to Concrete	Thread Dia-UNC	Metal to Metal	Metal to Concrete
.250-20	7	6	**1.250-7**	1060	840
.3125-18	15	12	**1.375-6**	1360	1100
.375-16	27	22	**1.500-6**	1840	1460
.500-13	67	54	**1.750-5**	3900	2700
.625-11	134	108	**2.000-4.5**	5900	4100
.750-10	242	194	**2.250-4.5**	8600	6000
.875-9	395	315	**2.500-4**	11800	8300
1.000-8	590	475	**2.750-4**	14600	10200
1.125-7	740	590	**3.000-4**	19400	13600

Lubrication Recommendations

INTRODUCTION

Carefully follow instructions on the drive nameplate, warning tags and installation manuals furnished with the drive.

Lubricants listed in this manual are typical products ONLY and should not be construed as exclusive recommendations. Industrial type petroleum-based rust and oxidation inhibited (R & O), industrial type extreme pressure (EP) or industrial type micropitting resistant gear lubricants are the recommended gear lubricants. They can be formulated using petroleum or synthetic base stocks.

The section on food grade lubricants provides guidance selecting lubricants for applications needing this class of lubricants. Food grade lubricants are formulated using petroleum or different types of synthetic base stocks.

LUBRICANT SELECTION PROCESS

1. Refer to Table 5 or 6 for proper lubricant viscosity grade based on ambient temperature range.
2. Refer to Table 3 for summary of lubricant type.
3. Using proper lubricant table and viscosity grade, select desired lubricant manufacturer name.
4. Refer to Table 4 for approximate oil capacity to purchase.

TABLE 3 — Summary of Lubricant Type and Greases

Petroleum-Based		
R & O Inhibited See Table 8A	Extreme Pressure (EP) See Table 8B	Micropitting Resistant See Table 8C
Synthetic Lubricant, Polyalphaolefin Type (PAO)		
R & O Inhibited See Table 9A	Extreme Pressure (EP) See Table 9B	Micropitting Resistant See Table 9C
Conventional Grease See Table 10		
Food Grade Lubricant & Grease See Page 10		

VISCOSITY (IMPORTANT)

The proper viscosity grade for petroleum-based lubricant is found in Table 5. For synthetic lubricant viscosity grades, refer to Table 6 and the “Synthetic Lubricants” paragraphs.

Viscosity grade is determined by ambient air temperature in immediate vicinity of gear drive. Lubricant selections must have a pour point at least 10°F (5.5°C) below the expected minimum ambient starting temperature.

If a gear drive operates in a typical indoor environment where the ambient temperature is within 70°F to 125°F (21°C to 52°C), the oil viscosity may be increased one ISO grade above that shown for the 50°F to 125°F(10°C to 52°C) range. That is, an ISO VG 320 (AGMA 6) or ISO VG 460 (AGMA 7) may be substituted for an ISO VG 220 (AGMA 5) or ISO VG 320 (AGMA 6) respectively, under this ambient condition.

LUBRICANT TYPES

PETROLEUM-BASED LUBRICANTS (TABLES 8A, 8B & 8C) — Industrial type petroleum-based rust and oxidation inhibited (R & O) gear lubricants are the most common and readily available general purpose gear lubricants.

SYNTHETIC LUBRICANTS (TABLES 9A, 9B & 9C) — Synthetic lubricants of the polyalphaolefin (PAO) type are recommended for cold climate operation, high temperature applications, extended temperature range (all season) operation and/or extended lubricant change intervals. The proper viscosity grade of synthetic lubricant is given in Table 6.

WARNING: *Polyalkylene glycol (PAG) based synthetic lubricants including GMax 6000 cannot be used in the drives covered by this manual.*

ANTI-WEAR (AW) LUBRICANTS — For moderately loaded gear drives or operating conditions challenging for conventional R & O oils, industrial type anti-wear (AW) lubricants are suggested. These lubricants contain anti-wear additives that provide stronger thicker lubricant film to help maintain surface separation. Synthetic lubricants by inherent nature of base stock properties provide anti-wear performance.

EXTREME PRESSURE (EP) LUBRICANTS (TABLES 8B & 9B) — For highly loaded drives or for drives loaded in excess of original estimates, industrial-type petroleum EP lubricants are preferred. EP lubricants are manufactured from petroleum or synthetic base lubricants. Anti-scuff is another term used to describe EP lubricants.

MICROPITTING RESISTANT LUBRICANTS (TABLES 8C & 9C) — Micropitting resistant lubricants are specially developed for surface hardened gearing commonly used in modern industrial gear drives. These lubricants contain additives to resist formation of micropitting and other conventional forms of gear wear. Highly loaded gear drives or applications where operating loads are not well defined may benefit from this type of lubricant. Generally lubricants are available in limited number of viscosity grades.

WARNING: LUBRICANTS IN FOOD PROCESSING INDUSTRY — *Generally conventional gear lubricants are classified as H2 by NSF (National Sanitation Foundation) since they contain harmful substances and should not be used in the food processing industry. Lubricants registered as H1 by NSF are suitable for food processing applications.*

CLIMATE CONDITIONS — Ambient temperature in immediate vicinity of gear drive is very important for determining viscosity grade. Table 5 provides viscosity grade selections for petroleum-based lubricants. See Table 6 for synthetic lubricants.

Rexnord
3001 W. Canal St., Milwaukee, WI 53208-4200 USA
Telephone: 414-342-3131 Fax: 414-937-4359 www.rexnord.com

OIL LEVELS

Fill the drive with oil to the level indicated on the oil level dipstick. Run the lubrication system for several minutes to fill the system components and recheck the oil level. Approximate oil capacities (for ordering oil) are listed in Table 4.

