

7520 Tractor



TECHNICAL MANUAL 7520 Tractor

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7520 TRACTOR TECHNICAL MANUAL TM-1053 (Jan-72)

CONTENTS

SECTION 10 - GENERAL

- Group 5 - General Tractor Specifications
- Group 10 - Predelivery, Delivery, and After-Sale Services
- Group 15 - Tune-Up
- Group 20 - Lubrication
- Group 25 - Separation
- Group 30 - Torques and Special Tools

SECTION 20 - ENGINE

- Group 5 - General Information, Diagnosis, and Tests
- Group 10 - Cylinder Head, Valve Train, and Camshaft
- Group 15 - Cylinder Block, Liners, Pistons, and Rods
- Group 20 - Crankshaft, Main Bearings, and Flywheel
- Group 25 - Lubrication System
- Group 30 - Cooling System
- Group 35 - Specifications

SECTION 30 - FUEL SYSTEM

- Group 5 - Diagnosing Malfunctions
- Group 10 - Air Intake System
- Group 15 - Fuel Injection System
- Group 20 - Speed Control Adjustment
- Group 25 - Specifications

SECTION 40 - ELECTRICAL SYSTEM

- Group 5 - Information and Wiring Diagrams
- Group 10 - Motorola Charging Circuit
- Group 15 - Delcotron Charging Circuit
- Group 20 - Starting Circuit
- Group 25 - Lighting and Accessory Circuits
- Group 30 - Specifications

SECTION 50 - POWER TRAIN

- Group 5 - Clutch
- Group 10 - Torque Divider
- Group 15 - Syncro-Range Transmission
- Group 20 - Differentials
- Group 25 - Final Drives
- Group 30 - PTO
- Group 35 - Specifications

SECTION 60 - STEERING AND BRAKES

- Group 5 - General Information

SECTION 70 - HYDRAULIC SYSTEM

- Group 5 - General Information, Diagnosis, and Tests
- Group 10 - Main Reservoir, Filters, Valves, Oil Cooler, and Oil Reservoir
- Group 15 - Hydraulic Pumps
- Group 20 - Power Steering
- Group 25 - Power Brakes
- Group 30 - Selective Control Valve, Breakaway Couplers, and Remote Cylinders
- Group 35 - Specifications

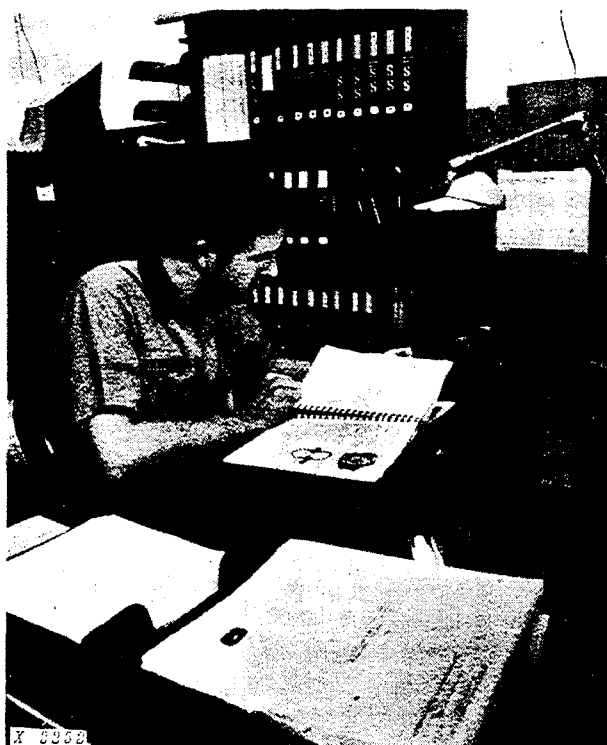
SECTION 80 - MISCELLANEOUS

- Group 5 - Hinge Assembly

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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 manual*
- *Exploded views showing parts relationship*
- *Photos showing service techniques*
- *Specifications grouped for easy reference*

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.



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.

