

2020 Tractor (117,500-)



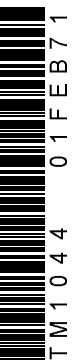
TECHNICAL MANUAL

2020 Tractor
(117,500-)

TM1044 (01FEB71) English

John Deere Tractor Works
TM1044 (01FEB71)

LITHO IN U.S.A.
ENGLISH



2020 TRACTOR

TECHNICAL MANUAL

TM-1044 (Feb-71)

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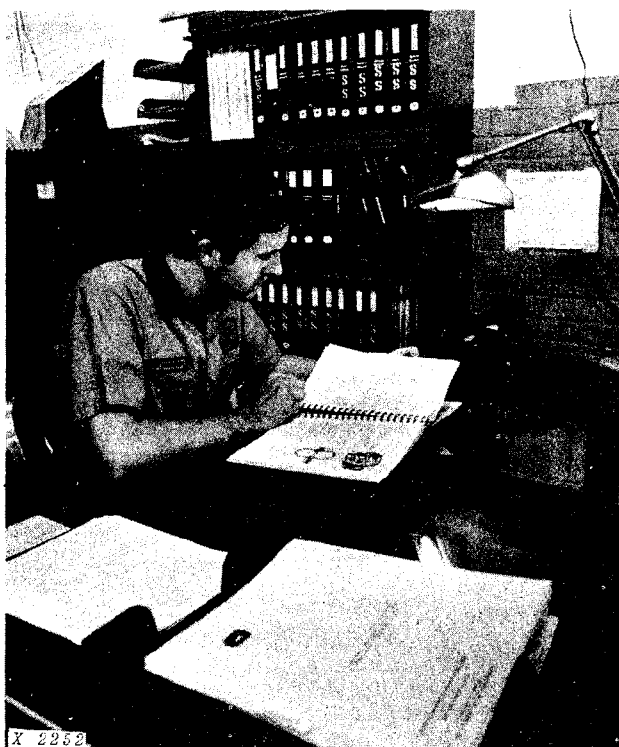
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INTRODUCTION



Use FOS Manuals for Reference



Use Technical Manuals for Actual Service

This technical manual is part of a twin concept of service:

- **FOS Manuals—for reference**
- **Technical Manuals—for actual service.**

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

Fundamentals of Service (FOS) Manuals cover basic theory of operation, *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failures and their causes. FOS Manuals are for training new men and for reference by experienced men.


Technical Manuals are concise service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by a journeyman mechanic.



When a serviceman should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.

Some features of this technical manual:

- *Table of contents at front of whole manual*
- *Contents at front of each Section*
- *Specifications at end of each Group*
- *Special tools at end of each Group*

 This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

This technical manual was planned and written for you—a journeyman mechanic. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

Section 10 GENERAL

CONTENTS OF THIS SECTION

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Group 5

GENERAL TRACTOR SPECIFICATIONS

	Gasoline	Diesel		
ENGINE			ELECTRICAL SYSTEM	
Maximum PTO horsepower*	53.91	54.09	Battery dry voltage	12 volts
Maximum drawbar horsepower*	45.45	47.39	Battery specific gravity at full charge (corrected to 80°F.)	1.260
Number of cylinders	4	4	Battery terminal grounded	negative
Bore and stroke, inches	3.86 x 3.86	3.86 x 4.33	CAPACITIES (U.S. Standard Measures)	
Displacement in cubic inches	180.0	202.0	Fuel tank	19-1/2 gals.
Compression ratio	7.5 to 1	16.3 to 1	Cooling system	12 qts.
Firing order	1-3-4-2	1-3-4-2	Crankcase (including filter)	6 qts.
Intake valve clearance	0.014-in.	0.014-in.	Transmission-hydraulic system	10 gals.
Exhaust valve clearance	0.022-in.	0.018-in.	Belt pulley	2-1/2 pts.
Slow idle	600 rpm	800 rpm	CLUTCH	Single or dual stage, spring-loaded, dry disk, foot-operated.
Fast idle	2680 rpm	2650 rpm		

* Official test at 2500 engine rpm.

TRANSMISSION

Type Collar shift
Gear selections 8 forward and 4 reverse
Shifting 4 speeds each in high, low, and reverse ranges. Park lock included.

