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MAINTENANCE & LUBRICATION

L-4100

80-321 (10-89)

C O N T E N T S

GENERAL

The regular care a machine receives by its operators and mechanics is generally rewarded by decreased downtime and greater reliability. With the help of the information in this section, you should be able to maintain your machine at top operating efficiency. The maintenance and lubrication procedures given here can be performed on the job site with a minimum of shop tools.

SAFETY PRECAUTIONS

Before doing any maintenance or lubrication, review the following safety precautions. They're included for your protection.

PERFORM MAINTENANCE ON LEVEL GROUND

The machine should be on level ground and free of traffic lanes whenever possible.

SUPPORT THE BOOM

Before doing any work under a raised boom or bucket, first do the following:

1. Empty the load.
2. Support the boom with a safety stand - don't rely on the hydraulics.
3. Shutdown the engine.
4. Set the parking brake and block the wheels.

INSTALL SWIVEL LOCKING BAR

A swivel locking bar is provided on 4-wheel drive models. Before working in the hinge area of the machine make sure this bar is installed. Place the machine on a level surface so that the locking bar can be aligned for pin insertion.

TAG KEY SWITCH

Before doing maintenance or lubrication remove the key from the switch, or tag the key switch "DO NOT START", to insure that the engine is not started inadvertently.

WHAT IS PREVENTIVE MAINTENANCE

Preventive maintenance is a system that is intended to detect problem areas and prevent equipment failure before trouble can develop to a critical point. The system is based on a series of maintenance checks and servicing points. To be effective, a preventive maintenance program demands strict adherence to a planned schedule of maintenance.

BENEFITS OF PREVENTIVE MAINTENANCE

The time that is diligently expended to make the required periodic checks is a real investment in working equipment and efficient use of manhours. Valuable benefits can be realized; all of which means savings in time and resources.

PREVENTIVE MAINTENANCE:

- IMPROVES EQUIPMENT AVAILABILITY - by minimizing the chances of breakdown.
- REDUCES UNEXPECTED DOWNTIME - crash repairs are expensive and detract from normal scheduled maintenance.
- REDUCES EQUIPMENT ABUSE - provides the abvility to predict component life and helps avoid operating equipment to destruction by replacing parts before they fail.
- ALLOWS PLANNING OF DAILY PRODUCTION - by knowing the condition of available equipment.
- ALLOWS PLANNING OF MAINTENANCE MANHOURS - by distribution of duties and necessary lead time for parts ordering.
- PROVIDES COMPLETE HISTORY OF EQUIPMENT - based on performance, frequency and type of failure and actual manhours expended on maintenance.
- PROMOTES SAFETY - well maintained equipment is more able to operate within its design specifications and react positively to the operator's control.

SHIFT MAINTENANCE

Shift maintenance is where preventive maintenance begins. The operator of the machine normally completes this inspection. It consists of the routine servicing and lubrication of the machines major systems. On a daily basis, the operator is in the best position to identify, remedy and/or record

potential problem areas and is able to quickly recognize any change in the performance of his machine. The comments he records on the shift maintenance report become a valuable tool to the maintenance department, and are an important ingredient to the overall success of a preventive maintenance program.

SHIFT MAINTENANCE CHECKLIST

A recomnmended checklist is given here as an aid in developing a practical shift maintenance program if one has not been developed by your company. a shift maintenance report, based on this checklist should be used to report defects found when making maintenance checks at the beginning of each shift.

Your company may have a different reporting method, however, it is usually a necessary requirement that this form be filled out at the end of each shift. Accurate shift maintenance reports can help your company anticipate maintenance problems and take action to prevent costly failures.

USING THE CHECKLIST

Actual operating environment governs the maintenance schedule. Some checks should be performed more often under heavy dust or other special conditions.

The maintenance schedule checklist is designed as a guide until adequate experience is obtained to establish a schedule to meet your specific operation.

A detailed list of component checks is provided through several check periods; also a suggested schedule basis is given for hours of operation, or calendar of time.