Click on the image link below for the full version of the service manual



Section 10 GENERAL

CONTENTS OF THIS SECTION

	Page		Page
GROUP 5 - GENERAL TRACTOR SPECIFICATIONS	5-1	GROUP 25 - SEPARATION	
GROUP 10 - PREDELIVERY, DELIVERY, AND AFTER-SALE SERVICES		Removing Roll-Gard Cab	25-1
Predelivery Services	10-1	Installing Roll-Gard Cab	25-2
Delivery Services	10-3	Separating Engine from Clutch Housing	25-2
After-Sale Services	10-4	Separating Engine from Tractor Front End	25-4
GROUP 15 - TUNE-UP		Removing Engine	25-6
Preliminary Engine Testing	15-1	Removing Front Axle Assembly	25-7
Engine Tune-Up	15-1	Separating Transmission and Differential from Torque Divider	25-9
Engine Final Testing	15-3	Separating Torque Divider and Tractor Rear End from Hinge	25-10
Tractor Tune-Up	15-3	Separating Clutch Housing from Front Hinge	25-11
GROUP 20 - LUBRICATION		Removing Final Drive Assembly	25-12
Lubrication Chart	20-1	Group 30 - SPECIFICATIONS AND SPECIAL TOOLS	
Engine Lubricating Oils	20-2	Specifications	30-1
Transmission-Hydraulic Oil	20-2	Special Tools	30-2
Greases	20-2		
Storing Lubricants	20-2		

Group 5 GENERAL TRACTOR SPECIFICATIONS

HORSEPOWER:*
Maximum observed at PTO 175.82

ENGINE:
Type 6-cylinder, in-line, valve-in-head, diesel, turbocharged, and intercooled

Engine Speeds:
Slow idle 800 rpm
Working range 1500 to 2100 rpm
Maximum transport speed 2300 rpm
Bore and stroke 4-3/4 in. x 5 in.
Displacement 531 cu. in.
Compression ratio 15.4 to 1
Firing order 1-5-3-6-2-4
Valve clearance In.-0.018 in.
Ex.-0.028 in.

Injection pump timing 27° BTDC

* Official test at 2100 engine rpm.

LUBRICATION SYSTEM Force-feed pressurized with full-flow oil filter

Fuel System:
Type Direct injection
Injection pump type Multiple plunger, in-line
Air cleaner Dry type with safety element

Cooling System:
Type Pressurized with centrifugal pump
Temperature control ... 3 heavy-duty thermostats

Capacities:
Fuel tank 78 U.S. gals. each tank
Crankcase (with filter change) 26 U.S. qts.
Transmission-hydraulic system 19 U.S. gals.
Cooling system 40 U.S. qts.
Front differential 7 U.S. gals.

Transmission:

Type Syncro-Range, constant mesh
Clutch Heavy-duty, 13-1/2 in. dual
plate, hydraulic assist, foot operated
Gear selections 8 forward and 2 reverse
Shifting ... Two lever shifting, synchronized shift-
ing within stations, except reverse
gears; Optional "Hi-Lo" speed selec-
tor provides two speeds in each gear
for 16 forward and 4 reverse.

Ground Speeds (in miles per hour, 2100 engine
rpm)*

Gear	"Lo"	"Hi"
1st	2.08	2.39
2nd	3.33	3.82
3rd	4.39	5.04
4th	5.64	6.48
5th	7.02	8.07
6th	9.20	10.58
7th	11.91	13.70
8th	19.44	22.35
1st reverse	4.27	4.91
2nd	6.84	7.86

Electrical System:

Type 12-volt, negative grounded
Batteries Two, 6-volt, 87-plate, 204-ampere-
hour, 7D type, connected in series
Alternator 12-volt, with transistorized
regulator; 55 amp without air
conditioning; 72 amp with air
conditioning

* Ground speeds for tractors with standard 8-speed
transmission are the same as "Lo."

Power Take-Off:

Type Transmission-driven
Speed
1800 engine rpm in "Hi" 1000 rpm
2100 engine rpm in "Lo" or with
standard 8-speed transmission 1000 rpm
PTO ahead of drawbar hitch point 20 in.

Hydraulic System:

Type Closed center, constant pressure. In-
cludes power steering, power brakes,
implement control, and transmission and
differential lubrication
Standby pressure 2250 psi

Brakes Hydraulically power-actuated
disk-type operating in oil

Tires* * 23.1-30, 8-ply rating

Wheel Tread: See operator's
manual

Dimensions:

Wheel base 125 in.
Over-all length 220 in.
Over-all height 123 in.
-With air conditioner 131 in.