HI-LO SHIFT

Hydraulic wet clutches, no clutching required. Shifting from high to low decreases ground speed 25.8 percent and increases pull power up to 35 percent in any of the transmission speeds.

REVERSER

Hydraulic wet clutches, no clutching required. Provides reverse speeds for gear selections 1 through 4 which are 16% faster than corresponding forward speeds.

BRAKES Hydraulically actuated, wet-disk type.

DIFFERENTIAL AND FINAL DRIVES

Type Planetary reduction final drives with spiral bevel gear drive differential.
Differential lock ... Hand or foot operated mechanical lock, spring-loaded out of engagement.

POWER TAKE-OFF

Type Continuous-running, independent, or transmission-driven types available in 540 and/or 1000 rpm options.

HYDRAULIC SYSTEM

Type Closed center, constant pressure.
Standby oil pressure 2250 psi

STEERING

Type ... Manual or power; power steering is hydraulically actuated, with manual provision in case of hydraulic failure.

FRONT TIRES*

	Size	Ply Rating
RU tractor	6.00-16	6
	7.5L-15	6
	7.50-16	6
LU tractors	5.00-15	4
	6.00-14	4
	9.00-10	4
HU tractors	6.00-16	4
	7.5L-15	6
	7.50-16	6

REAR TIRES*

RU tractors	12.4-28	4
	14.9-28	6
	16.9-28	6
LU tractors	14.9-24	6
	16.9-24	6
	18.4-16.1	6
HU tractors	12.4-36	4
	13.9-36	4
	14.9-36	6

* Additional tire sizes available.

DIMENSIONS

	RU Tractor	HU Tractor	LU Tractor
Over-all height	79-7/8 in.	83-1/8 in.	75-7/8 in.
Over-all width, min.	63-1/16 in.	67-1/4 in.	51-3/16 in.
Over-all length (with 3-point hitch)	139-3/4 in.	139-3/4 in.	139-3/4 in.
Shipping weight (approx.)			
Gasoline tractor	4565 lbs.	4850 lbs.	4060 lbs.
Diesel tractor	4645 lbs.	4930 lbs.	4140 lbs.

Group 10

PREDELIVERY, DELIVERY, AND AFTER-SALE SERVICES

PREDELIVERY SERVICE

Because of the shipping factors involved, plus extra finishing touches that are necessary to promote customer satisfaction, proper predelivery service is of prime importance to the dealer.

After completing the factory-recommended dealer checks and services listed on the predelivery tag, remove the tag from the tractor and file it with the shop order for the job. The tag will certify that the tractor has received the proper predelivery service when that portion of the customer's John Deere Delivery Receipt is completed.

A tag pointing out the factory-recommended procedure for predelivery service is attached to each new tractor before it leaves the factory.

Temporary Tractor Storage

Service	Specification	Reference
Check radiator for coolant loss and antifreeze protection	Midway between core and filler neck	
Drain fuel system (gasoline)		Operator's manual
Reduce shipping pressure of tires		Operator's manual
Cover tractor and tires for protection and cleanliness		

Before Delivering Tractor

Electrical System

Remove resistor and connect wiring lead (red) to alternator output terminal. Do not attempt to polarize		Section 40, Group 10
Install electrolyte and charge batteries		FOS-20 Manual
Punch date code on battery tag		
Check battery terminal connections		Section 40, Group 5
Check alternator belt tension	3/4-inch deflection, 20 lb. force	Operator's manual

Cooling System

Inspect radiator for coolant loss	Midway between core and filler neck	
Check antifreeze protection		

Before Delivering Tractor—Continued

Service	Specification	Reference
Tires and Wheels		
Adjust pressure of tires		Operator's manual
Check front wheel hub bolts, rear wheel rim clamp nuts, and rear wheel cap screws for tightness	Front hub bolts; Tires 6.00-16 or smaller . . . 85 ft-lb. Tires larger than 6.00-16 . . . 100 ft-lb. Rear hub bolts-300 ft-lb. Rim clamp nuts-170 ft-lb. Rear wheel-to-flanged axle; cast-130 ft-lb., steel wheel-100 ft-lb.	Operator's manual
Lubrication		
Check crankcase oil level	To upper marks on dipstick	Operator's manual
Check transmission-hydraulic system oil level	To top of "SAFE" range on dipstick. Type 303 Special-Purpose Oil	Operator's manual
Lubricate grease fittings	SAE multipurpose-type grease	Operator's manual
Check distributor lubrication	Distributor cam lubricant	Section 40, Group 20
Check belt pulley oil level		Operator's manual
Engine		
Check air cleaner		Operator's manual
Drain sediment from fuel filter and (or) fuel pump bowl		Operator's manual
Fill fuel tank and start engine	19-1/2 U.S. gallons	Operator's manual
Check operation of starter, alternator, lights, flashers, gauges, and indicator lights		Operator's manual
Check engine timing	Diesel - TDC Gasoline - "S" mark, 2500 rpm	Operator's manual
Check throttle linkage for free operation		Section 20, Group 40