TABLE 4 — Types LBX, LHXV, LBR, and LHR Approximate Oil Capacities

Drive Size	Vertical Output		Horizontal Output	
	LBX3 & LHXV2	LBX4, LHXV3, & LHXV4	LBR3 & LHR2	LBR4, LHR3, & LHR4 ★
	Gallons	Gallons	Gallons	Gallons
1100	10	10	14	14/18
1200	15	15	19	19/27
1300	25	25	35	35/50
1400	30	30	40	40/55
1500	40	45	50	60/80
1600	50	60	65	80/100
1750	70	80	95	110/140
1850	100	120	130	160/220

★ Values to right of slash mark are for type LHR4 drives when HS Shaft is above drive center line.

Before starting, if conditions permit, rotate the input shaft by hand to check for any obstruction. Then start the drive and allow it to run without a load for several minutes. If everything is satisfactory, the drive is ready for operation.

TABLE 5 — Viscosity Grade Recommendations For Petroleum Lubricants

Output RPM	Ambient Temperature Range			
	+15° to +60°F (–9° to +16°C)		+50° to +125°F (+10° to +52°C)	
	ISO-VG	AGMA	ISO-VG	AGMA
Below 80	150	4	320	6
80 & Above	150	4	220	5

OIL PUMPS — When selecting a lubricant for a gear drive equipped with an oil pump, cold temperature oil viscosity is important. Lubricant viscosity at start-up generally should not exceed 1725 cSt (8,000 SSU). When exceeding this viscosity, pump cavitation is possible, preventing oil circulation. A sump heater may be required or it may be possible to use a lower viscosity oil to minimize pump cavitation.

LUBRICATION SYSTEMS

PUMP LUBRICATION SYSTEM — The standard vertical output drive is equipped with an external pump and components mounted on the low speed end of the drive. The system is composed of an electric motor (230/460 volt, 3 phase) driven gear pump, oil filter, flow indicator with switch and internal distribution network with relief valve (fixed at 30 psi). The system provides lubricant to all upper bearings and gear meshes. Lubrication system must be in operation when drive is in operation.

SYSTEM ELECTRICAL — Provide 3 phase electrical power for the pump motor, 230 or 460 volt, and wire the motor for correct rotation as indicated by the rotation arrow. The flow indicator is provided for warning/control with a single pole, double throw electrical switch rated at 15A, 125V/7A, 250V Maximum. The flow indicator switch must be included with the prime mover control circuitry to prevent drive operation without the lubrication system. Refer to the supplementary instructions provided with the lubrication system components for more information.

PREVENTIVE MAINTENANCE

AFTER FIRST WEEK — Check alignment of total system and realign where necessary. Also tighten all external bolts and plugs where necessary. DO NOT readjust the internal gear or bearing settings in the drive, these were permanently set at the Factory.

OIL FILTER SERVICE — (Sizes 1100-1500, Model A) Record oil pressure at oil filter indicating gauge with drive at operating temperature, with fresh oil. Replace oil filter when oil pressure INCREASE reaches 10 psi with drive at operating temperature. Replacement filter elements (Falk Part No. 10092262, Gresen K-22002 or equivalent 30 micron) are available from Factory.

OIL FILTER SERVICE — (Sizes 1100-1500, Model B & Sizes 1600-1850, Model D) Oil filters are equipped with a visual pop-up element condition indicator. When indicator is completely red this means oil is by-passing the filter element and filter should be changed. Note, cold oil (during start-up) may by-pass the filter, but once drive comes up to operating, temperature the indicator will turn green.

When servicing a filter, use the following procedure:

1. Stop the system's power unit.
2. Relieve pressure in the filter line.
3. Rotate bowl counter-clockwise and remove.
4. Remove element from housing. Discard all disposable elements. These elements are not cleanable.
5. Place new, clean element in housing, centering it on location in the head.
6. Inspect bowl seal and replace if necessary.
7. Replace bowl. Rotate clockwise and hand tighten.

TABLE 7 — Replacement Oil Filter Elements

(Sizes 1100-1500, Model B & Sizes 1600-1850, Model D)

Drive Size	Falk Element Part No.	Parker Element Part No.
1100	10094464	930370Q
1200	10094464	930370Q
1300	10094465	930100Q
1400	10094465	930100Q
1500	10094465	930100Q
1600	10094466	930119Q
1750	10094466	930119Q
1850	10094466	930119Q

TABLE 6 — Viscosity Grade Recommendations for Synthetic Lubricants

Output RPM	Cold Climates				Normal Climates					
	–30° to +10°F (–34° to –12°C)		–15° to +50°F (–26° to +10°C)		0° to +80°F (–18° to +27°C)		+10° to +125°F (–12° to +52°C)		+20° to +125°F (–7° to +52°C)	
	ISO-VG	AGMA	ISO-VG	AGMA	ISO-VG	AGMA	ISO-VG	AGMA	ISO-VG	AGMA
All	32	0	68	2	150	4	220	5	320	6

TABLE 8A —Petroleum Based R & O (Rust & Oxidation) Inhibited Lubricants ▲

Maximum Operating Temperature of Lubricants 200°F (93°C)

