

# John Deere 644-B Loader



JOHN DEERE

## TECHNICAL MANUAL John Deere 644-B Loader

TM1095 (01AUG78) English

John Deere Davenport Works  
TM1095 (01AUG78)

LITHO IN U.S.A.  
ENGLISH



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TM-1095 (Aug-78)****CONTENTS**

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*The specifications and design information contained in this manual were correct at the time this machine was manufactured. It is John Deere's policy to continually improve and update our machines. Therefore, the specifications and design information are subject to change without notice. Wherever applicable, specifications and design information are in accordance with SAE and IEMC standards.*

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## INTRODUCTION



*Use FOS Manuals for Reference*

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

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

### •FOS Manuals—for reference

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



When a service technician 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.

### •Technical Manuals—for actual service

*Technical Manuals* are concise service guides for a specific machine. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.



*Use Technical Manuals for Actual Service*

This technical manual was planned and written for you an experienced service technician. 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.


Some features of this manual:

- Inside front cover - "Table of Contents" and "Maintenance Without Accident".
- Section 10 - General specifications and services.
- Sections 20 through 60 - Removal, repair, testing (components removed), installation, and adjustment.
- Section 70 - Detailed explanation of system operation, diagnosis, visual inspection, testing, and adjustments.
- Specifications grouped and illustrated at the end of each section.

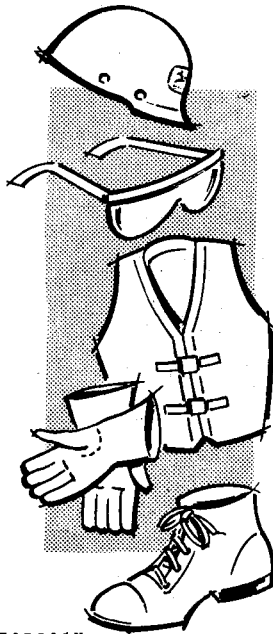
## MAINTENANCE WITHOUT ACCIDENT WORK SAFELY



T27999

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

**EVERY EMPLOYER HAS A  
SAFETY PROGRAM. KNOW  
WHAT IT IS!**



T27501N

Consult your shop foreman for specific instructions on a job, and the safety equipment required.

For instance, you may need: Hard hat, safety shoes, safety goggles, heavy gloves, reflector vests, ear protectors, respirators.

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T27502N

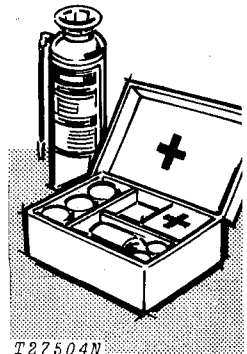
**ALWAYS AVOID** loose clothing or any accessory—flopping cuffs, dangling neckties and scarves, or rings and wrist watches—that can catch in moving parts and put you out of work.



T32701N

### BE ALERT!

Plan ahead — work safely — avoid accidental damage and injury. If a careless moment does cause an accident or fire, react quickly with the tools and skills at hand — know how to use a first aid kit and a fire extinguisher — and where to get aid and assistance. In an emergency, split-second action is the key to safety.



T27504N

## MAINTENANCE WITHOUT ACCIDENT

Specific safety procedures should always be observed, whether servicing the equipment or making the repairs. Remembering these—in time!—can prevent an injury... or save your life....

### AVOID FIRE HAZARDS—

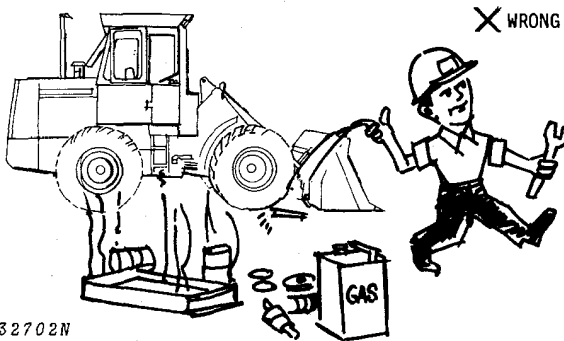
#### Fuel Is Dangerous!

Don't smoke while refueling.

Don't smoke while handling highly flammable material.

Engine should be shut off when refueling.

Use care in refueling if the engine is hot.



T32702N

Don't use open pans of gasoline or diesel fuel for cleaning parts. Good commercial, nonflammable solvents are preferred.

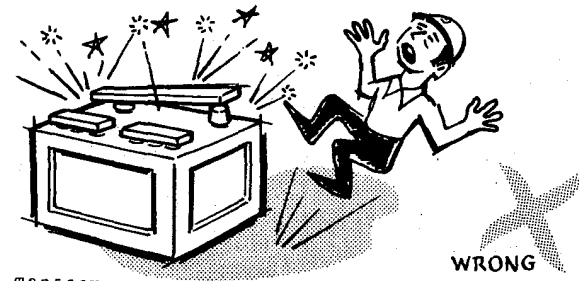
#### Flame Is Not a Flashlight!

Never check fuel, battery electrolyte or coolant levels with an open flame.

Never use an open flame to look for leaks anywhere on the equipment.

Never use an open flame as a light anywhere on or around the equipment.

#### Know Where Fire Extinguishers Are Kept!



T27508N

#### Battery Gas Is Highly Flammable!

Provide adequate ventilation when charging batteries.

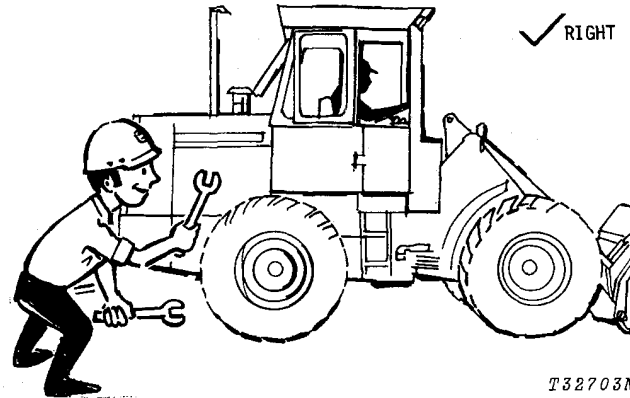
Don't check battery charge by placing metal objects across the posts.

Don't allow sparks or open flame near batteries.

Don't smoke near battery.

### UNDER ALL MAINTENANCE CONDITIONS—

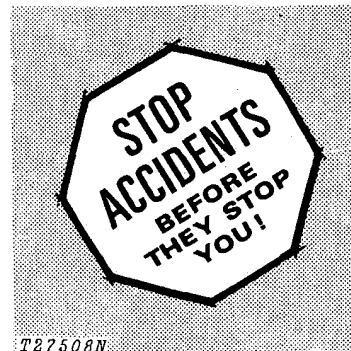
Do not perform any work on the equipment unless authorized to do so. Then be sure you follow recommended procedures.



T32703N

Never service the equipment while it is being operated.

Avoid working on equipment with the engine running. If it is necessary to make checks with the engine running. **ALWAYS USE TWO TECHNICIANS**—one, the operator, at the controls, the other checking where the operator can see. Also, put the transmission in neutral, set the parking brake, and apply any safety locks provided. **KEEP HANDS AWAY FROM MOVING PARTS.**

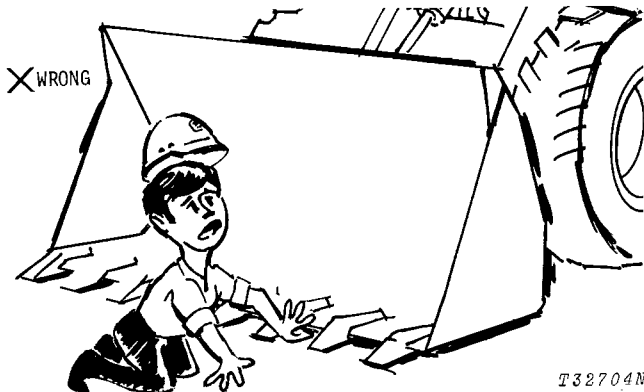


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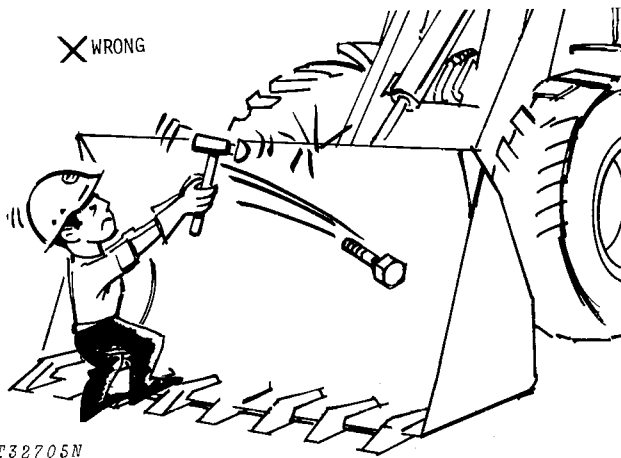
## MAINTENANCE WITHOUT ACCIDENT

Before servicing, adjusting, or repairing loaders which have attachments such as log and lumber forks, buckets, etc. —**LOWER** attachments to the ground— or, if necessary to raise them for access to certain parts, **SECURELY SUPPORT** by external means. **DO NOT** rely on controls to support or position attachments for maintenance.

Never allow **ANYONE** to walk under equipment that is raised and not properly blocked.



Avoid working directly under raised and blocked equipment unless absolutely necessary.



Wear safety glasses when drilling, grinding, or hammering metal.

If the machine is on an incline, block it securely.

Use hoisting equipment for lifting heavy parts. **TAKE CARE! WATCH OUT FOR OTHER PEOPLE IN THE VICINITY.**

Use extreme caution in removing radiator caps, drain plugs, grease fittings, or hydraulic pressure caps.

Make sure the maintenance area is adequately vented.

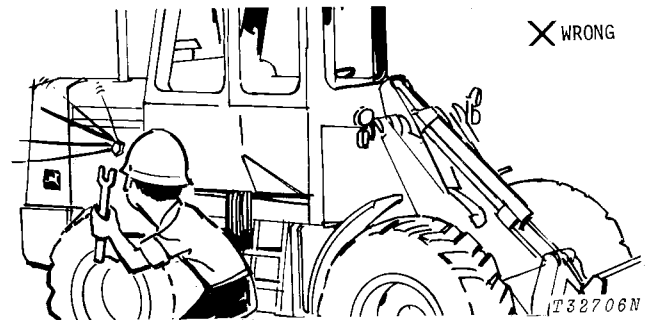
Keep maintenance area **CLEAN AND DRY**. Oily and wet floors are slippery; greasy rags are a fire hazard; wet spots are dangerous when working with electrical equipment.

Store starting aids in a cool and well-ventilated place, out of the reach of unauthorized personnel.

## SERVICING PRECAUTIONS

Stop the engine before cleaning or lubricating the equipment.

Lower mounted equipment and tools to the ground *carefully*.



Engine coolant gets hot! Don't remove the radiator cap until coolant temperature is below the boiling point. Then turn cap slightly to relieve pressure before removing.

Exhaust gases are dangerous! Periodically check exhaust system for excessive leakage.

Don't forget a hydraulic system may be pressurized! To relieve pressure, follow the technical manual.

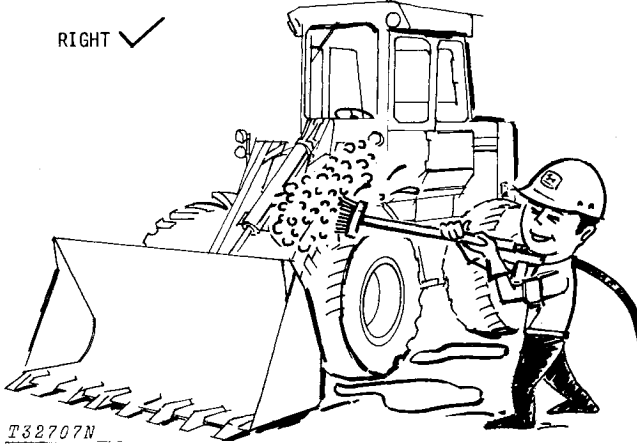
The loader is equipped with a hydraulic accumulator—recharge by using only dry nitrogen. Again follow the technical manual for procedure.

When checking hydraulic pressure, be sure to use the correct test gauge for the pressure in the particular system.

## MAINTENANCE WITHOUT ACCIDENT

When preparing engine for storage, remember that inhibitor is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.

RIGHT ✓



T32707N

Keep ALL equipment free of dirt and oil. This attention will minimize fire hazards and facilitate spotting of loose or defective parts.

### ADJUSTING PRECAUTIONS

.... for Operating Adjustments

Keep clutch and brake control units properly adjusted at all times. Before making adjustments, stop engine.

X WRONG



T32708N

Before removing any housing covers, stop engine. Take all objects from your pockets which could fall into the opened housings. Don't let adjusting wrenches fall into opened housings.

.... for Maintenance Adjustments

X WRONG



T32709N

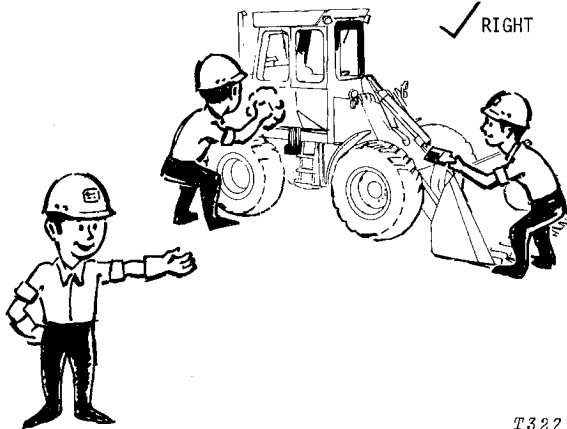
Don't attempt to check belt tension while the engine is running.

Don't adjust the fuel system while the machine is in motion.

## MAINTENANCE WITHOUT ACCIDENT

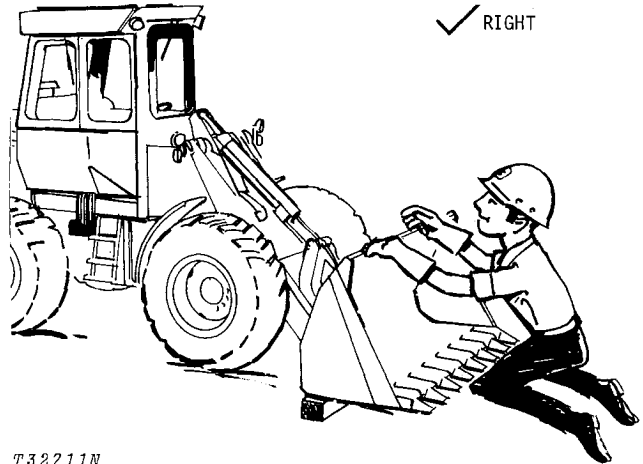
### PRECAUTIONS DURING REPAIR

Before working on hydraulic systems—make sure engine is not running and the system pressure is relieved by working the control levers, steering wheel and brakes in all directions with the engine shut off.



T32710N

Before repairing the electrical system, or performing a major overhaul, make sure the batteries are disconnected.



T32711N

When changing cutting edges on bucket—  
Stop the engine and securely block the bucket.  
Never let your bare hands come in contact with the sharp edges. WEAR GLOVES.



T27508N



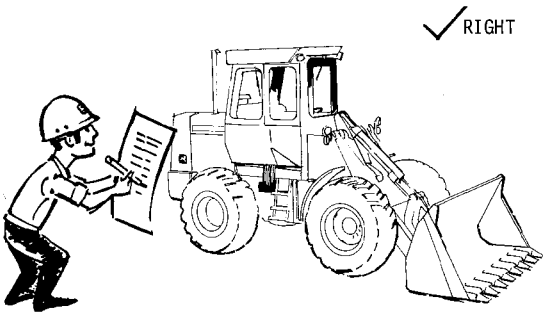
## MAINTENANCE WITHOUT ACCIDENT

### KNOW EQUIPMENT IS READY!

Check guards, canopies, safety bars—all protective devices installed on the loader. Every one should be in place and secure.

### CHECK IT OUT!

- GUARDS
- CANOPIES
- SHIELDS
- PROTECTIVE DEVICES
- ROLL-OVER PROTECTIVE STRUCTURES
- SEAT BELTS, ETC.

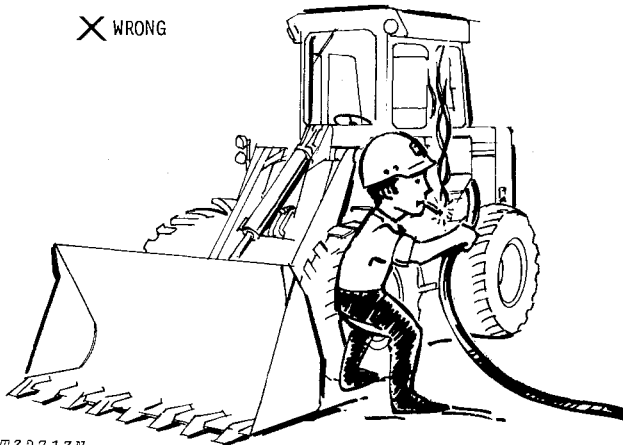


T32712N

Carefully inspect equipment for visual defects—leaks in fuel, lubrication, and hydraulic systems. Do not search for pressurized fluid leaks with your hands. Use cardboard or wood to search for leaks.

Check and secure all caps and filler plugs for fuel, oils, radiator, etc.

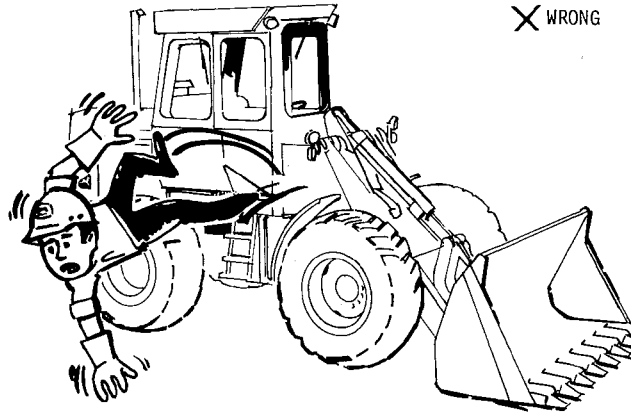
✗ WRONG



T32713N

Check levels of fuel, coolant, hydraulic fluid, and lubricating oil. If fuel must be added—**FIRST, PUT OUT THAT CIGARET.**

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T32714N

Be sure to clean any oil, grease or mud accumulation from floor of operator's compartment, stepping points, and grab rails to minimize the danger of slipping.

In freezing weather beware of snow or ice deposits on stepping points, grab rails, and floor.

Remove loose bolts, tools, or other objects from floor of operator's compartment.

Although it is impractical to try to cover every possible maintenance situation, the safety precautions recommended here should serve to develop and promote safe maintenance procedures.

The information contained in this manual is not intended to replace safety codes, insurance requirements, federal, state, and local laws, rules and regulations. In particular, your service area or jobsite activities may be subject to state safety rules and/or federal regulation under the Occupational Safety and Health Act (OSHA). Familiarize yourself with all regulations applicable to your situation in order to avoid possible safety violations.

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# Section 10 GENERAL

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## Group 5 GENERAL MACHINE SPECIFICATIONS

*(Specifications and design are subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, specifications are based on a machine equipped with all standard equipment, 20.5-25, 12-ply, loader-tread tires with 1820 lb. (826 kg) of CaCl<sub>2</sub> solution in rear tires, side counterweights, ROPS cab, full fuel tank, and 175 lb. (79.4 kg) operator.)*

<b>Power</b> (at 2,200 engine rpm):	<b>SAE</b>	<b>DIN</b>
Gross .....	160 (119.3 kW*)	
Net .....	145 (108.1 kW*)	147.5 PS

*\*Net engine flywheel horsepower is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, fuel pump, alternator, and muffler. The gross engine power is without fan. Flywheel power ratings are under SAE standard conditions of 500 ft. (152 m) altitude and 85°F. (29.4°C) temperature and DIN 70 020 conditions (non-corrected). No derating is required up to 10,000 ft. (3 000 m) altitude.*

*\*In the international system of units (SI), power is expressed in kilowatts (kW).*

Engine: John Deere turbocharged diesel, vertical 6-cylinder, valve-in-head, 4-stroke cycle.

Bore and stroke .....

4.75 x 5 in.	
	(120.5 mm x 127 mm)

Piston displacement .....

531 cu. in. (8 702 cm <sup>3</sup> )	
--------------------------------------	--

Compression ratio .....

15.8 to 1	
-----------	--

Maximum torque @ 1500 rpm .....

432 lb-ft	
	(59.7 kg-m)

NACC or AMA (U.S. Tax) horsepower .....

54.0	
------	--

Lubrication .....

Pressure system with full-flow filter	
---------------------------------------	--

Cooling .....

Pressurized with thermostat and fixed bypass	
--	--

Fan .....

Blower	
--------	--

Air cleaner with restriction indicator .....

Dry	
-----	--

Electrical system .....

12-volt (12V) with alternator	
-------------------------------	--

Batteries (2) .....