Before Delivering Tractor—Continued

Service	Specification	Reference
Check engine speeds		
Gasoline	Slow idle, 600 rpm High idle, 2680 rpm Foot throttle, 2800 rpm	
Diesel	Slow idle, 800 rpm High idle, 2650 rpm Foot throttle, 2800 rpm	Section 20, Group 40
Operation		
Check transmission clutch free travel (tractors without reverser)	Approximately 1-inch free pedal travel	Operator's manual
Check clutch wear adjustment (tractors with reverser)	5-1/4 in.	Operator's manual
Shift transmission through all speeds		Operator's manual
Check power takeoff operation		Operator's manual
Check differential lock operation		Operator's manual
Check steering operation		Operator's manual
Check brakes	Bleed brakes if spongy, check for excessive pedal travel, and even position	Operator's manual
Check hydraulic system operation: Rockshaft, and remote cylinder		Operator's manual
Check 3-point hitch operation		Operator's manual
Check negative stop screw adjustment		
Tractors without independent PTO	1/4 turn	Section 70, Group 30
Tractors with independent PTO	1/3 turn	Section 70, Group 30
Check operation of reverser, or Hi-Lo shift		Operator's manual
Check seat operation		Operator's manual
General		
Tighten accessible nuts and cap screws		
Clean tractor and touch up paint		

DELIVERY SERVICE

A thorough discussion of the operation and service of a new tractor at the time of delivery helps to assure complete customer satisfaction. Proper delivery should be an important phase of a dealer's program. A portion of the John Deere Delivery Receipt emphasizes the importance of proper delivery service.

It is a well-known fact that many complaints have arisen simply because the owner was not shown how to operate and service his new tractor properly. Enough time should be devoted, at the customer's convenience, to introducing the owner to his new tractor and explaining to him how to operate and service it.

The following procedure is recommended before the serviceman and owner complete the delivery acknowledgments portion of the delivery receipt.

Using the tractor operator's manual as a guide, be sure that the owner understands these points thoroughly:

1. Controls and Instruments.
2. How to start and stop the engine.
3. The importance of the break-in period.
4. How to use liquid or cast-iron ballast.
5. All functions of the hydraulic system.
6. Using the power takeoff and belt pulley.
7. The importance of safety.
8. The importance of lubrication and periodic services.

After explaining and demonstrating the above features, have the owner sign the delivery receipt and give him the operator's manual.

AFTER SALE INSPECTION

The purchaser of a new John Deere tractor is entitled to a free inspection within the warranty period after the equipment has been "run in." The terms of this after-sale inspection are outlined on the back of the John Deere Delivery Receipt.

The purpose of this inspection is to make sure that the customer is receiving satisfactory performance from his tractor. At the same time, the inspection should reveal whether or not the tractor is being operated, lubricated, and serviced properly.

If the recommended after-sale service inspection is followed, the dealer can eliminate a needless volume of service work by preventing minor irregularities from developing into serious problems later on. This will promote strong dealer-customer relations and present the dealer an opportunity to answer questions that may have arisen during the first few days of operation. During the inspection service, the dealer has the further opportunity of promoting the possible sale of other new equipment.

The following inspection program is recommended within the first 100 hours of tractor operation.