Over-all width 95-7/8 in.
-long-axle-114 in.

Turning radius (80-in. tread) 220 in.

Shipping Weight (With equipment for average
field service, less fuel and ballast) 16,790 lbs.

* * Additional tire sizes available

(Specifications and design subject to change without notice.)

Group 10 PREDELIVERY, DELIVERY AND AFTER-SALE SERVICE

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.

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

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 the portion of the customer's John Deere Delivery Receipt is completed.

NOTE: A Caplug is placed in the muffler outlet to prevent turbocharger rotation during transit. Remove Caplug before unloading tractor. Reinstall Caplug before transporting the tractor to the customer.

Temporary Tractor Storage

Service	Specification	Reference
Check radiator for coolant loss and antifreeze protection	Within 3/4-in. from bottom of filler neck.	.....
Reduce shipping pressure of tires ...	.....	Operator's manual
Cover tractor and tires for protection and cleanliness .....	.....	.....

Before Delivering Tractor

ELECTRICAL SYSTEM		
Install electrolyte and charge batteries .....	.....	FOS - 20 Manual
Date code battery warranty tag .....	.....	FOS - 20 Manual
Connect Motorola alternator. Do not attempt to polarize .....	.....	Section 40, Group 10
Install light switch knob .....	.....	.....
Clean terminals and connect battery cables .....	.....	Section 40, Group 5
Check alternator belt adjustment	1-inch deflection, 25 lb. force.	Operator's manual
COOLING SYSTEM		
Inspect radiator for coolant loss	Within 3/4-in. from bottom of filler neck.	.....
Check antifreeze protection .....	.....	.....

Before Delivering Tractor—Continued

Service	Specification	Reference
TIRES AND WHEELS		
Adjust pressure of tires .....	.....	Operator's manual
Check wheel rim clamp nuts, and wheel retainer cap screws for tightness	Retainer cap screws-300 ft-lbs Rim clamp nuts-170 ft-lbs .....	.....
Set front and rear wheel tread to a minimum of 80 in., and add at least 1,000 lb. ballast to each wheel for single wheel operation .....	.....	Operator's manual
Hillside operation—use double wheels only .....	.....	Operator's manual
LUBRICATION		
Check crankcase oil level	To upper marks on dipstick	Operator's manual
Check transmission-hydraulic sys- tem oil level	To top of "SAFE" range on dipstick. Type 303 Special- Purpose Oil	Operator's manual
Check front differential oil level	To level of filler plug opening. Type 303 Special-Purpose Oil. ...	Operator's manual
Lubricate grease fittings	John Deere Multipurpose Lubricant	Operator's manual
ENGINE		
Check air cleaner .....	.....	Operator's manual
Fill fuel tank and start engine	Capacity - 78 U.S. gallons each tank	Operator's manual
Check operation of starter, alterna- tor, flasher, gauges, and indicator lights .....	.....	Operator's manual
Check engine timing	27° BTDC	Section 30, Group 15
Check engine speeds	800 rpm, slow idle speed 2300 rpm fast idle speed and max. transport speed	Section 30, Group 15

Before Delivering Tractor—Continued

Service	Specification	Reference
OPERATION		
Check transmission clutch free travel	Approximately 1-11/16 inches free travel (engine at fast idle)	Operator's manual
Shift transmission through all Speeds		Operator's manual
Check throttle linkage for free operation		Section 30, Group 20
Adjust headlights and check operation		Operator's manual
Check power takeoff operation		Operator's manual
Check brakes and accumulator	3 in. maximum travel when brakes have been bled, and accumulator is working properly.	Operator's manual
Check air conditioning, heater, and pressurizer operation		Operator's manual
Check hydraulic system operation; steering, rockshaft, and remote cylinder		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.

Many complaints have arisen simply because the owner was not shown how to operate and service his new tractor properly. Spend enough time, at the customer's convenience, to introduce the owner to his new tractor and explain to him how to operate and service it properly.

IMPORTANT: Install Caplug in muffler outlet if transporting tractor to customer. This will prevent damage to the turbocharger caused by air passing through the turbocharger and rotating it without lubrication when the engine is stopped.