A maintenance schedule should be established using the checklist as a guide; the result will be a maintenance program to fit your specific operation.

OIL ANALYSIS SAMPLING PROGRAM

Use scheduled oil sampling (SOS) to monitor machine condition and maintenance requirements. Oil samples from Engine, Transmission, Axles and Hydraulic System should be taken when the oil is hot and well mixed to ensure an accurate analysis.

Consult your dealer for complete information and assistance in establishing a scheduled oil sampling program for your equipment.

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SHIFT MAINTENANCE CHECKLIST

EVERY 10 HOURS OR DAILY

Note general vehicle condition. Clear away all collected debris — steam clean if necessary. Check for mechanical damage and loose or leaking components. Report faults to maintenance department.

Before Starting Engine - Check The Following:

REF	ITEM	OK	NO	ADD
13	ENGINE (Check oil level - check for leaks)	☐	☐	____
—	FUEL TANK (Drain off moisture & sediment)	☐	☐	____
11	HYDRAULIC TANK (Check oil level - check for leaks)	☐	☐	____
2	RADIATOR (Check coolant level - check for leaks)	☐	☐	____
24	AIR CLEANER (Check indicator - clean or change A/R)	☐	☐	
45	ENGINE BELTS (Check for adjustment and wear)	☐	☐	
15	FUEL FILTER (Drain off water & sediment)	☐	☐	
8	AIR TANKS (Drain off water & sediment)	☐	☐	
2	RADIATOR & OIL COOLER (Are fins clean & unobstructed?)	☐	☐	
37,54	WHEEL & TIRE ASSEMBLIES (Check condition & pressure)	☐	☐	____
7	HYDRAULIC BRAKE RESERVOIRS (Check Fluid Level)	☐	☐	____
—	LUBRICATE CHASSIS (Refer to Lube Chart)	☐	☐	

After Starting Engine - Check The Following:

13	ENGINE (Does it sound normal?)	☐	☐	
25	INSTRUMENTS (Check for normal readings)	☐	☐	
25	CONTROLS (Check for normal operation)	☐	☐	
24	AIR INTAKE SYSTEM (Check for leaks and damage)	☐	☐	
23	EXHAUST SYSTEM (Check for leaks & excessive smoke)	☐	☐	
48	TRANSMISSION (Check oil level - Check for leaks)	☐	☐	____

Note Anything Abnormal Or In Need Of Repair:

LIGHTS _____ DEFROSTER _____ REVERSE W/HORN _____

HORN _____ WINDSHIELD WIPERS _____ _____

HEATER _____ AIR CONDITIONER _____ _____

OPERATOR _____ SUPERVISOR _____ DATE _____

MODEL _____ SERIAL NO. _____ HOUR METER _____

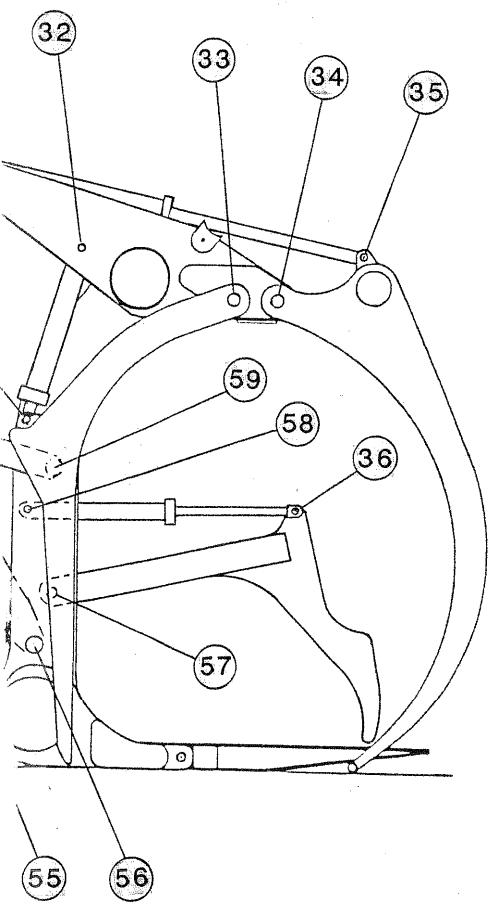
LUBRICATION POINTS
L-4100

CAUTION!