ISO Viscosity Grade	150	220	320
AGMA Viscosity Grade	4	5	6
Viscosity cSt @ 40°C ■	135-165	198-242	288-352
Viscosity SSU @ 100°F	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Castrol Industrial Lubricants	Hyspin AWS 150 Castrol Paradene R&O 150 Castrol Paradene AW 150	Hyspin AWS 220 Castrol Paradene R&O 220 Castrol Paradene AW 220	- - - Castrol Paradene R&O 320 Castrol Paradene AW 320
Chevron / Texaco / Caltex	Rando HD 150	Rando HD 220	Rando HD 320
Citgo Petroleum Corp.	Pacemaker T 150	Pacemaker SD 220	Pacemaker SD 320
Exxon Mobil / Esso	DTE Oil Extra Heavy Vacuoline 528	DTE Oil BB Vacuoline 533	DTE Oil AA Vacuoline 537
Petro-Canada Lubricants	TurboFlo R&O 150	TurboFlo R&O 220	TurboFlo R&O 320
Phillips 66 / Conoco / 76 Lubricants / Kendall	Multipurpose R&O 150	Multipurpose R&O 220	Multipurpose R&O 320
Shell Oil Co.	Morlina S2 B 150 Morlina S2 BA 150	Morlina S2 B 220 Morlina S2 BA 220	Morlina S2 B 320 Morlina S2 BA 320
Total Lubricants USA / Keystone Div. Penwalt Corp.	Cirkan ZS 150	Cirkan ZS 220	Cirkan ZS 320
Whitmore Manufacturing Company	Hyperion 150	Hyperion 220	Hyperion 320

▲ Minimum viscosity index of 90.

■ Kinematic viscosity in units of mm^2/s is equivalent to cSt (centistokes).

TABLE 8B — Petroleum Based EP (Extreme Pressure) Lubricants ▲

Maximum Operating Temperature of Lubricants 200°F (93°C)

ISO Viscosity Grade	150	220	320
AGMA Viscosity Grade	4	5	6
Viscosity cSt @ 40°C ■	135-165	198-242	288-352
Viscosity SSU @ 100°F	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Castrol Industrial Lubricants	Alpha SP 150	Alpha SP 220	Alpha SP 320
Chevron / Texaco / Caltex	Meropa 150 Ultra Gear 150	Meropa 220 Ultra Gear 220	Meropa 320 Ultra Gear 320
Citgo Petroleum Corp.	EP Compound 150	EP Compound 220	EP Compound 320
Exxon Mobil / Esso	Mobilgear 600 XP 150	Mobilgear 600 XP 220	Mobilgear 600 XP 320
Fuchs Lubricants Company	- - -	GearMaster CLP Oils 220	- - -
Kluber Lubrication	Kluberoil GEM 1 N 150	- - -	- - -
Petro-Canada Lubricants	Enduratex EP 150	Enduratex EP 220	Enduratex EP 320
Phillips 66 / Conoco / 76 Lubricants / Kendall	Extra Duty Gear Oil 150	Extra Duty Gear Oil 220	Extra Duty Gear Oil 320
Shell Oil Co.	Omala S2 G 150	Omala S2 G 220	Omala S2 G 320
Total Lubricants USA / Keystone Div. Penwalt Corp.	Carter EP 150	Carter EP 220	Carter EP 320

▲ Minimum viscosity index of 90.

■ Kinematic viscosity in units of mm^2/s is equivalent to cSt (centistokes).

TABLE 8C — Petroleum Based Micropitting Resistant Lubricants ▲

Maximum Operating Temperature of Lubricants 200°F (93°C)

ISO Viscosity Grade	150	220	320
AGMA Viscosity Grade	4	5	6
Viscosity cSt @ 40°C ■	135-165	198-242	288-352
Viscosity SSU @ 100°F	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Kluber Lubrication	- - -	Kluberoil GEM 1 N 220	Kluberoil GEM 1 N 320

▲ Minimum viscosity index of 90.

■ Kinematic viscosity in units of mm^2/s is equivalent to cSt (centistokes).

Rexnord
3001 W. Canal St., Milwaukee, WI 53208-4200 USA
Telephone: 414-342-3131 Fax: 414-937-4359 www.rexnord.com

TABLE 9A — Synthetic PAO (Polyalphaolefin) R & O (Rust & Oxidation) Inhibited Lubricants ▲

ISO Viscosity Grade	32	68	150	220	320
AGMA Viscosity Grade	0	2	4	5	6
Viscosity cSt @ 40°C ■	28.8-35.2	61.2-74.8	135-165	198-242	288-352
Viscosity SSU @ 100°F	134-164	284-347	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Castrol Industrial Lubricants	Alphasyn T 32 Castrol Isolube 32	Alphasyn T 68 Castrol Isolube 68	Alphasyn T 150 Castrol Isolube 150	Alphasyn T 220 Castrol Isolube 220	Alphasyn T 320 Castrol Isolube 320
Chevron / Texaco / Caltex	Cetus HiPerSYN Oil 32	Cetus HiPerSYN Oil 68	Cetus HiPerSYN Oil 150	Cetus HiPerSYN Oil 220	Cetus HiPerSYN Oil 320
Citgo Petroleum Corp.	- - -	CITGEAR Synthetic HT 68	CITGEAR Synthetic HT 150	CITGEAR Synthetic HT 220	CITGEAR Synthetic HT 320
Exxon Mobil / Esso	Mobil SHC 624	Mobil SHC 626	Mobil SHC 629	Mobil SHC 630	Mobil SHC 632
Kluber Lubrication	- - -	Klubersynth G 4 68	Klubersynth G 4 150	Klubersynth G 4 220	- - -
Petro-Canada Lubricants	Synduro SHB 32	Synduro SHB 68	Synduro SHB 150	Synduro SHB 220	- - -
Phillips 66 / Conoco / 76 Lubricants / Kendall	- - -	Syncon R&O 68	Syncon R&O 150 ●	Syncon R&O 220 ●	Syncon R&O 320 ●
Shell Oil Co.	- - -	Morlina S4 B 68	Morlina S4 B 150	Morlina S4 B 220	Morlina S4 B 320

▲ Minimum viscosity index of 130. Consult lubricant supplier/manufacturer for maximum operating temperature.
■ Kinematic viscosity in units of mm^2/s is equivalent to cSt (centistokes).
● Minimum viscosity index of 120.