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.
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	Within 3/4-in. from bottom of filler neck.	.....
Clean external surface of radiator core .....	.....	.....
Check hoses and connections for leaks .....	.....	.....
FUEL SYSTEM		
Remove water and foreign matter from filter sediment bowl .....	.....	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 batteries ...	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	1-inch deflection with a 25-pound force	Operator's manual

Inspection Procedure—Continued

Service	Specification	Reference
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 front differential oil level	To level with filler plug opening Use John Deere Type 303 Special-Purpose Oil	Operator's manual
ENGINE		
Check valve clearance	Intake: 0.018-inch	Operator's manual
	Exhaust: 0.028-inch	
Check engine speed under load, fuel consumption, and horsepower	Specification	Group 15 of this Section.
TRACTOR AND POWER TRAIN		
Check transmission clutch free travel	Approximately 1-11/16 inches free travel (engine at fast idle)	Operator's manual
Shift transmission through all speeds .....	.....	Operator's manual
Check power steering	Smooth, easy operation	Section 70, Group 20
Check brakes and accumulator	3 inches maximum brake travel when brakes have been bled and accumulator is working properly.	Operator's manual

Inspection Procedure—Continued

Service	Specification	Reference
HYDRAULIC SYSTEM		
Check rockshaft and remote cylinder operation		Section 70, Group 30
Reverse signal lockout		Section 70, Group 30
Check entire tractor for leaks. Inspect drive shafts, hydraulic system pipes and hoses, and check tractor cab controls for proper operation		Operator's manual
NUTS AND CAP SCREWS		
Tighten accessible nuts and cap screws that seem to require adjustment		

TORQUE CHART (ft-lbs)

			
Bolt Diameter	Plain Head*	Three Radial Dashes*	Six Radial Dashes*
1/4	6	10	14
5/16	13	20	30
3/8	23	35	50
7/16	35	55	80
1/2	55	85	120
9/16	75	130	175
5/8	105	170	240
3/4	185	300	425
7/8	160* *	445	685
1	250* *	670	1030

* The types of bolts and cap screws are identified by head markings as follows:

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

* * Machine bolts and cap screws 7/8-inch and larger are sometimes formed hot rather than cold, which accounts for the lower torque.

Group 15

TUNE-UP

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 condi-

tion 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 2100 engine rpm full load) . . .	Compare with previous recorded output; compare with output after tune-up	FOS - 30 Manual, Chapter 12
Compression Test	330-380 at 200-250 rpm	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		FOS - 30 Manual, Chapter 12
Normal reading, inches of water (with clean filter elements) . .	16 in. at 2100 rpm (full load)	
Maximum permitted reading . .	25 in. at 2100 rpm (full load)	
Check restriction indicator light operation	24-26 in. at 2100 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

Engine Tune-up—Continued

Operation	Specification	Section-Group Reference
Crankcase Ventilating System Check system for restrictions . . .	.....	FOS - 30 Manual, Chapter 12
Cooling System Clean grill screen, radiator core, and oil cooler core . . . . .	.....	20-30
Clean and flush system; check thermostat . . . . .	.....	20-30
Check pressure cap	6.25 to 7.50 psi release pressure . . .	20-30
Cylinder Head and Valves Torque cylinder head cap screws	180 ft-lbs. in sequence	20-10
Set valve clearance	Intake: 0.018-in. Exhaust: 0.028-in.	20-10
Diesel Fuel System Check fuel tank for water . . . . .	.....	30-15
Check fuel pump pressure	Approx. 20 psi	30-15
Change filter . . . . .	.....	30-15
Injection Pump: Service and check timing	27° BTDC	30-15
Adjust throttle linkage	2300 rpm fast idle speed (hand throttle and foot throttle) 800 rpm slow idle speed	30-20 30-20
Lubrication system Check engine oil pressure	40 - 50 psi (2100 rpm)	20-25
Charging System Check battery specific gravity . . .	1.240 - 1.260	40-10
Check battery water consump- tion and electrolyte level . . . . .	.....	40-10
Clean battery, cables, and box . . .	.....	40-10
Check alternator belt tension . . .	25 lbs. at 1-in. belt deflection	40-10
Check alternator output	50 amps (2000 engine rpm). On air conditioned tractors, 65 amps (2000 engine rpm)	40-10
Check alternator regulated voltage	14.1 - 14.7 volts (operating)	40-10