Due to the extreme height of the upper lube points, it is essential to personnel safety that safe ladders and/or scaffolding be used while servicing. These areas can be dangerously slick under conditions of rain, frost, or oil smears.

Before lubricationg - always lower carriage to the ground and extend/retract holddown arms/carriage to obtain the lowest possible configuration.

◯ Circled numbers indicate Lubrication points.



REF		FTGS
	10 HOURS	
(1) & (3)	STEERING CYLINDER PINS	4
(27)	BOOM TO CHASSIS PIN	2
(56)	*BOOM TO CARRIAGE PIN	3
(29) & (55)	*HOIST CYLINDER PINS	4

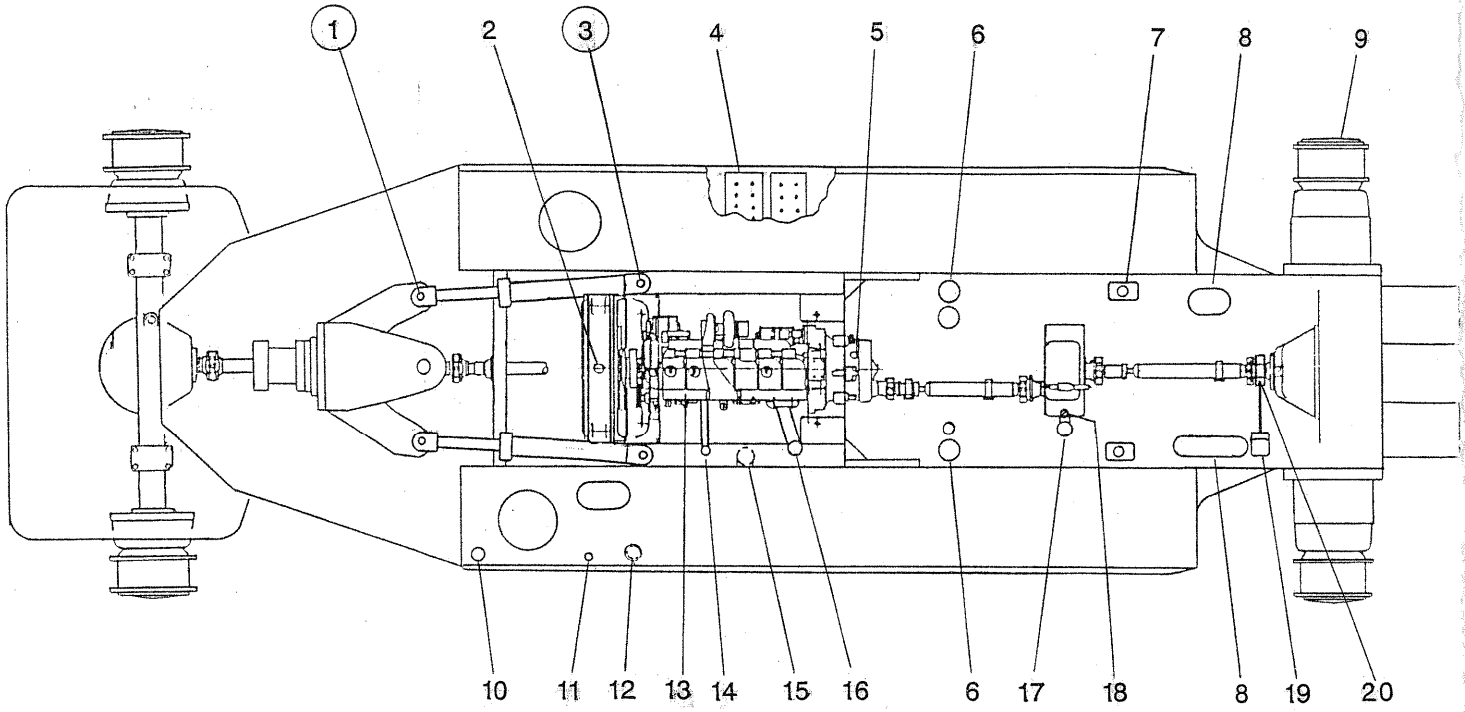
* WHEN OPERATING IN WATER, LUBRICATE SUBMERGED POINTS MORE FREQUENTLY.