TABLE 9B — Synthetic PAO (Polyalphaolefin) EP (Extreme Pressure) Lubricants ▲

ISO Viscosity Grade	32	68	150	220	320
AGMA Viscosity Grade	0	2	4	5	6
Viscosity cSt @ 40°C ■	28.8-35.2	61.2-74.8	135-165	198-242	288-352
Viscosity SSU @ 100°F	134-164	284-347	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Castrol Industrial Lubricants	- - -	Castrol Isolube EP 68	Alphasyn EP 150 Castrol Isolube EP 150	Alphasyn EP 220 Castrol Isolube EP 220	Alphasyn EP 320 Castrol Isolube EP 320
Chevron / Texaco / Caltex	- - -	- - -	Tegra Synthetic Gear Lubricant 150	Tegra Synthetic Gear Lubricant 220	Tegra Synthetic Gear Lubricant 320
Citgo Petroleum Corp.	- - -	CITGEAR Synthetic EP Gear 68	CITGEAR Synthetic EP Gear 150	CITGEAR Synthetic EP Gear 220	CITGEAR Synthetic EP Gear 320
Exxon Mobil / Esso	- - -	- - -	Mobil SHC Gear 150	Mobil SHC Gear 220	Mobil SHC Gear 320
Fuchs Lubricants Company	- - -	- - -	- - -	Renolin Unisyn CLP 220	Renolin Unisyn CLP 320
Kluber Lubrication	- - -	- - -	Klubersynth EG 4 150	Klubersynth EG 4 220	Klubersynth EG 4 320
Petro-Canada Lubricants	- - -	- - -	Enduratex Synthetic EP 150	Enduratex Synthetic EP 220	Enduratex Synthetic EP 320
Phillips 66 / Conoco / 76 Lubricants / Kendall	- - -	- - -	Syncon EP Plus Gear Oil 150	Syncon EP Plus Gear Oil 220	Syncon EP Plus Gear Oil 320
Shell Oil Co.	- - -	Omala S4 GX 68	Omala S4 GX 150	Omala S4 GX 220	Omala S4 GX 320
Whitmore Mfg. Company	- - -	- - -	Decathlon HD 150	Decathlon HD 220	Decathlon HD 320

▲ Minimum viscosity index of 130. Consult lubricant supplier/manufacturer for maximum operating temperature.
■ Kinematic viscosity in units of mm^2/s is equivalent to cSt (centistokes).

TABLE 9C — Synthetic PAO (Polyalphaolefin) Micropitting Resistant Lubricants ▲

ISO Viscosity Grade	32	68	150	220	320
AGMA Viscosity Grade	0	2	4	5	6
Viscosity cSt @ 40°C ■	28.8-35.2	61.2-74.8	135-165	198-242	288-352
Viscosity SSU @ 100°F	134-164	284-347	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Chevron / Texaco / Caltex	- - -	- - -	- - -	- - -	Pinnacle WM 320
Exxon Mobil / Esso	- - -	- - -	- - -	- - -	Mobil SHC Gear 320 WT
Kluber Lubrication	- - -	- - -	Klubersynth GEM 4 N 150	Klubersynth GEM 4 N 220	Klubersynth GEM 4 N 320
Petro-Canada Lubricants	- - -	- - -	- - -	- - -	Harnex 320
Phillips 66 / Conoco / 76 Lubricants / Kendall	- - -	- - -	- - -	- - -	Syncon WTL 320
Whitmore Manufacturing Company	- - -	- - -	Decathlon F 150	Decathlon F 220	Decathlon F 320

▲ Minimum viscosity index of 130. Consult lubricant supplier/manufacturer for maximum operating temperature.
■ Kinematic viscosity in units of mm^2/s is equivalent to cSt (centistokes).

AFTER FIRST MONTH — Proceed as follows:

1. Operate drive until old sump oil reaches normal operating temperature. Shut down drive and drain immediately.
2. Immediately flush drive with an oil of the same type and viscosity grade as the original charge (warmed to approximately 100°F (38°C) in cold weather) by rapidly pouring or pumping a charge equal to 25 -100% of the initial fill volume or until clean oil flows through the drain.
3. Close the drain and refill the drive to the correct level with new oil of the correct type and viscosity.

PERIODICALLY —

1. Check the oil level of the drive when it is stopped and at ambient temperature. Add oil if needed. If the oil level is ABOVE the high oil level mark on the dipstick, have the oil analyzed for water content. Moisture in the oil may indicate that a seal or the heat exchanger is leaking. If so, replace the defective part immediately and change the oil. DO NOT fill above the mark indicated as leakage or undue heating may result.
2. Check coupling alignment to make certain that foundation settling has not caused excessive misalignment.
3. If drive is equipped with a fan, periodically clean accumulated foreign matter from the fan, guard, and deflector.
4. Purge grease from grease lubricated seals **WITH HAND GREASE GUN**. Regrease those bearings requiring grease lubrication.

LUBRICANT ANALYSIS AND CHANGES

OIL ANALYSIS REPORT — Checking oil condition at regular intervals is recommended. Analyze oil samples approximately every 1000 hours for petroleum lubricants or every 3000 hours for synthetic lubricants. In the absence of more specific limits, the guidelines listed below may be used to indicate when to change petroleum or polyalphaolefin type synthetic lubricants:

1. Water content is greater than 500 ppm (parts per million) (0.05%).
2. Iron content exceeds 150 ppm.
3. Silicon (dust/dirt) exceeds 25 ppm, above reference sample from new oil container.
4. Copper content exceeds 75 ppm.
5. TAN (Total Acid Number) 50% increase above reference sample from new oil container.
6. Viscosity changes more than ±15%.
7. Solid particle contamination code exceeds 25/22/18 for particle sizes ≥4/≥6/≥14 microns, respectively per ISO 4406.

Laboratory analysis is recommended for optimum lubricant life and gear drive performance.

PETROLEUM LUBRICANTS — In the absence of oil analysis, change gear oils every 6 months or 2500 operating hours, whichever occurs first. Change oil more frequently when gear drives operate in extremely humid, chemical or dust laden atmospheres. In these cases, lubricants should be changed every 3 to 4 months or 1500 to 2000 hours. If the drive is operated in an area where temperatures vary with the seasons, change the oil viscosity grade to suit the temperature, refer to Table 5. Lubricant suppliers can test oil from the drive periodically and recommend economical change schedules.

SYNTHETIC LUBRICANTS — In the absence of oil analysis, synthetic lube change intervals can be extended to 8000 hours depending upon operating temperatures. Laboratory analysis is recommended for optimum lubricant life and drive performance. Change lube with change in ambient temperature, if required. Refer to Table 6.

GREASE-LUBRICATED SEALS AND BEARINGS

All high speed shaft seal cages and upper low speed shaft seal cages have grease purgeable outer seal cavities. All Type LBX & LHX drives with drywells have grease lubricated lower low speed shaft bearings. Drives are normally shipped without grease in the seal housing cavity. Gear drives are shipped with NLGI #2 grade grease in those bearings requiring grease lubrication unless otherwise specified. Refer to Table 10 for grease recommendations.

TABLE 10 — Conventional NLGI #2 Grade Grease ▲ for Grease Lubricated Bearings & Grease Purged Seals

0° to +200°F (-18° to +93°C)

Manufacturer	Lubricant
Chevron / Texaco / Caltex	Multifak EP 2
Citgo Petroleum Corp.	Lithoplex RT 2 Premium Lithium EP 2
ExxonMobil / Esso	Mobilux EP 2 Mobilith SHC 460 ■
Petro-Canada Lubricants	Precision General Purpose EP2
Phillips 66 / Conoco / 76 Lubricants / Kendall	Multiplex Red
Shell Oil Co.	Gadus S1 V220-2
Total Lubricants USA / Keystone Div. Penwalt Corp.	Multis 2 or Multis EP 2

▲ Not suitable for food grade applications.
■ High performance synthetic alternate.

Grease application or re-lubrication should be done at temperatures above 20°F (-7°C). If grease must be applied at cooler temperatures consult factory or lubricant supplier for recommendations.

Rexnord
3001 W. Canal St., Milwaukee, WI 53208-4200 USA
Telephone: 414-342-3131 Fax: 414-937-4359 www.rexnord.com

GREASE LUBRICATED BEARINGS — All lower low speed shaft bearings of drives with drywells are grease lubricated at the Factory. Remove pressure relief plug when greasing bearing on solid shaft extension down and hollow shaft drives. Pump grease into gearing cage until it appears at the plug. Replace pressure relief plug.

Grease bearings during oil change intervals or every 6 months or 2500 hours of operation, whichever occurs first. Refer to Table 11 for approximate grease capacities.

TABLE 11 — L.S. Shaft Lower Bearing Regreasing Capacity (Ounces)†

Drive Size	Solid Shaft		Hollow Shaft
	Down	Up	
1100	12	12‡	12
1200	12	18‡	12
1300	24	18‡	24
1400	30	40‡	30
1500	60	40‡	60
1600	60	60‡	60
1750	80	80‡	80
1850	80	100‡	80

† The quantities of grease (in ounces) listed in the table are for relubrication of the bearing which have been originally packed with grease in assembly and are an approximate guide. The actual requirements are dependent upon load, speed and operating conditions and can only be determined from experience of the equipment operator.

‡ These bearings are normally oil lubricated. Quantity listed is for grease lubrication option.

GREASE LUBRICATED SEALS —The high speed shaft and upper low speed shaft seal cages are furnished with grease purgeable dual seal assemblies, which minimize the entry of contaminants and abrasive dusts into the drive. Normally, drives are shipped without grease in the seal housing cavity. The option of adding grease is the purchaser's. The use of this feature is recommended for drives operating in abrasive atmospheric conditions.

If using the grease purgeable seals, grease seals during oil change intervals. Depending upon the degree of contamination, it may be necessary to purge contaminated grease from seals more often (at least every 3 to 6 months). Slowly pump fresh grease through the seal, **WITH HAND GREASE GUN**, until fresh grease flows out along the shaft. Wipe off purged grease.

CAUTION: *Rapid regreasing with a power grease gun can force grease inward past the seals and interfere with oil lubrication of the high speed bearing.*

WARNING: *Greases in Table 10 contain harmful substances not allowed in the food processing industry. If grease could contaminate the product, as in the food and drug industries, the grease originally supplied with gear drive must be removed and replaced with grease listed in Table 18. Simply purging grease with grease gun will not remove all grease and cross-contamination will likely occur. Refer to gear drive assembly/disassembly instructions. Grease registered as H1 by NSF, National Sanitation Foundation, is suitable for food processing applications.*

STORED & INACTIVE GEAR DRIVES

Each gear drive is protected with rust preventive that will protect parts against rust for a period of 4 months in an outdoor shelter or 12 months in a dry building after shipment from the Factory.

If a gear drive is to be stored, or is inactive after installation beyond the above periods, add Nox-Rust VCI-10▲ vapor-phase rust inhibitor. For drives that have oil installed, add Nox-Rust VCI-10 vaper-phase rust inhibitor at the rate of 2% of sump capacity. For drives without oil, add Nox-Rust VCI-10 vapor-phase rust inhibitor at the rate of one ounce per cubic foot of internal drive space. Rotate the shafts several times by hand. Before operating, drives which have been stored or inactive must be filled to the proper level with oil meeting the specifications given in this manual. Refer to Manual 128-014 for "Start-up after Storage" instructions.