Reserve capacity: 310 minutes each battery	
--	--

<b>Torque Converter:</b>	
Type .....	Twin-turbine
Torque multiplication .....	4.9 to 1

**Transmission** .....

Power shift planetary	
-----------------------	--

<b>Forward Speeds</b>	<b>mph</b>	<b>km/h</b>
1 .....	0-3.3	0-5.3
2 .....	3.3-7	5.3-12.6
3 .....	0-12.5	0-20.1
4 .....	12.5-25.8	20.1-41.5

<b>Reverse Speeds</b>		
1 .....	0-4.5	0-7.2
2 .....	4.5-10.2	7.2-16.4

*NOTE: Shift from 1st to 2nd and 3rd to 4th is automatic.*

<b>Differentials:</b>	
Front .....	No-Spin
Rear .....	Standard

**Drive Axles** ... Inboard-mounted planetary gears to each wheel. Front axle fixed. Rear axle oscillates 22-degree total. 15.3 inches (389 mm) vertical travel at center of tire.

**Brakes:**

Service. . . Power actuated, 4-wheel, inboard-mounted wet disk. Foot-operated by either right or left pedal. Parking. . . 10 x 1.5-inch (254 mm x 38 mm) expanding shoe on transmission output shaft. Adjustable, hand-operated with warning light and buzzer.

**Steering** . . . . . Full power steering. Frame articulated 80 degrees by two hydraulic cylinders. Turning radius of 15 feet 5 inches (4.7 m).

**Hydraulic Systems:**

Loader functions. . . Independent engine-driven, gear pump delivers 58.2 gpm (220 Lpm) at 600 psi (42 kg/cm<sup>2</sup>) and 220 engine rpm. 2,250 psi (158.2 kg/cm<sup>2</sup>) relief-valve pressure setting.

Control . . . . . Single-lever, dual hydraulic valve. Optional triple hydraulic valve for fork or multipurpose bucket.

Steering and brakes. . . . Engine-driven, eight-piston, variable-displacement pump delivers 26.5 gpm (100 Lpm) at 2,200 engine rpm and 2,000 psi (140.6 kg/cm<sup>2</sup>). Maximum system pressure is 2,400 psi (169 kg/cm<sup>2</sup>).

**Hydraulic**

<b>Cylinders:</b>	<b>Bore</b>	<b>Stroke</b>
Boom, two . . .	6.25 in. (159 mm)	25.55 in. (649 mm)
Bucket, one . . .	6.25 in. (159 mm)	29.60 in. (752 mm)
Cylinder rods . . . . .	Ground, heat-treated, chrome-plated, polished	
Boom and bucket cylinder rods . . . . .	2.75 in. (70 mm) dia.	

**Tires:**

- 17.5-25, 12-ply-rating, loader tread, L-2
- 20.5-25, 12-ply-rating, rock tread, L-3
- 20.5-25, 12-ply-rating, loader tread, L-2
- 20.5-25, 16-ply-rating, rock tread, L-3

**Wheel Treads:**

Front and rear . . . . . 80 in. (2.03 m)

**Capacities:**

	<b>U.S.</b>	<b>Litres</b>
Cooling system . . . . .	49 qt.	46.4
Fuel tank . . . . .	56 gal.	211.9
Crankcase . . . . .	20 qt.	18.9
Crankcase, includes filter . . . . .	22 qt.	20.8
Transmission case and filters . . . . .	39 qt.	36.9
Front differential . . . . .	24 qt.	22.7
Rear differential . . . . .	25 qt.	23.7
Loader hydraulic sump . . . . .	70 qt.	66.2

**Additional Standard Equipment:**

- Adjustable cushioned seat
- Engine side shields
- Front fenders
- Gauges:
  - Transmission oil temperature
  - Transmission oil pressure
  - Fuel
  - Coolant temperature
  - Engine oil pressure
  - Electric hour meter
  - Voltmeter
- Loader hydraulic system indicator
- Key switch
- Pushbutton safety start
- Cigar lighter
- Parking brake warning light and buzzer
- Transistorized voltage regulator
- Vandal protection
- Horn
- Lights
- Fuel filter
- Automatic return-to-dig
- Rear counterweight
- Fixed drawbar
- Exhaust w/rain cap
- Rear bottom guard
- Hand grips
- ROPS w/cab and seat belt
- Heater
- Antifreeze
- Cold weather starting aid
- Flashing and turning lights
- Work lights
- Precleaner

**Special Equipment:**

- Rear axle disconnect
- ROPS canopy and seat belt
- Instrument panel cover with lock
- Reverse warning alarm
- Triple loader hydraulic valve
- Bucket teeth
- Auxiliary side weights
- Splash guard for fenders
- Front bottom guard
- License plate bracket
- Defroster fan
- Automatic boom height control
- Engine coolant heater
- SMV emblem
- ROPS quiet cab
- Auxiliary cutting edges
- Air conditioning
- Adjustable suspension seat



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