	50 HOURS	
(26) & (59)	TILT CYLINDER PINS	4
(34)	HOLDDOWN ARM PINS	2
(33)	KICKOFF ARM PINS	2
(31) & (35)	HOLDDOWN CYLINDER PINS	4
(30) & (32)	KICKOFF CYLINDER PINS	4
(57)	AUX HOLDDOWN ARM PINS	2
(36) & (58)	AUX HOLDDOWN CYLINDER PINS	4
(21)	SWIVEL BEARING	1
(22) & (42)	HINGE BEARINGS	2
(40)	SWIVEL SUPPORT BEARING	1
	**DRIVELINES	
(28)	CONVERTER TO TRANSMISSION	3
(51)	TRANS TO FRONT AXLE	3
(49)	TRANS TO FRONT SUPPORT BEARING	3
(44)	FRONT/REAR BEARING TO HINGE	3
(41)	HINGE DRIVELINE	3
(39)	HINGE TO REAR AXLE	3
(43) & (47)	FRONT & REAR SUPPORT BEARINGS	2

** USE HANDGUN OR LOW PRESSURE ADAPTER; LUBRICATE SPARINGLY.

	250 HOURS	
(45)	FAN DRIVE BEARING	1

NOTE: Due to variations in engine types and models, the indicated location of engine filters (fuel - oil - coolant) may not be exact. Consult your specific engine Service Manual for exact locations.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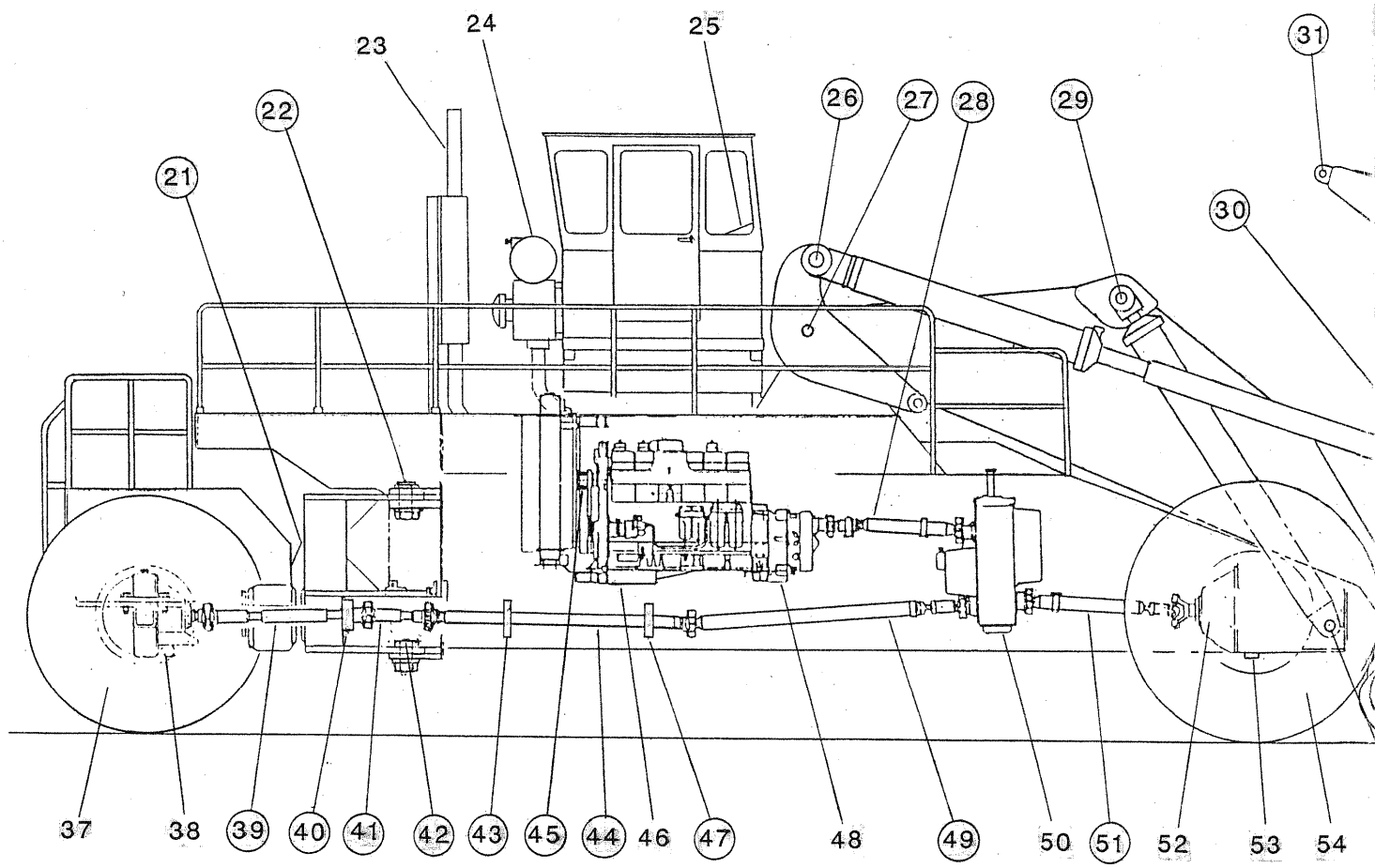
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COMPONENT CAPACITIES & LUBRICANTS