▲ Product of the Daubert Chemical Company, Chicago, Illinois.

Periodically inspect stored or inactive gear drives and add Nox-Rust VCI-10 every six months, or more often if necessary. Indoor dry storage is recommended.

The vented dipstick should be replaced with a plug (vented dipstick should be attached to gear drive for future use) so that the protective rust inhibiting atmosphere is sealed inside the drive. Install vented dipstick when preparing drive for operation.

WARNING*: The rust preventative oil from the factory and Nox-Rust VCI-10 are not H1 registered with the NSF (National Sanitation Foundation) as suitable for food processing applications. When Food Grade Lubricants are to be used, it is the end users responsibility to properly flush and prepare the drive for Food Grade service. Contact the lubricant manufacturer for specific information and flushing procedures.*

FOOD GRADE LUBRICANTS

Guidance for selecting petroleum-based and synthetic-based food grade lubricants are shown below in Table 12. For general lubrication guidlines, refer to the first part of the "Lubrication Recomendation" Section.

FOOD GRADE LUBRICANT SELECTION PROCESS

1. Refer to Table 13 or 14 for proper lubricant viscosity grade based on ambient temperature range.
2. Refer to Table 12 for summary of food grade lubricant type.
3. Using proper food grade lubricant table and viscosity grade, select desired lubricant manufacturer name.
4. Refer to Table 4 for approximate oil capacity to purchase.

TABLE 12 — Summary of Food Grade Lubricants and Greases

Petroleum-Based	
R & O Inhibited See Table 16A	Extreme Pressure (EP) See Table 16B
Synthetic Lubricant, Polyalphaolefin Type (PAO)	
R & O Inhibited See Table 17A	Extreme Pressure (EP) See Table 17B
Food Grade Grease	
See Table 18	

TABLE 13 — Viscosity Grade Recommendations For Food Grade Petroleum-Based Lubricants

Output RPM	Ambient Temperature Range			
	+15° to +60°F (–9° to +16°C)		+50° to +125°F (+10° to +52°C)	
	ISO-VG	AGMA	ISO-VG	AGMA
Below 80	150	4	320	6
80 & Above	150	4	220	5

OIL PUMPS — When selecting a lubricant for a gear drive equipped with an oil pump, cold temperature oil viscosity is important. Lubricant viscosity at start-up generally should not exceed 1725 cSt (8,000 SSU). When exceeding this viscosity, pump cavitation is possible, preventing oil circulation. A sump heater may be required or it may be possible to use a lower viscosity oil to minimize pump cavitation.

FOOD GRADE LUBRICANTS (TABLES 16A, 16B, 17A, 17B, & 18) — Food grade lubricants are a class of lubricants registered as H1 by NSF, National Sanitation Foundation. They contain base stock and additives which comply with Food and Drug Administration Title 21 CFR 178.3570 regulations for lubricants with incidental food contact. Base stock can be petroleum oil or different types of synthetic lubricant. Food grade lubricants are not same as biodegradable or environmentally friendly lubricants.

Rust and corrosion inhibitors used to protect gear drive during shipment are not qualified as food grade fluids. Flush out inhibitor oil before filling with food grade lubricant.

Tables 16A, 16B, 17A, 17B, & 18 list food grade lubricants that have performance properties meeting Rexnord/Falk specifications. They are not exclusive recommendations but serve as a guide for making proper lubricant selections.

CLIMATE CONDITIONS — Ambient temperature in immediate vicinity of gear drive is very important for determining viscosity grade. Table 13 provides viscosity grade selections for petroleum-based lubricants. See Table 14 for synthetic lubricants.

PREVENTIVE MAINTENANCE

AFTER FIRST WEEK — Check alignment of total system and realign where necessary. Also tighten all external bolts and plugs where necessary. DO NOT readjust the internal gear or bearing settings in the drive, these were permanently set at the Factory.

OIL FILTER SERVICE — (Sizes 1100-1500, Model A) Record oil pressure at oil filter indicating gauge with drive at operating temperature, with fresh oil. Replace oil filter when oil pressure INCREASE reaches 10 psi with drive at operating temperature. Replacement filter elements (Falk Part No. 10092262, Gresen K-22002 or equivalent 30 micron) are available from Factory.

OIL FILTER SERVICE — (Sizes 1100-1500, Model B & Sizes 1600-1850, Model D) Oil filters are equipped with a visual pop-up element condition indicator. When indicator is completely red this means oil is by-passing the filter element and filter should be changed. Note, cold oil (during start-up) may by-pass the filter, but once drive comes up to operating, temperature the indicator will turn green.

TABLE 14 — Viscosity Grade Recommendations For Food Grade Synthetic Lubricants

Output RPM	Cold Climates				Normal Climates					
	–30° to +10°F (–34° to –12°C)		–15° to +50°F (–26° to +10°C)		0° to +80°F (–18° to +27°C)		+10° to +125°F (–12° to +52°C)		+20° to +125°F (–7° to +52°C)	
	ISO-VG	AGMA	ISO-VG	AGMA	ISO-VG	AGMA	ISO-VG	AGMA	ISO-VG	AGMA
All	32	0	68	2	150	4	220	5	320	6

Rexnord
3001 W. Canal St., Milwaukee, WI 53208-4200 USA
Telephone: 414-342-3131 Fax: 414-937-4359 www.rexnord.com

When servicing a filter, use the following procedure:

1. Stop the system's power unit.
2. Relieve pressure in the filter line.
3. Rotate bowl counter-clockwise and remove.
4. Remove element from housing. Discard all disposable elements. These elements are not cleanable.
5. Place new, clean element in housing, centering it on location in the head.
6. Inspect bowl seal and replace if necessary.
7. Replace bowl. Rotate clockwise and hand tighten.

TABLE 15 — Replacement Oil Filter Elements

(Sizes 1100-1500, Model B & Sizes 1600-1850, Model D)

Drive Size	Falk Element Part No.	Parker Element Part No.
1100	10094464	930370Q
1200	10094464	930370Q
1300	10094465	930100Q
1400	10094465	930100Q
1500	10094465	930100Q
1600	10094466	930119Q
1750	10094466	930119Q
1850	10094466	930119Q

AFTER FIRST MONTH — Proceed as follows:

1. Operate drive until old sump oil reaches normal operating temperature. Shut down drive and drain immediately.
2. Immediately flush drive with an oil of the same type and viscosity grade as the original charge (warmed to approximately 100°F (38°C) in cold weather) by rapidly pouring or pumping a charge equal to 25 -100% of the initial fill volume or until clean oil flows through the drain.
3. Close the drain and refill the drive to the correct level with new oil of the correct type and viscosity.

PERIODICALLY —

1. Check the oil level of the drive when it is stopped and at ambient temperature. Add oil if needed. If the oil level is ABOVE the high oil level mark on the dipstick, have the oil analyzed for water content. Moisture in the oil may indicate that a seal or the heat exchanger is leaking. If so, replace the defective part immediately and change the oil. DO NOT fill above the mark indicated as leakage or undue heating may result.
2. Check coupling alignment to make certain that foundation settling has not caused excessive misalignment.
3. If drive is equipped with a fan, periodically clean accumulated foreign matter from the fan, guard, and deflector.
4. Purge grease from grease lubricated seals **WITH HAND GREASE GUN**. Regrease those bearings requiring grease lubrication.

LUBRICANT ANALYSIS AND CHANGES

OIL ANALYSIS REPORT (FOOD GRADE) — Checking oil condition at regular intervals is recommended. Analyze oil samples approximately every 1000 hours for food grade petroleum lubricants or every 3000 hours for food grade synthetic lubricants. In the absence of more specific limits, the guidelines listed below may be used to indicate when to change food grade lubricants:

1. Water content is greater than 500 ppm (parts per million) (0.05%).
2. Iron content exceeds 150 ppm.
3. Silicon (dust/dirt) exceeds 25 ppm, above reference sample from new oil container.
4. Copper content exceeds 75 ppm.
5. TAN (Total Acid Number) 50% increase above reference sample from new oil container.
6. Viscosity changes more than ±15%.
7. Solid particle contamination code exceeds 25/22/18 for particle sizes ≥4/≥6/≥14 microns, respectively per ISO 4406.

TABLE 16A — Food Grade Petroleum-Based R & O (Rust & Oxidation) Inhibited Lubricants – NSF (National Sanitation Foundation) H1 Registered

Maximum operating temperature of lubricants 200°F (93°C)

ISO Viscosity Grade	150	220	320
AGMA Viscosity Grade	**4**	**5**	**6**
Viscosity cSt @ 40°C ■	**135-165**	**198-242**	**288-352**
Viscosity SSU @ 100°F	**626-765**	**918-1122**	**1335-1632**
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Bel-Ray Company, Inc.	No-Tox Gear Oil ISO 150	No-Tox Gear Oil ISO 220	No-Tox Gear Oil ISO 320
Kluber Lubrication	Paraliq P 150	---	- - -
Lubriplate Lubricants Co.	Lubriplate FMO 900-AW	Lubriplate FMO 1100-AW	Lubriplate FMO 1700-AW

■ Kinematic viscosity in units of mm^2/S is equivalent to cSt (centistokes)

TABLE 16B — Food Grade Petroleum-Based EP (Extreme Pressure) Lubricants – NSF (National Sanitation Foundation) H1 Registered

Maximum operating temperature of lubricants 200°F (93°C)

ISO Viscosity Grade	150	220	320
AGMA Viscosity Grade	4	5	6
Viscosity cSt @ 40°C ■	135-165	198-242	288-352
Viscosity SSU @ 100°F	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Petro-Canada	Purity FG EP 150	Purity FG EP 220	Purity FG EP 320
Total Lubricants USA, Inc.	Nevastane EP 150	Nevastane EP 220	Nevastane EP 320

■ Kinematic viscosity in units of mm^2/S is equivalent to cSt (centistokes)

TABLE 17A — Food Grade Synthetic PAO (Polyalphaolefin) R & O (Rust & Oxidation) Inhibited Lubricants – NSF (National Sanitation Foundation) H1 Registered

Maximum operating temperature of lubricants 200°F (93°C)

ISO Viscosity Grade	32	68	150	220	320
AGMA Viscosity Grade	0	2	4	5	6
Viscosity cSt @ 40°C ■	28.2-35.2	61.2-74.8	135-165	198-242	288-352
Viscosity SSU @ 100°F	134-164	284-347	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
ExxonMobil	Mobil SHC Cibus 32	Mobil SHC Cibus 68	Mobil SHC Cibus 150	Mobil SHC Cibus 220	Mobil SHC Cibus 320
Kluber Lubrication	Kluberoil 4 UH1 N 32	Kluberoil 4 UH1 N 68	Kluberoil 4 UH1 N 150	Kluberoil 4 UH1 N 220	Kluberoil 4 UH1 N 320
Lubriplate Lubricants Co.	Lubriplate SFGO Ultra 32	Lubriplate SFGO Ultra 68	Lubriplate SFGO Ultra 150	Lubriplate SFGO Ultra 220	Lubriplate SFGO Ultra 320
Total Lubricants USA, Inc.	Nevastane SL 32	Nevastane SL 68	Nevastane SL 150	Nevastane SL 220	Nevastane SL 320