Inspection Procedure

Service	Specification	Reference
Cooling System		
Check radiator coolant level.	Midway between core and filler neck	

Inspection Procedure—Continued

Service	Specification	Reference
Clean external surface of radiator core		
Check hoses and connections for leaks		
Fuel System		
Remove water and foreign matter from fuel pump and filter sediment bowls		Operator's manual
Bleed fuel system		Operator's manual
Tighten loose connections and check entire system for leaks. Correct if necessary		
Check air cleaner element and unloading valve. Clean element if necessary		Operator's manual
Electrical System		
Check specific gravity of battery(s)	Full charge - 1.260 at 80°F.	Operator's manual
Check level of battery electrolyte.	To bottom of filler neck in each cell	Operator's manual
Check belt tension	3/4-inch deflection with a 20 lb. force	Operator's manual
Start engine and check operation of starter, lights, and indicator lamps		Operator's manual
Lubrication		
Check crankcase oil level	To upper marks on dipstick	Operator's manual
Check transmission-hydraulic system oil level	In "SAFE" range on dipstick. Use John Deere Type 303 Special-Purpose Oil	Operator's manual
Check distributor lubrication	Distributor cam lubricant	Section 40, Group 20
Engine		
Check valve clearance (static)	Intake: 0.014 in. Exhaust: Gasoline-0.022 in. Diesel -0.018 in.	Operator's manual

Inspection Procedure—Continued

Service	Specification	Reference
Check engine speed (under load), and horsepower	Specification	Group 15 of this Section.
Operation		
Check transmission clutch free travel (tractors without reverser)	Approximately 1-inch free pedal travel	Operator's manual
Check clutch wear adjustment (tractors with reverser)	5-1/4 in.	Operator's manual
Shift transmission through all speeds		Operator's manual
Check Reverser, Hi-Lo operation		Operator's manual
Check Power Take-Off operation		Section 50, Groups 35 & 40
Check differential lock operation		Operator's manual
Check rockshaft and remote cylinder operation		Section 70, Group 30
Check negative stop screw adjustment		
Tractors without Independent PTO	1/4 turn	Section 70, Group 30
Tractors with Independent PTO	1/3 turn	Section 70, Group 30
Check steering system operation	Smooth, without excessive freeplay	Section 70, Group 20
Check brakes	Bleed brakes if spongy, check for excessive pedal travel, and even position	Section 70, Group 25
Nuts and Cap Screws		
Tighten accessible nuts and cap screws that seem to require adjustment		

Group 15 TUNE-UP

GENERAL INFORMATION

Before tuning up a tractor, determine whether a tune-up will restore operating efficiency. When there is doubt, the following preliminary tests will help to

determine if the engine can be tuned-up. If the condition is satisfactory, proceed with the tune-up. Choose from the following procedures only those necessary to restore the unit.

Preliminary Engine Testing

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2500 engine rpm, full load)	Compare with previous recorded output; compare with output after tune-up	FOS 30 Manual, Chapter 12
Compression Test (minimum readings)		
Diesel	300 psi at full cranking speed	FOS 30 Manual, Chapter 12
Gasoline	120 psi at full cranking speed	FOS 30 Manual, Chapter 12
Manifold Depression Test (gasoline)	15 to 20 inches Mercury, engine at slow idle	FOS 30 Manual, Chapter 12
Engine Coolant Check Test	No air bubbles or oil film in radiator	FOS 30 Manual, Chapter 12

Engine Tune-Up

Operation	Specification	Section-Group Reference
Air Intake System		
Service air cleaner and check system for leaks		FOS 30 Manual, Chapter 12
Check system for restrictions using water manometer, and with clean filter element		FOS 30 Manual, Chapter 12
Normal reading (inches of water)	4 in. at 2500 rpm (full load)	
Maximum permitted reading	25 in. at 2500 rpm (full load)	
Exhaust System		
Check system for leaks		FOS 30 Manual, Chapter 12
Check muffler and exhaust pipe for restrictions		FOS 30 Manual, Chapter 12
Crankcase Ventilating System		
Check system for restrictions		FOS 30 Manual, Chapter 12

Engine Tune-Up—Continued

Operation	Specification	Section-Group Reference
Cooling System		
Clean grille screen, radiator core, and oil cooler core .....	.....	20-35
Clean and flush system; check thermostat opening temperature, if necessary .....	.....	20-35
Check pressure cap	6.25 to 7.50 psi release pressure	20-35
Cylinder Head and Valves		
Torque cylinder head cap screws	110 ft-lbs in sequence	20-10
Set valve clearance	Intake-0.014 inch Exhaust-0.022 inch (gasoline) 0.018 inch (diesel)	20-10
Ignition System		
Inspect system; install new points, condenser, and plugs		
Points	0.020 in. (66-72 degrees dwell)	40-20
Spark plugs	0.025 in.; 35 ft-lbs torque	40-20
Time distributor	"S" mark, 2500 rpm	40-20
Gasoline Fuel System		
Check fuel tank for water or other foreign material .....	.....	30-15
Clean fuel pump sediment bowl and filter screen .....	.....	30-15
Check system for leaks .....	.....	30-15
Check fuel pump pressure	3-1/2 to 4-1/2 psi	30-15
Clean carburetor inlet screen .....	.....	30-15
Drain carburetor bowl .....	.....	30-15
Check choke operation .....	.....	30-15
Check carburetor load needle adjustment	Engine at high idle, turn in load needle until engine misses, turn load needle out until engine runs smooth, then turn out one extra turn	30-15
Adjust throttle linkage	Foot pedal - 2800 rpm Hand Throttle High idle - 2680 rpm Slow idle - 600 rpm	20-40

Engine Tune-Up—Continued

Operation	Specification	Section-Group Reference
Diesel Fuel System		
Check fuel tank for water or other foreign material		
Check fuel pump pressure	3-1/2 - 4-1/2 psi	30-10
Clean sediment bowls and change filter(s)		30-10
Injection Pump:		
Service and check timing	TDC	30-10
	4° advance at 1200 rpm (no load)	30-10
Adjust throttle linkage	Foot throttle - 2800 rpm	
	Hand throttle	
	High idle - 2650 rpm	
	Slow idle - 800 rpm	20-40
Lubrication System		
Check engine oil pressure	45 - 65 psi at high idle	20-30
Charging System		
Check battery specific gravity	1.240 - 1.260	40-10
Check battery water consumption and electrolyte level		40-10
Clean battery, cables, and box		40-10
Check alternator belt tension	20 lb. with 3/4 in. belt deflection	40-10
Check alternator output	25 amps at 13 to 15 volts (2052 engine rpm, 3000 alternator rpm)	40-10
Check alternator regulated voltage	13.8 - 14.3 volts (operating)	40-10
Starting System		
Check start-safety switch operation		
Check battery voltage when starting	Min. 9 volts (cranking)	40-15
Check starter current draw	Diesel - approx. 400 amps	40-15
	Gasoline - approx. 170 amps	40-15
Check operation of alternator and oil pressure indicator lights		40-25

Final Engine Test

Operation	Specification	Section-Group Reference
Carburetor mixture	Use exhaust gas analyzer and dynamometer	30-15
Dynamometer	Compare with previous recorded output. Record for future use.	FOS 30 Manual, Chapter 12

Tractor Tune-Up

Operation	Specification	Section-Group Reference
Adjust transmission clutch pedal free travel		
Tractors without reverser	1-inch	50-5
Tractors with reverser	5-1/4 inches	50-5
Check transmission shifting .....	.....	50-20
Check transmission for proper operation without excessive noise .....	.....	50-20
Check reverser, Hi-Lo operation .....	.....	50-10&15
Check power take off for proper operation .....	.....	50-35&40
Check differential lock operation .....	.....	50-25
Check brake pedal travel and position ...	Bleed brakes if spongy	70-25
Check front wheel bearing adjustment and lubrication	35 ft-lbs; backoff to nearest hole .....	.....
Check front wheel toe-in	1/8 - 3/8 in. ....	.....
Check tire inflation	See operator's manual .....	.....
Transmission pump	6 gpm at 2500 rpm	70-5
Main hydraulic pump	2200-2300 psi standby; 10-1/2 gpm (8-piston), or 5-3/4 gpm (4-piston), 2100 rpm and 2000 psi	70-5
Pressure control valve	1700 - 1800 psi at 1900 engine rpm	70-5
Rockshaft lift cycle time (60 degrees rotation)	1.5 - 1.6 seconds at 2100 rpm	70-30
Check selective control valve and remote cylinder cycle time	Remote cylinder (2-1/2 x 8-in.) extends in 1.5 to 2.0 sec.	70-35

Hydraulic system pressures and flow rates are for conditions specified in Section 70 (tractor at operating temperature, transmission-hydraulic oil at correct temperature, proper test equipment, correct test sequence, etc.)

Group 20 LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated lubrication instructions are included in the operator's manual furnished with your customer's machine. Remind him to follow these instructions.