L-4100

COMPONENT OR SYSTEM	REFILL CAPACITY (APPROX) U.S. GAL	LITERS	LUBRICANT TYPE *
ENGINE CRANKCASE W/FILTERS	13	49	HD ENGINE OIL
FUEL TANK	425	1609	DIESEL FUEL
COOLING SYSTEM	22.5	85	WATER/ANTIFREEZE
HYDRAULIC SYSTEM	350	1325	HYDRAULIC OIL
TRANSMISSION	--	--	TRANSMISSION OIL
DIFFERENTIAL, FRONT	50	189	GEAR LUBE
DIFFERENTIAL, REAR	16	61	GEAR LUBE
PLANETARY HUBS (EA), FRONT	3.5	21	GEAR LUBE
PLANETARY HUBS (EA), REAR	2.5	9.5	GEAR LUBE
BRAKE RESERVOIRS	AS REQUIRED		MINERAL OIL
CHASSIS GREASE FITTINGS	AS REQUIRED		CHASSIS GREASE

* SEE LUBRICANT SPECIFICATIONS, PAGE 9.

MAINTENANCE SPECIFICATIONS

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HYDRAULIC PRESSURE RELIEF SETTINGS

	MAIN	CIRCUIT
(1) Steering	2350 psi	2500 psi
(2) Holddown & Kickoff, LH	2350 psi	2450-2600 psi
(3) Holddown & Kickoff, RH	2350 psi	2450-2600 psi
(4) Auxiliary Holddown	150 psi	N/A
(5) Hoist	2300 psi	2500 psi
(6) Tilt (Base End)	N/A	950-1200 psi
(7) Tilt (Stem End)	N/A	2500 psi

NOTE: Set main reliefs at 1500 RPM.
Circuit reliefs are pre-set at factory.

WHEEL LUGNUT TORQUE

Front	300 Ft/Lbs
Rear	500 Ft/Lbs

TIRE INFLATION PRESSURE

Front	24.0 X 35-36PR	90-95 psi
Rear	23.5 X 25-20PR	60-65 psi

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MAINTENANCE CHECKLIST

IMPORTANT: Consult engine manufacturer's Maintenance Manual for additional engine related maintenance checks and/or details.

EVERY 50 HOURS OR WEEKLY

1.	REPEAT THE 10 HOUR CHECK	OK_____	NO_____
2.	CHECK FOR FLUID LEAKS - OIL, FUEL, WATER	OK_____	REPAIR_____
3.	CHECK BRAKES FOR ADJUSTMENT & WEAR . . .	OK_____	REPAIR_____
4.	CHECK WHEEL NUTS & STUDS - MECHANICALLY	OK_____	REPAIR_____
5.	CHECK BATTERY ELECTROLYTE	OK_____	ADD_____
6.	LUBRICATE CHASSIS - REFER TO LUBE CHART .	OK_____	NO_____
7.	RECORD ENGINE RPM	HIGH_____	STALL_____
8.	CHECK FOR STRUCTURAL DAMAGE - INSPECT CHASSIS & ATTACHMENTS FOR BENDING, CRACKING, & BROKEN WELDS	OK_____	REPAIR_____

EVERY 250 HOURS OR MONTHLY

1.	REPEAT THE 50 HOUR CHECK	OK_____	NO_____
2.	CHANGE ENGINE OIL & FILTERS*	OK_____	ADDED_____
3.	TAKE ENGINE OIL SAMPLE FOR ANALYSIS*. . .	OK_____	NO_____
4.	CHECK AXLE DIFFERENTIAL OIL LEVEL	OK_____	ADDED_____
5.	CHECK AXLE PLANETARY OIL LEVEL	OK_____	ADDED_____
6.	CHANGE COOLING SYSTEM FILTER	OK_____	REPLACE_____
7.	CHECK ALL HYDRAULIC PRESSURES & RECORD. .	OK_____	NO_____
8.	CHECK FIRE SUPPRESSION SYSTEM	OK_____	NO_____

EVERY 500 HOURS OR QUARTERLY

1.	REPEAT THE 250 HOUR CHECK	OK_____	NO_____
2.	SERVICE FUEL FILTERS	OK_____	REPLACE_____
3.	SERVICE HYDRAULIC FILTERS*	OK_____	REPLACE_____
4.	SERVICE TRANSMISSION FILTERS*	OK_____	REPLACE_____
5.	TAKE OIL SAMPLES FROM TRANSMISSION, AXLE AND HYDRAULIC SYSTEM FOR ANALYSIS* . . .	OK_____	NO_____
6.	INSPECT BRAKE SYSTEM & COMPONENTS	OK_____	REPAIR_____

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MAINTENANCE CHECKLIST

1000 HOURS OR SEMI-ANNUALLY

1.	REPEAT 500 HOUR/SEMI-ANNUAL CHECK	OK_____	NO_____
2.	CHANGE TRANSMISSION OIL & FILTERS* . . .	OK_____	ADDED_____
3.	CLEAN & FLUSH COOLING SYSTEM	OK_____	ADDED_____
4.	CHECK PINS & BUSHINGS FOR WEAR	OK_____	REPLACE_____

2000 HOURS OR ANNUALLY

1.	REPEAT 1000 HOUR/SEMI-ANNUAL CHECK . . .	OK_____	NO_____
2.	DRAIN, FLUSH & REFILL DIFFERENTIALS*. . .	OK_____	ADDED_____
3.	DRAIN, FLUSH & REFILL PLANETARIES*. . . .	OK_____	ADDED_____
4.	CHANGE HYDRAULIC OIL & FILTERS*	OK_____	ADDED_____

***Normal drain period & filter change intervals are for average environmental and duty-cycle conditions. Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination.**

Change intervals should be adjusted according to the results of oil sampling analysis. Consult your dealer for assistance in establishing an oil sampling program for your equipment.