■ Kinematic viscosity in units of mm^2/S is equivalent to cSt (centistokes)

TABLE 17B — Food Grade Synthetic PAO (Polyalphaolefin) EP (Extreme Pressure) Lubricants – NSF (National Sanitation Foundation) H1 Registered

Maximum operating temperature of lubricants 200°F (93°C)

ISO Viscosity Grade	32	68	150	220	320
AGMA Viscosity Grade	0	2	4	5	6
Viscosity cSt @ 40°C ■	28.2-35.2	61.2-74.8	135-165	198-242	288-352
Viscosity SSU @ 100°F	134-164	284-347	626-765	918-1122	1335-1632
Manufacturer	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**	**Lubricant Name**
Petro-Canada	---	---	---	Purity FG Synthetic EP 220	---

■ Kinematic viscosity in units of mm^2/S is equivalent to cSt (centistokes)

Laboratory analysis is recommended for optimum lubricant life and gear drive performance.

PETROLEUM LUBRICANTS (FOOD GRADE) — In the absence of oil analysis, change gear oils every 6 months or 2500 operating hours, whichever occurs first. Change oil more frequently when gear drives operate in extremely humid, chemical or dust laden atmospheres. In these cases, lubricants should be changed every 3 to 4 months or 1500 to 2000 hours. If the drive is operated in an area where temperatures vary with the seasons, change the oil viscosity grade to suit the temperature, refer to Table 13. Lubricant suppliers can test oil from the drive periodically and recommend economical change schedules.

SYNTHETIC LUBRICANTS (FOOD GRADE) — In the absence of oil analysis, synthetic lube change intervals can be extended to 8000 hours depending upon operating temperatures. Laboratory analysis is recommended for optimum lubricant life and drive performance. Change lube with change in ambient temperature, if required. Refer to Table 14.

Rexnord
3001 W. Canal St., Milwaukee, WI 53208-4200 USA
Telephone: 414-342-3131 Fax: 414-937-4359 www.rexnord.com

GREASE-LUBRICATED SEALS AND BEARINGS

All high speed shaft seal cages and upper low speed shaft seal cages have grease purgeable outer seal cavities. All Type LBX & LHX drives with drywells have grease lubricated lower low speed shaft bearings. Drives are normally shipped without grease in the seal housing cavity. Gear drives are shipped with NLGI #2 grade grease in those bearings requiring grease lubrication unless otherwise specified.

GREASE LUBRICATED BEARINGS — All lower low speed shaft bearings of drives with drywells are grease lubricated at the Factory. Remove pressure relief plug when greasing bearing on solid shaft extension down and hollow shaft drives. Pump grease into gearing cage until it appears at the plug. Replace pressure relief plug.

Grease bearings during oil change intervals or every 6 months or 2500 hours of operation, whichever occurs first. Refer to Table 11 for approximate grease capacities.

GREASE LUBRICATED SEALS — The high speed shaft and upper low speed shaft seal cages are furnished with grease purgeable dual seal assemblies, which minimize the entry of contaminants and abrasive dusts into the drive. Normally, drives are shipped without grease in the seal housing cavity. The option of adding grease is the purchaser's. The use of this feature is recommended for drives operating in abrasive atmospheric conditions.

If using the grease purgeable seals, grease seals during oil change intervals. Depending upon the degree of contamination, it may be necessary to purge contaminated grease from seals more often (at least every 3 to 6 months). Slowly pump fresh grease through the seal, **WITH HAND GREASE GUN**, until fresh grease flows out along the shaft. Wipe off purged grease.

CAUTION: *Rapid regreasing with a power grease gun can force grease inward past the seals and interfere with oil lubrication of the high speed bearing.*

If grease could contaminate the product, as in the food and drug industries, the grease originally supplied with gear drive must be removed and replaced with grease listed in Table 18. Simply purging grease with grease gun will not remove all grease and cross-contamination will likely occur. Refer to gear drive assembly/disassembly instructions. Grease registered as H1 by NSF, National Sanitation Foundation, is suitable for food processing applications.

TABLE 18 — Food Grade Grease ▲ for Grease Lubricated Bearings & Grease Purged Seals, NLGI #2 Grade
0° to +200°F(-18° to +93°C)

Manufacturer	Lubricant
Bel-Ray Company, Inc.	No-Tox HD Grease 2
Chevron USA, Inc. (Texaco/ Caltex)	Chevron FM ALC EP 2
Exxon Mobil	Mobil SHC Polyrex 462
Kluber Lubrication	Klubersynth UH1 14-222
Lubriplate	Lubriplate FGL-2
Total Lubricants USA, Inc.	Nevastane HT/AW 2
Petro-Canada	Purity FG
Phillips 66 / Conoco / 76 Lubricants / Kendall	Food Machinery Grease 2

▲ NSF (National Sanitation Foundation) H1 Registered.

Grease application or re-lubrication should be done at temperatures above 20°F (-7°C). If grease must be applied at cooler temperatures consult factory or lubricant supplier for recommendations.

STORED & INACTIVE GEAR DRIVES

Prior to shipment from the factory, all Rexnord enclosed gear drives are protected internally against corrosion with a rust preventative oil. A vapor phase rust inhibitor may also be added.

WARNING*: These corrosion inhibitors are not H1 registered with the NSF (National Sanitation Foundation) as suitable for food processing applications. When Food Grade Lubricants are to be used, it is the end users responsibility to properly flush and prepare the drive for Food Grade service. Contact the lubricant manufacturer for specific information and flushing procedures.*