



5020 Tractor



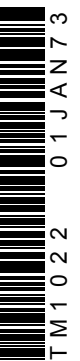
TECHNICAL MANUAL

5020
Tractor

TM1022 (01JAN73) English

**John Deere Tractor
TM1022 (01JAN73)**

LITHO IN U.S.A.
ENGLISH



5020 TRACTOR TECHNICAL MANUAL TM-1022 (JAN-73)

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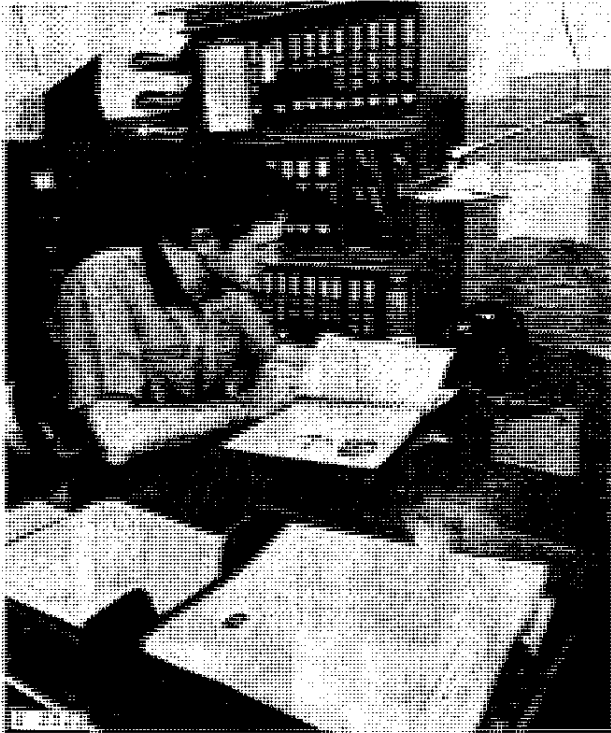
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INTRODUCTION



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 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.

Section 10 GENERAL

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Group 5

GENERAL TRACTOR SPECIFICATIONS

PTO HORSEPOWER (Official Test): 141.34 hp.

ENGINE:

Type . . . 6-cylinder, in-line, valve-in-head
 Bore and stroke 4-3/4 in. x 5 in.
 Displacement 531 cu. in.
 Compression ratio 16.5 to 1
 Firing order 1-5-3-6-2-4
 Valve clearance Intake-0.018 in.
 Exhaust-0.028 in.
 Injection pump timing TDC
 Engine Speeds:
 Slow idle 800 rpm
 Working range 1500 to 2200 rpm
 Maximum transport speed 2500 rpm

LUBRICATION SYSTEM: . . Full pressurized with full-flow micronic oil filter, water cooled oil cooler, and bypass valves for filter and cooler

FUEL SYSTEM:

Type Direct injection
 Filters Two-stage with replaceable impregnated paper elements
 Injection pump type Inlet metering, distributing type
 Air cleaner Dry type

COOLING SYSTEM:

Type . . . Pressurized with centrifugal pump, engine temperature control, two heavy-duty thermostats

CAPACITIES:

Fuel tank 68 U.S. gals.
 Crankcase (with filter change) . 20 U.S. qts.
 Transmission-hydraulic system 16 U.S. gals.
 Cooling system (add 2 qts. for
 cab heater) 33 U.S. qts.

TRANSMISSION:

Type Syncro-Range, constant mesh
 Clutch Heavy-duty, two 12 in. plate,
 foot operated
 Gear selections . . . 8 forward and 2 reverse
 Shifting 4 stations, synchronized
 shifting within stations

POWER TAKE-OFF:

Type Independent, rear
 Clutch Wet disk, hydraulically actuated
 Speed (1900 engine rpm) 1010 rpm
 PTO ahead of drawbar hitch point . . 16 in.

HYDRAULIC SYSTEM:

Type Closed center, constant pressure.
 Includes power steering, power
 brakes and implement control
 Standby pressure 2250 psi

BRAKES Hydraulically power actuated,
 disk-type operating in oil
 Provision for manual operation
 with brake accumulator to supply oil

STEERING Full power, hydrostatic type
 Provision for manual operation

ELECTRICAL SYSTEM:

Type 12-volt, negative ground
 Batteries Two 6-volt, 87-plate, 204
 ampere-hour group 6T3A,
 tractor-type, connected in series
 Alternator 12-volt, 55-amp, with
 integral transistorized regulator
 Tractors with air
 conditioned cabs, 12-volt, 72-amp, with
 integral or separate regulator (depending
 on serial number)

FRONT TIRES:*

Standard 11.00-16, 8-ply
 Row-Crop 9.50-20, 8-ply

REAR TIRES:*

Standard 24.5-32, 10-ply
 Row-Crop 18.4-38, 12-ply

FRONT WHEEL TREAD:

Fixed tread 69 or 71 in.
 Adjustable tread (11.00-16 tires). 68 to 80 in.

REAR WHEEL TREAD:

Standard:
 24.5-32 tire 70 to 82 in.
 18.4-34 tire (dual) 68 and 112 in.
 18.4-38 tire (dual) 65 to 120 in.
 Row-Crop:
 18.4-38 tire 60 to 120 in.
 24.5-32 tire 70 to 112 in.

GROUND SPEEDS IN MILES PER HOUR

(1900 engine rpm with 24.5-32 tires)
 1st 1.7
 2nd 2.6
 3rd 3.5
 4th 4.5
 5th 5.6
 6th 7.3
 7th 9.4
 8th 15.4
 1st reverse 3.4
 2nd reverse 5.4

DIMENSIONS:

Standard (Fixed tread front axle):
 Wheel base 104 in.
 Over-all length 172.3 in.
 **Over-all height 98.3 in.
 Height to steering wheel 82.4 in.
 Width Regular wheel, 95.8 in.
 Drawbar clearance 16 in.
 Turning radius 12 ft. 6 in.
 Row-Crop (81.5-inch tread front axle):
 Wheel base 102 to 106 in.
 Over-all length 172.3 in.
 **Over-all height 98.3 in.
 Height to steering wheel 82.4 in.
 Over-all width 108.4 in.
 Turning radius 13 ft.

SHIPPING WEIGHT (With equipment for
 average field service, less fuel and ballast).
 Add 575 lbs. if equipped with Roll-Gard.
 Standard 15,600 lbs.
 Row-Crop 14,480 lbs.

**Additional tire sizes available.*
***Tractors with Air Conditioned Cab
 and 20.8-38 tires 119.6 in.*
*Tractors with Cab and without
 Air Conditioning (20.8-38 tires) . . 117.6 in.*

(Specifications and design subject to change without notice.)

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.

Tractors shipped from the factory with the alternator completely disconnected require an AR47860 Auxiliary Ignition Battery Kit to supply power for the fuel shutoff solenoid. The adapter on the battery harness kit plugs into the cigar lighter. Be sure to read the instructions at-

tached to the tractor before starting the engine.

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.

TEMPORARY TRACTOR STORAGE

Service	Specifications	Reference
Check radiator for coolant loss and antifreeze protection.	1-1/2 inches above baffle.	. . . . .
Reduce shipping pressure of tires. . .	. . . . .	Operator's manual
Cover tractor and tires for protection and cleanliness. . . . .	. . . . .	. . . . .

BEFORE DELIVERING TRACTOR

<u>Electrical System</u>		
Install electrolyte and charge batteries. . . . .	. . . . .	FOS-20
Punch date code on battery tag. . . . .	. . . . .	. . . . .
Connect 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, 20 lb. force. .	Operator's manual

BEFORE DELIVERING TRACTOR—Continued

Service	Specifications	Reference
<u>Cooling System</u>		
Inspect radiator for coolant loss. . . .	1-1/2 inches above baffle. . . . .	. . . . .
Check antifreeze protection. . . . .	. . . . .	. . . . .
<u>Tires and Wheels</u>		
Adjust pressure of tires. . . . .	. . . . .	Operator's manual
Check front wheel hub bolts, rear wheel rim clamp nuts, and rear wheel retainer cap screws for tightness.	Front hub bolts - 100 ft-lbs Rear hub bolts - 300 ft-lbs Rim clamp nuts - 170 ft-lbs	. . . . .
<u>Lubrication</u>		
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
<u>Engine</u>		
Check air cleaner. . . . .	. . . . .	Operator's manual
Fill fuel tank and start engine.	Capacity - 68 U.S. gallons . . .	Operator's manual
Check operation of gauges and indicator lamps. . . . .	. . . . .	Operator's manual
Check speed control linkage for free operation. . . . .	. . . . .	Section 30, Group 10
Check engine idle speeds. . . . .	. . . . .	Section 30, Group 10
<u>Operation</u>		
Shift transmission through all speeds. . . . .	. . . . .	Operator's manual
Check transmission clutch operation.	Clutch pedal free travel should be 1-1/2 inches.	Operator's manual
Check power take-off operation. . . . .	. . . . .	Operator's manual
Check differential lock operation. . . . .	. . . . .	Operator's manual
Check hydraulic system operation: Rockshaft, steering, remote cylinder, and brakes. . . . .	. . . . .	Operator's manual

BEFORE DELIVERING TRACTOR—Continued

Service	Specifications	Reference
Check 3-point hitch operation.	Operator's manual
Check seat operation	Operator's manual
Check cab pressurizer and wind- shield wiper operation, air conditioner and heater system operation (if equipped)	Operator's manual
Adjust headlights and check operation.	Operator's manual
<u>General</u>		
Adjust air conditioner drive belt tension.	1-inch deflection, 25 lb. force. .	Operator's manual
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. 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.
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 at some mutually agreeable time 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 customer's 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 needless 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 sale of other new equipment.

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

INSPECTION PROCEDURE

Service	Specifications	Reference
<u>Cooling System</u>		
Check radiator coolant level.	1-1/2 inches above baffle. . . . .	. . . . .
Clean external surface of radiator core. . . . .	. . . . .	. . . . .
Check hoses and connections for leaks. . . . .	. . . . .	. . . . .
<u>Fuel System</u>		
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 clean it if necessary. . . . .	. . . . .	Operator's manual
<u>Electrical System</u>		
Check specific gravity and electrolyte level of batteries.	Full charge - 1.260 at 80° F.	Operator's manual
Check belt tension.	1-inch deflection with a 20-pound force.	Operator's manual
Start engine and check operation of starter, lights, and indicator lamps . . . . .	. . . . .	Operator's manual

INSPECTION PROCEDURE—Continued

Service	Specifications	Reference
<u>Lubrication</u>		
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
<u>Engine</u>		
Check valve clearance.	Intake - 0.018 inch. Exhaust - 0.028 inch.	Operator's manual
Check engine speed under load, fuel consumption, and horsepower.	Specification.	Group 15 of this Section
<u>Clutches and Differential Lock</u>		
Check transmission clutch free travel	Approximately 1-1/2-inch free travel.	Operator's manual
Check PTO clutch and brake operation. ....	.....	Section 50, Groups 35 and 40
Check differential lock operation. ...	.....	Operator's manual
<u>Hydraulic System</u>		
Check rockshaft and remote cylinder operation. ....	.....	Operator's manual
Check power steering.	Smooth, easy operation.	Section 70, Group 20
Check power brakes and accumulator.	The accumulator should supply oil to each brake for at least 20 applications at 5 second intervals after the engine has been stopped for 15 minutes, when applied individually.	Operator's manual
<u>Cab</u>		
Check operation of cab controls. ....	.....	Operator's manual
Check air conditioning compressor drive belt tension.	1-inch deflection, 25-lb force..	Operator's manual
<u>Nuts and Cap Screws</u>		
Tighten accessible nuts and cap screws that 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 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 - 2200 engine rpm or 1170 PTO rpm	Compare with previous recorded output record and compare with output after tune-up	FOS 30 Manual, Chapter 12
Compression Test	375 - 400 psi at cranking speed	FOS 30 Manual, Chapter 12
Vapor Flow Test (average engine condition)— Conduct compression test if blowby is excessive.	Normal Blowby - 100 to 170 cu. ft./hr. Excessive Blowby - 300 cu. ft./hr.	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

Air Intake System		
Service air cleaner and check system for leaks	.....	FOS 30 Manual, Chapter 12
Check system for restrictions using water manometer (inches of water)	.....	FOS 30 Manual, Chapter 12
Normal reading (with clean filter elements)	12-14 in. at 2200 rpm	.....
Maximum permitted reading	25 in. at 2200 rpm	.....
Check restriction indicator light operation	24-26 in. at 2200 rpm	.....
Exhaust System		
Check system for leaks	.....	FOS 30 Manual, Chapter 12
Check for restricted muffler or exhaust pipe	.....	FOS 30 Manual, Chapter 12
Crankcase Ventilating System		
Check system for restrictions	.....	FOS 30 Manual, Chapter 12
Cooling System		
Clean grille 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

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Cylinder Head and Valves	180 ft-lbs in sequence	20-10
Torque cap screws	Intake, 0.018 in.	
Set valve clearance	Exhaust, 0.028 in.	20-10
Diesel Fuel System:		
Check fuel tank for water . . . . .	.....	30-10
Check fuel pump pressure	3-1/2 to 4-1/2 psi	30-10
Clean sediment bowls and change filter . . . . .	.....	30-10
Service injection nozzles . . . . .	.....	30-10
Injection Pump (AR46386):		
Service and check timing	TDC	30-10
	2° advance at 1300 rpm (no load);	
	5° ± 1/2° advance at 2500 rpm (no	
	load); 4° advance at 1900 rpm (full	
	load); 5° ± 1/2° advance by 2500	30-10
	rpm (full load)	
Adjust throttle linkage (PTO shaft		
speeds given in parentheses)	Hand - 2150 (1144) rpm idle speed, 1900	
	load speed	
	Hand - 800 (426) rpm slow idle speed	
	Hand - 2400 (1277) rpm idle speed, 2200	
	load speed	
	Foot - 2650 (1410) rpm idle speed, 2500	
	load speed	30-10
Check engine oil pressure	25 - 35 psi (1900 rpm)	20-25
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 lbs. at 1 in. belt deflection	40-10
Check alternator output	55 amp alternator - 45 amps at	
	1440 engine rpm and 13 to 15 volts	
	72 amp alternator - 65 amps at	
	1400 engine rpm and 13 to 15 volts	40-10
Check alternator regulated voltage.	14.2 - 14.6 volts (operating)	40-10
Starting System:		
Check start-safety switch operation . . . . .	.....	40-15
Check starter current draw	Approximately 525 amps	40-15
Check battery voltage when starting	Min. 9 volts (cranking)	40-15
Check operation of alternator, oil		
pressure and indicator lights . . . . .	.....	40-20

FINAL ENGINE TESTING

Dynamometer	Compare with previous recorded output and file for future reference.	20-5
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TRACTOR TUNE-UP

Operation	Specification	Section-Group Reference
Adjust transmission clutch free travel . . .	1-1/2 in.	50-5
Transmission:		
Check shifting . . . . .	. . . . .	50-10 & 20
Check for proper operation without excessive noise . . . . .	. . . . .	50-10 & 20
Power Take-Off:		
Check engagement feel . . . . .	. . . . .	50-25
Check for excessive noise . . . . .	. . . . .	50-25
Check differential lock operation	420 - 525 psi	50-15
Check brake pedal travel and even position.	3 inches maximum pedal travel for 20 applications (each brake pedal) at 5 second intervals, when applied individually	70-25
Check front wheel bearing adjustment and lubrication	35 ft-lbs, loosen to hole	. . . .
Check front wheel toe-in	1/8 - 3/8 in.	. . . .
Check tire inflation . . . . .	. . . . .	. . . .
<i>Hydraulic system pressures, flow rates, or cycle times are for conditions specified in Section 70 (tractor at operating temperature, transmission-hydraulic oil at 140°F. to 160°F., proper test equipment, correct test sequence, etc.).</i>		
Transmission pump	5 gpm minimum at 1900 engine rpm	70-5
Main hydraulic pump	2200 - 2300 psi (standby) 22 gpm at 2000 psi and 1900 rpm	70-5
Pressure control valve	1650 - 1700 psi at 800 rpm (approximately 10 gpm flow)	70-5
Rockshaft:		
Lift cycle time (75 degrees rotation) . . .	2.7 - 3.0 seconds at 1900 rpm	70-30
Lever position (depth control)	Full raise (lever leading edge at 0 on quadrant)	70-30
Lever position (load control)	Complete raise (control lever leading edge at 1-1/2 on quadrant)	70-30
	Complete lower (control lever leading edge at 2-1/2 on quadrant)	70-30
Selective control valve	3 to 18 gpm at 1200 psi and 1900 rpm	70-35

10 General
15-4 Tune-Up

Tractors - 5020
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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, 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	20 U.S. quarts (includes filter)	See "Engine Lubricating Oil" on page 20-2	10 Hours - Check level 100 Hours - Change oil 200 Hours - Replace filter
Transmission and Hydraulic System	16 U.S. gallons	John Deere Type 303 Special-Purpose Oil	200 Hours - Check level 600 Hours - Replace filter 1200 Hours - Change oil
Front Wheel Bearings	.....	Wheel Bearing Grease	1200 Hours - Repack bearings
Grease Fittings	.....	John Deere Multi-Purpose Lubricant or its equivalent	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-L2104C
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.