REPAIRS:

PROBLEM:_____

PARTS:_____

_____

HOURS LABOR_____

REPAIRS:

PROBLEM:_____

PARTS:_____

_____

HOURS LABOR_____

OPERATOR:_____

SUPERVISOR:_____

PARTS:_____

MODEL:_____ SERIAL NUMBER:_____ HOUR METER:_____

LUBRICANT SPECIFICATIONS

	MANUFACTURER & SPECIFICATION	RECOMMENDED VISCOSITY	PREVAILING AMBIENT TEMPERATURES (FAHRENHEIT)	(CELSIUS)
ENGINE	CUMMINS	SAE 10W-30	-13°F to 95°F	-25°C to 35°C
	MIL-L-2104D	SAE 15W-40	14°F and ABOVE(Normal)	-10°C and ABOVE(Normal)
	(API CD/SE)	SAE 20W-40	32°F and ABOVE	0°C and ABOVE
	DETROIT DIESEL	SAE 30	BELOW 32°F	BELOW 0°C
	MIL-L-46152	SAE 40	ABOVE 32°F	ABOVE 0°C
	API CC/SF	Note: Multi-grade oils are not recommended in Detroit Diesel Engines.		
	CATERPILLAR	SAE 5W-20	-13°F to 50°F	-25°C to 10°C
	MIL-L-2104D	SAE 10W-30	-4°F to 104°F	-20°C to 40°C
	(API CD or CD/TO-2)	SAE 15W-30	5°F to 122°F(Normal)	-15°C to 50°C(Normal)
TRANSMISSION	CLARK	MIL-L-46167	-65°F to 0°F	-54°C to -18°C
	MIL-L-2104D	SAE 10W	-10°F to 140°F(Normal)	-23°C to -60°C(Normal)
	(API SE) Type C-3	SAE 30	30°F to 140°F	-1°C to 60°C
	ALLISON	SAE 5W-20	BELOW -10°F	BELOW -23°C
		SAE 10W	BELOW 10°F(Normal)	BELOW -12°C(Normal)
	MIL-L-2104D	SAE 15W-40	BELOW 30°F	BELOW -1°C
	(API SE) TYPE C-3	SAE 30	BELOW 35°F	BELOW 2°C
		Note: Preheat transmission fluid to indicated minimum temperature before operating transmission. . . or if preheating equipment is not available, operate transmission in NEUTRAL for minimum of 20 minutes prior to engaging Forward or Reverse ranges.		
	TWIN-DISC	SAE 5W-20	-60°F to 0°F	-51°C to -18°C
	MIL-L-2104D	SAE 10W	-10°F to 140°F(Normal)	-23°C to 60°C(Normal)
	(API SE) TYPE C-3	SAE 30	30°F to 140°F	-1°C to 60°C
AXLE	CLARK	SAE 75W	-40°F to -10°F	-40°C to -23°C
		SAE 75W-80	-40°F to 0°F	-40°C to -18°C
	MIL-L-2105C	SAE 80W-90	-13°F to 100°F(Normal)	-27°C to 37°C(Normal)
	(API GL-5)	SAE 85W-140	ABOVE 10°F	ABOVE -12°C
	BRYAN	SAE 20	BELOW 0°F	BELOW -18°C
	MIL-L-2104C	SAE 30	-20°F to 120°F(Normal)	-29°C to 49°C(Normal)
	(API CD)	SAE 40	ABOVE 100°F	ABOVE 37°C
	RIMPULL	SAE 75W-90	-65°F to 20°F	-54°C to -29°C
	MIL-L-2105C	SAE 80W-90	-20°F and above(Normal)	-29°C and above(Normal)
	(API GL-5)	SAE 120	-90°F to 120°F	-32°C to 49°C
HYDRAULIC	WAGNER	ISO VG32	-10°F to 120°F	-23°C to 49°C
	Premium Grade Hydraulic Oil	Note: Hydraulic Oil must include the following: Anti-Wear Agents; Rust, Foam and Oxidation Inhibiters; High Demulsibility; High Viscosity Index; Cold Weather Properties; Minimum Pour Point of -40°F and Minimum viscosity Index of 140.		
CHASSIS	WAGNER			
	Multipurpose Chassis Grease w/EP & MoS_2	NLGI-1	BELOW 10°F	BELOW -12°C
		NLGI-2	ABOVE 10°F	ABOVE -12°C