For your convenience, the following chart shows capacities and types of lubricants for the tractor components and systems. Specifications for lubricants follow the chart.

Item	Capacity	Type of Lubricant	Interval of Service
Engine crankcase	6 U.S. quarts (including filter)	See page 20-2	10 Hours—Check 100 Hours—Drain and re-fill 200 Hours—Change filter
Transmission and hydraulic system	10 U.S. gals.	JD303 Special-Purpose Oil (or its equivalent)	50 Hours—Check 50 Hours—Change filter (end of initial break-in) 500 Hours—Change filter 1000 Hours—Drain and re-fill. Clean screen.
Clutch throwout bearing (without reverser)	2 strokes	High temperature grease	200 Hours
Belt pulley	2-1/2 pts.	JD303 Special-Purpose Oil (or its equivalent) or SAE 80 multipurpose lubricant	200 Hours—Check 500 Hours—Drain, flush and refill
Grease fittings	.....	SAE multipurpose-type lubricant	See Operator's manual
Distributor cam	Trace	Cam lubricant or high temperature grease	500 Hours
Starter	Saturate wicks	SAE 10W engine crankcase oil	1000 Hours
	Lubricate armature shaft splines during assembly	SAE 10W engine crankcase oil	.....

ENGINE LUBRICATING OILS

Oil Recommendations



X2227

We recommend John Deere Torq-Gard engine oil for use in the engine crankcase. Torq-Gard was compounded specifically for use in John Deere engines and provides superior lubrication under all conditions for diesel or gasoline engines. NEVER PUT ADDITIVES IN THE CRANKCASE. Torq-Gard oil was formulated to provide all the protection your engine needs. Additives could reduce this protection rather than help it.

If oil other than Torq-Gard is used, it must conform to the following specifications:

DIESEL ENGINES		GASOLINE ENGINES
Fuel Sulphur Content Less Than 0.5%	Fuel Sulphur Content More Than 0.5%	
MIL-L-2104B or API Service CC * DM	Series 3 (S-3) MIL-L-45199B API Service CD * DS	MIL-L-2104B or API Service CC * DM
Series 3 (S-3) MIL-L45199B API Service CD * DS		API Service SD * MS

* Denotes previous API designation.

NOTE: As further assurance of quality, use oil bearing the following statement on the container or words to the effect: "Passes Car Manufacturer's Tests."

Viscosity

Depending on the highest expected prevailing temperature for the fill period, use oil of viscosity as shown in the following chart.

NOTE: At temperatures below 32°F., a lighter viscosity oil is recommended to facilitate starting. If

starting is no problem, the heavier viscosity oil listed for a higher temperature range may be used.

Air Temp.	John Deere Torq-Gard Oil	Other Oils	
		Single Viscosity Oil	Multi-Viscosity Oil
Above 32°F.	SAE 30	SAE 30	Not recommended
-10°F. to 32°F.*	SAE 10W-20	SAE 10W	SAE 10W-30
Below -10°F.* *	SAE 5W-20	SAE 5W	SAE 5W-20

* SAE 5W-20 oil may be used to facilitate starting.
* * Some increase in oil consumption may be expected when SAE 5W-20 or SAE 5W oils are used. Check oil level more frequently.

Break-In Oil

Use Torq-Gard SAE 10W-20 oil for the first refill after a major engine overhaul.

TRANSMISSION-HYDRAULIC OIL

Use John Deere Type 303 Special-Purpose Oil or its equivalent in the transmission-hydraulic system. This special oil may be used in all weather conditions. Other types of oil will not give satisfactory service and may result in eventual damage.

MULTI-PURPOSE GEAR LUBRICANTS

Use SAE 80 or SAE 90 Multi-Purpose gear lubricant meeting API classification GL-1 in gear housings requiring this type of lubricant.

GREASES

Use John Deere Multi-Purpose lubricant or an equivalent SAE multipurpose-type grease for all grease fittings. Wheel bearing grease is recommended for front wheel bearings. Application of grease as instructed in the operator's manual will provide proper lubrication and will prevent bearing contamination.

STORING LUBRICANTS

Using contaminated lubricants will result in a short machine service life. Advise your customer to handle lubricants in clean containers. Tell him to store them in an area protected from dust, moisture and other contamination.