Engine Tune-up—Continued

Operation	Specification	Section-Group Reference
Starting System		
Check start-safety switch operation .....	.....	40-15
Check battery voltage when starting	Min. 9 volts (cranking)	40-15
Check starter current draw	Approx. 525 amps	40-15
Check operation of alternator and oil pressure indicator lights .....	.....	40-25

Final Engine Test

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2100 engine rpm)	Compare with previous recorded output; record for future use	FOS - 30 Manual - ENGINES, Chapter 12

Tractor Tune-up

Operation	Specification	Section-Group Reference
Adjust transmission clutch free travel	1-11/16-in. (engine at fast idle)	50-5
Transmission		
Check shifting .....	.....	50-10 & 15
Check for proper operation without excessive noise .....	.....	50-15
Power Take-Off		
Check for proper operation without excessive noise .....	.....	50-30
Check brake pedal travel and even position	3-inch maximum travel with brakes bled and with accumulator working properly	70-25
Check tire inflation	See operator's manual	...
Transmission pump	9 gpm at 1900 rpm (in "Lo" or with 8-speed transmission)	70-5
Main hydraulic pump	Standby - 2200 - 2300 psi Capacity - 21 gpm (2000 psi and 1800 rpm)	70-5
Pressure control valve	1650 - 1700 psi at 800 rpm (approximately 5 gpm flow)	70-5
Selective control valve	2 to 20 gpm at 1200 psi and 1900 rpm	70-5

Tractor Tune-up—Continued

Operation	Specification	Section-Group Reference
Rockshaft:		
Lift cycle time (75 degrees rotation)	2.4 - 2.7 seconds at 1900 rpm	70-5
Maximum oil flow	12.5 gpm at 2000 psi and 1900 rpm	70-5
Lever position (depth control) ...	Complete raise with lever rear edge 1/32- to 1/16-inch from rear of slot	70-30
Lever position (load control)	Begins to raise when rear edge of lever is at "O" on quadrant	70-30
Reverse signal lockout .....	.....	70-30

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

Group 20 LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated instructions are included in the tractor operator's manual. Remind your customer to follow the recommendations in these instructions.

For your convenience when servicing the tractor, the following chart showing capacities and type of lubricant for the various components has been included. Additional lubrication information is on page 20-2.

Component	Capacity	Type of Lubricant	Interval of Service
Engine Crankcase	26 U.S. quarts (Includes filter)	See "Engine Lubricating Oils" on page 20-2	10 Hours - Check level 100 Hours - Change oil 200 Hours - Replace filter
Transmission and Hydraulic system	22 U.S. gallons (dry system) 19 U.S. gallons at service intervals	John Deere Type 303 Special-Purpose Oil	200 Hours - Check level 600 Hours - Replace filter 1200 Hours - Change oil
Front differential	7 U.S. gallons	John Deere Type 303 Special-Purpose Oil	1200 Hours - Change oil
Grease Fittings	.....	John Deere Multi- purpose Lubricant	See Operator's Manual

LUBRICANTS

Engine Lubricating Oils



We recommend John Deere Torq-Gard or Torq-Gard Supreme Engine Oil for use in the engine crankcase. These oils are compounded specifically for use in John Deere engines and provide superior lubrication under all conditions. NEVER PUT ADDITIVES IN THE CRANKCASE. Torq-Gard oils are formulated to provide all the protection this engine needs. Additives could reduce this protection rather than help it.

If Torq-Gard or Torq-Gard Supreme is not used, use an engine oil that conforms to one of the following specifications:

SINGLE VISCOSITY OILS

API Service CD/SD
MIL-L-2104C
Series 3*

MULTI-VISCOSITY OILS

API Service CC/SE, CC/SD, or SD
MIL-L-46152

* As further assurance of quality, the oil should also be identified as suitable for API service designation SD.

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

Air Temperature	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 where required to insure optimum lubrication at starting, particularly for an engine subjected to -10°F. or lower for several hours.

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

Transmission Hydraulic Oils

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

Greases

John Deere Multi-Purpose Lubricant or an equivalent SAE Multipurpose-Type grease is recommended for grease fittings. Application of grease as instructed in the lubrication section of the operator's manual will provide proper lubrication and will keep contamination out of bearings.

Storing Lubricants

A tractor can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination.