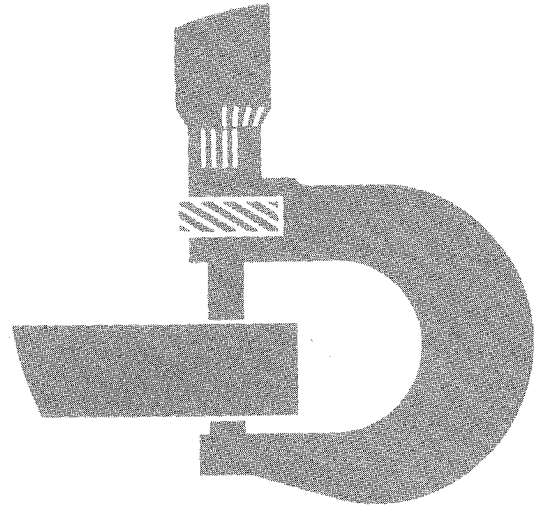


# 480C Forklift



## TECHNICAL MANUAL

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# 480C FORKLIFT TECHNICAL MANUAL TM-1249 (JUN-81)

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*All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice. Wherever applicable, specifications and design information are in accordance with SAE and ICED standards.*

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**X, Y, Z**

# INTRODUCTION AND SAFETY INFORMATION

## INTRODUCTION

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

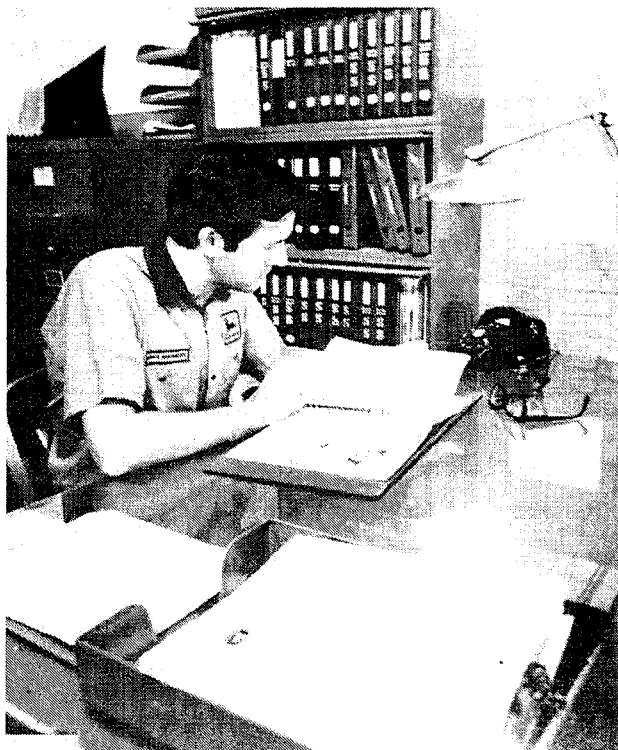
### FOS Manuals - for reference

### 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 troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

*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.



Some features of this technical manual:

- John Deere ILLUSTRATION format emphasizing more detailed pictures and a minimum use of words.
- Detailed repair procedures outlined in individual sections.
- System diagnostic testing detailed in separate section.
- Table of contents of all sections at the front of the manual and a listing of all groups and headings at the front of each section.
- Special tools and specifications listed at the front of each group they are used in.
- Special tools illustrated in numerical order at end of manual.
- Alphabetical listing of all major components, specifications, and special tools.
- General specifications, lubricating requirements, and a summation of safety rules.

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 when you need to know 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.



## SAFETY AND YOU

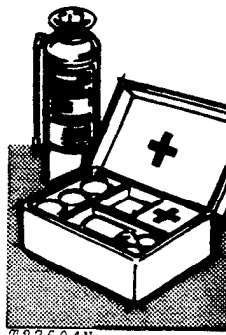


**CAUTION:** This safety symbol is used for important safety messages. When you see this symbol, follow the safety message to avoid personal injury.



45A:T81289 T30:1 I102 280581

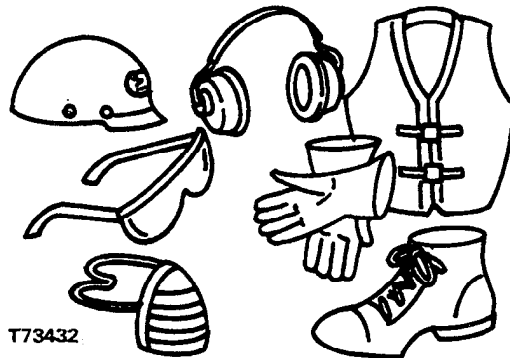
Be prepared for an accident or fire.  
Know where the first aid kit and fire extinguisher are.  
Know how to use them.  
Know where to get help.



T27504N

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Wear safety equipment.



T73432

45A:T73432 T30:1 I104 280581

Wear fairly tight clothing.



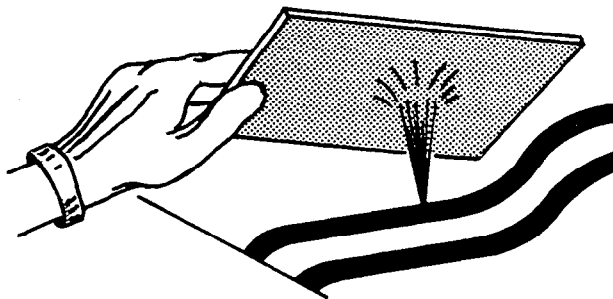
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**CAUTION:** Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious injury. Before disconnecting lines, be sure connections are tight and lines, pipes and hoses are not damaged. Use a piece of cardboard or wood, rather than hands, to search for leaks.

If injured by escaping fluid, see a doctor at once. Serious infection or reaction can develop if proper medical treatment is not administered immediately.



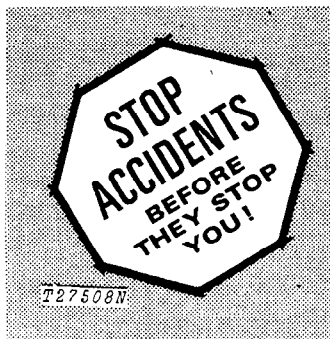
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### KEEP SHOP AND STORAGE AREA CLEAN

Maintenance area should be well-ventilated.

Keep maintenance area clean and dry.

Store flammable materials in a cool and well-ventilated area out of reach of unauthorized personnel.



45A:T27508 N T091 1107 280961

## FOLLOW SAFE WORKING CONDITIONS

Do not work on the equipment unless you are approved to do so. Then be sure you know the correct procedure.

Do not work on equipment while it is being operated.

Keep hands away from moving parts.

When the engine is running, do not work on equipment unless the procedure is approved.

X WRONG



T32709N

If you must work on the machine with the engine running, ALWAYS USE TWO service technicians. One must be at the controls. The other must be within sight of the operator.

Put a support under all raised equipment.

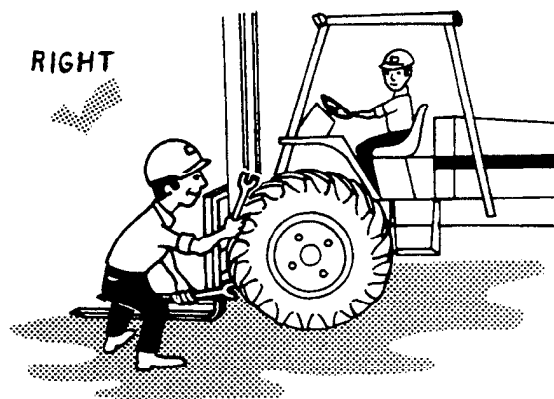
If the machine is parked on a slope, use blocks to hold it in place.

Do not lift heavy parts by yourself. Use a hoist or jack.

TAKE CARE! WATCH OUT FOR OTHER PEOPLE IN THE AREA.

When you drill, grind or hammer metal, wear safety glasses.

RIGHT



45A:T32709 N T81390 T30:1 IIG8 070781

### OBSERVE SERVICE PRECAUTIONS

Keep ALL equipment free of dirt and oil.

Clean oil, grease, mud, ice or snow from the operator's station, steps and hand rail.

Do not remove the radiator cap unless the engine is cool. First, loosen the cap slowly to the stop. Then release all pressure in the cooling system before you remove the cap.

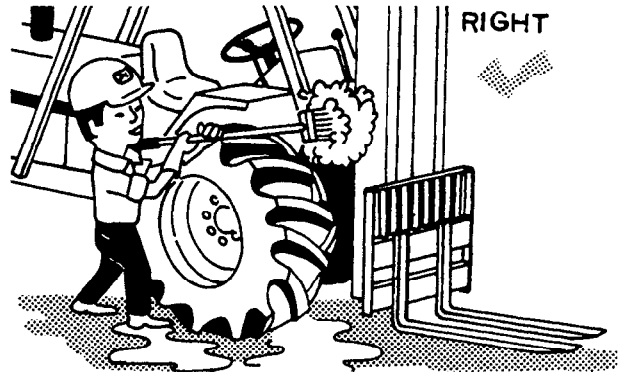
Check the exhaust system regularly for leaks.

Release hydraulic pressure before you work on the hydraulic system.

When you check hydraulic pressure, be sure to use the correct test gauge.

Before you work on the fuel system, close the fuel shutoff valve.

Before you work on the electrical system, or make major repairs, disconnect the battery ground strap.

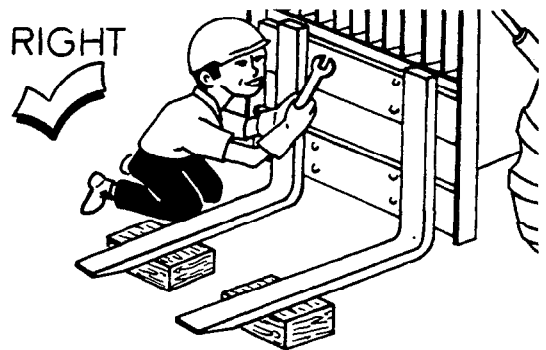


45A/T81391 T30:1 I109 280501

Put blocks under forks if you must work on raised mast or carriage.

Before you work on hydraulic system, release hydraulic pressure.

Before you overhaul the forklift or work on the electrical system, disconnect the battery.



45A/T81392 T30:1 I110 280501

### CHECK SAFETY EQUIPMENT ON MACHINE

All protective parts (shields, guards, ROPS, etc.) should be in good condition and fastened in place.

Check for leaks in all systems:

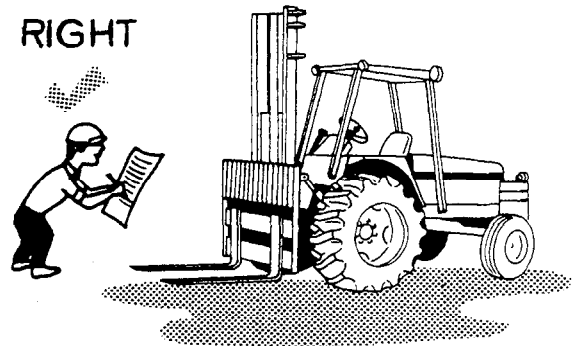
Air intake system

Engine oil system

Transmission-hydraulic system

Fuel system

Cooling system



45A/T81393 T30:1 I111 280501

### AVOID EXPLOSIONS OR FIRE

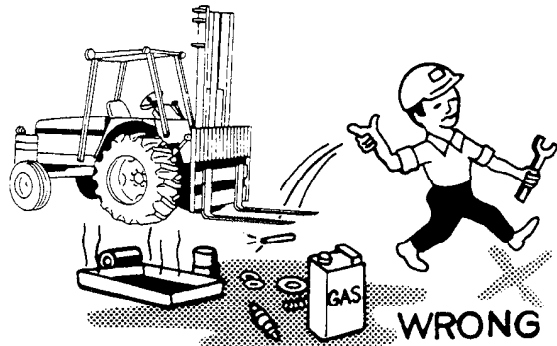
Do not smoke while you fill the fuel tank.

Do not smoke while you work with material that will start on fire easily.

Stop the engine before you fill the fuel tank.

Do not fill fuel tank if engine is hot.

Do not use gasoline or diesel fuel for cleaning parts. Use solvents that will not start on fire.



45A-T01374 T301 1132 280501

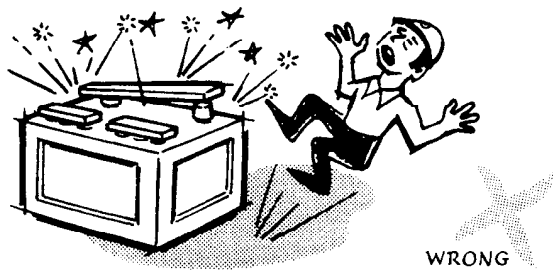
### OBSERVE BATTERY PRECAUTIONS

Do not put metal objects across terminals to check the battery charge.

When you charge a battery, be sure there is enough ventilation.

Keep sparks and flames away from batteries.

Do not smoke near battery.



45A-T27506 T301 1113 280281





*General Specifications*

**Tires:**

**Drive**

16.9-24, 8 ply rating, R4  
 19.5L-24, 8 ply rating,  
 R4, low profile,  
 tubeless

**Steering**

11L-15, 8 ply rating, F3  
 7.50/8.00-16,  
 10 ply rating, F3

**Wheel Tread** (front and rear) ..... 62 in. (1.58 m)

**Dimensions:**

Overall width ..... 6 ft. 7 in. (2.01 m)  
 Ground clearance, min. .... 1 ft. 2 in. (356 mm)  
 Reach from center line of  
 drive wheels to front of  
 fork carriage ..... 2 ft. 8 in. (813 mm)

**Capacities:**

	<b>U.S.</b>	<b>Imp.</b>	<b>Liters</b>
Cooling system	3.0 gal.	2.5 gal.	11.4
Fuel tank	19.5 gal.	16.3 gal.	73.8
Engine lubrication, including filter	1.5 gal.	1.3 gal.	5.7
Hydraulic system	12.5 gal.	10.4 gal.	47.3

**SAE Operating Weight** (w/required counterweights):

14 ft., 6000-lb capacity .....11,440 lb. (5190 kg)  
 21 ft. 6 in., 5000-lb. capacity ...11,310 lb. (5129 kg)  
 28 ft., 5000-lb. capacity .....12,160 lb. (5513 kg)

**Shipping Weight:**

Two 4-ft. (1.22 m) 5000-lb.  
 (2268 kg) pallet tines ..... 350 lb. (159 kg)  
 Two 4-ft. (1.22 m), 6000-lb.  
 (2722 kg) pallet tines ..... 425 lb. (193 kg)

**Additional Standard Equipment:**

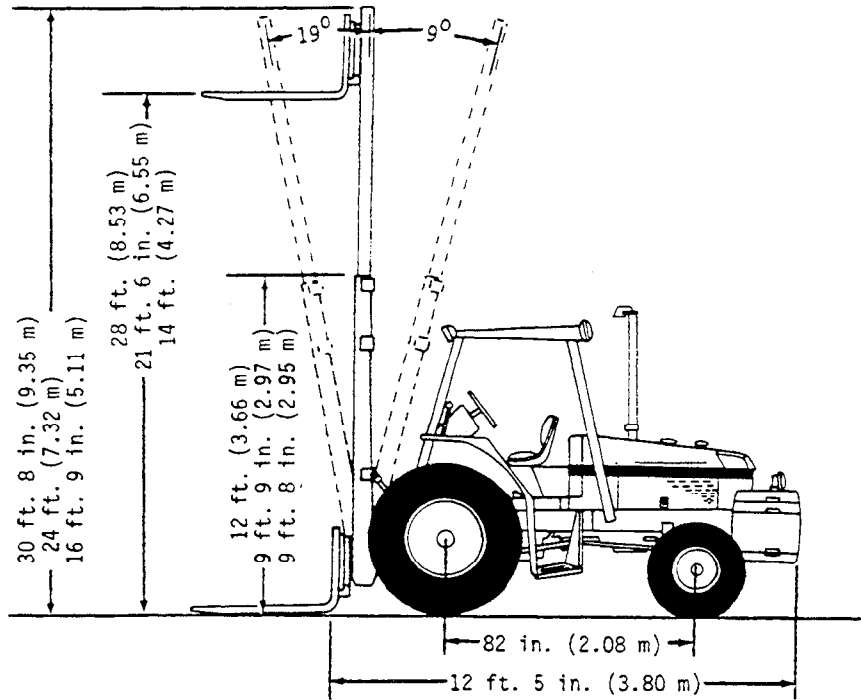
Electric hour meter  
 Under-hood muffler w/extension and rain cap  
 Cold weather starting aid  
 Overhead guard  
 Hand throttle  
 Foot throttle  
 Differential lock  
 Fenders  
 Fuel filter  
 Key switch safety start  
 Antifreeze  
 Fuel gauge  
 Oil pressure indicator light  
 Alternator charge indicator light  
 Coolant temperature gauge  
 Appropriate counterweight  
 Lights  
 Transistorized voltage regulator  
 Horn  
 Air cleaner restriction indicator

**Special Equipment:**

Engine coolant heater  
 Vandal protection  
 Load backrest extension  
 Parking brake

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## General Specifications



Operating Information	Maximum Lifting Height					
	14 ft. (4.27 m)			21 ft. 6 in. (6.55 m)		28 ft. (8.53 m)
Max. lift capacity*	4000 lb. (1815 kg)	6000 lb. (2722 kg)	Standard and free lift	5000 lb. (2268 kg)	4000 lb. (1815 kg)	5000 lb. (2268 kg)
Lift Capacity at full height*	4000 lb. (1815 kg)	6000 lb. (2722 kg)		2500 lb. (1134 kg)	2500 lb. (1134 kg)	1000 lb. (454 kg)
Side-shift . . . 3 in. (76 mm) to right and left of center	Yes			Yes		No
Rate of lift @ 2200 engine rpm (max. load)	52 fpm 15.9 (m/min)			76 fpm (23.2 m/min)		76 fpm (23.2 m/min)
Rate of lift @ 2200 engine rpm (empty)	55 fpm (16.8 m/min)			86 fpm (26.3 m/min)		86 fpm (26.3 m/min)
Rate of drop (max. load)	29 fpm (8.8 m/min)			54 fpm (16.5 m/min)		54 fpm (16.5 m/min)
Rate of drop (empty)	33 fpm (10.1 m/min)			68 fpm (20.7 m/min)		68 fpm (20.7 m/min)

\*Measured at 24 in. (610 mm) from heel of fork with load centered

45A;778487 45A;T81358 T301 J1116 290581

## GENERAL INFORMATION

When you service the forklift, check the periodic service chart on the left fender. See copy of chart below. The 480C operator's manual has details for forklift service.

### PERIODIC SERVICES

REFER TO OPERATOR'S MANUAL FOR DETAILED INFORMATION

INTERVAL HOURS	ITEM NO.	COMPONENTS	SERVICE POINTS	DESCRIPTION OF SERVICE	CAPACITY OR MEASUREMENT	APPROVED SERVICE MATERIAL
<div style="border: 1px solid black; padding: 2px;">△</div> 10 OR DAILY	1	AIR CLEANER*	1	CHECK UNLOADER VALVE, RESTRICTION INDICATOR AND CLEAN ELEMENT AS REQUIRED	OPERATOR'S MANUAL	
	2	TRANSMISSION	1	CHECK OIL LEVEL	TO TOP MARK WITH DIPSTICK RESTING ON TOP OF FILLER TUBE	HY-GARD OR EQUIVALENT
	3	RADIATOR	1	CHECK COOLANT LEVEL, DRAIN AND REFILL, SPRING AND FALL	MIDWAY BETWEEN CORE AND FILLER NECK	OPERATOR'S MANUAL
	4	FUEL FILTER	1	REPLACE AS REQUIRED	OPERATOR'S MANUAL	
	5	MAST SPROCKET BEARINGS	4	LUBRICATE	SEVERAL SHOTS	SAE MPG
	6	STEER AXLE AND STEERING CYLINDER	6	LUBRICATE	SEVERAL SHOTS	SAE MPG
	7	ENGINE OIL	1	CHECK LEVEL	BETWEEN MARKS ON DIPSTICK	SEE OIL CHART
	8	STEER WHEELS	2	SERVICE ONLY WHEN UNIT IS BEING OPERATED IN EXTREME WET AND MUDDY CONDITIONS	OPERATOR'S MANUAL	
	9	MAST PIVOTS AND TRUNION BAR**	3	LUBRICATE FITTINGS	2 SHOTS	SAE MPG
	10	CAPSCREWS AND BOLTS		CHECK FOR TIGHTNESS	OPERATOR'S MANUAL	
<div style="border: 1px solid black; padding: 2px;">□</div> 50	11	FIRMS	4	CHECK AIR PRESSURE	OPERATOR'S MANUAL	
	12	TRANSMISSION AND HYDRAULIC SYSTEM	2	REPLACE 2 FILTER ELEMENTS (BREAK IN OIL Y)	OPERATOR'S MANUAL	
<div style="border: 1px solid black; padding: 2px;">◐</div> 100	13	BATTERY	1	CHECK ELECTROLYTE LEVEL AND TERMINALS	TO BOTTOM OF FILLER NECK REMOVE ANY CORROSION	DISTILLED WATER
	14	CARRIAGE CHAIN		LUBRICATE	BRUSH ON	ENGINE OIL
	15	SPARK ARRESTING MUFFLER		CLEAN	OPERATOR'S MANUAL	
	16	MAST CHANNEL	2	LUBRICATE	SEVERAL SHOTS	SAE MPG
<div style="border: 1px solid black; padding: 2px;">◑</div> 200	17	TILT CYLINDER PIVOT PINS	4	LUBRICATE	BRUSH	ENGINE OIL
	18	CONTROL LEVERS	6	LUBRICATE	TRACE	ENGINE OIL
	19	ENGINE OIL AND FILTER	1	DRAIN, REFILL AND REPLACE FILTER	SEE CHART BELOW	SEE OIL CHART
	20	CARRIAGE CHAIN	2	CHECK TENSION	OPERATOR'S MANUAL	
<div style="border: 1px solid black; padding: 2px;">◒</div> 500	21	FAN BELT	1	CHECK TENSION	24 INCH (15 mm) FLEX WITH 20 LB (95 N) FORCE	
	22	FUEL TANK SLUMP	1	DRAIN SEDIMENT AND WATER	OPERATOR'S MANUAL	
	23	HYDRAULIC FILTER	1	REPLACE	OPERATOR'S MANUAL	
	24	AIR INTAKE HOSES	2	CHECK CONNECTIONS	OPERATOR'S MANUAL	
<div style="border: 1px solid black; padding: 2px;">◓</div> 1000	25	FUEL FILTER	1	REPLACE ELEMENT	OPERATOR'S MANUAL	
	26	DRIVE AXLE BEARINGS	2	CLEAN, OIL AND BOWL	8 SHOTS	SAE MPG
	27	TRANSMISSION FILTER	1	REPLACE ELEMENT	OPERATOR'S MANUAL	
	28	DRAINAGE VENT TUBE	1	REMOVE AND CLEAN		DIESEL FUEL
	29	ENGINE VALVE TAPPETS	1	ADJUST CLEARANCE	OPERATOR'S MANUAL	OPERATOR'S MANUAL
	30	ENGINE SPEEDS	1	CHECK SPEEDS		
	31	STEER WHEEL BEARINGS	2	CLEAN, REPACK AND ADJUST	OPERATOR'S MANUAL	SAE MPG
	32	STARTER	1	LUBRICATE WICKS	SATURATE WICKS	10W 20 OIL
	33	TRANSMISSION	2	DRAIN AND REFILL, CLEAN INTAKE SCREEN	12.5 GAL (47.3 L)	HY-GARD OR EQUIVALENT

**ENGINE OIL**

AIR TEMP	JOHN DEERE TORO GARD SUPREME OIL	SINGLE VISCOSITY OIL API SERVICE CD/SC	MULTI VISCOSITY OIL API SERVICE CG/SE
ABOVE 32°F (0°C)	SAE 30	SAE 30	NOT RECOMMENDED
32°F TO 104°F (0°C TO 23.3°C)	SAE 10W 20	SAE 10W	SAE 10W 20
BELOW 104°F (23.3°C)	SAE 5W 20	SAE 5W	SAE 5W 20

\* REPLACE ELEMENT ANNUALLY OR AS REQUIRED WITH JO FILTER  
\*\* LUBRICATE MAST PIVOT POINTS EVERY 5 HOURS UNDER ADVERSE CONDITIONS

WHEN FORKLIFT IS USED DURING PREVAILING AIR TEMPERATURES BELOW -10°F (-23°C), CHANGE OIL AFTER EVERY 100 HOURS OF OPERATION OR EVERY 5 WEEKS OF INTERMITTENT OPERATION WHICHEVER OCCURS FIRST

**CAPACITIES**

ITEM	U.S. MEASURE	METRIC
FUEL TANK	19.5 GAL	74 L
COOLING SYSTEM	12 QT	11.5 L
ENGINE CRANKCASE	4 QT	3.7 L
TRANSMISSION		
REFILL QUANTITY	12.5 GAL	47.3 L

## LUBRICANTS

### Engine Oils

Use John Deere TORQ-GARD SUPREME® engine oil.

Use John Deere TORQ-GARD SUPREME SAE 10W-20 oil or equivalent during the first 100 hours of operation for break-in.

Oils other than TORQ-GARD SUPREME should have one of the following specifications.

#### SINGLE VISCOSITY OILS

API Service CD/SC  
MIL-L-2104C  
Series 3

#### MULTI-VISCOSITY OILS

API Service CC/SE  
MIL-L-46152

### Transmission-Hydraulic Oils

Use John Deere HY-GARD® Transmission and Hydraulic Oil (J20A) or an equivalent.

### Greases

Use John Deere Multi-Purpose Grease or equivalent for all grease fittings and front wheel bearings.

### Storing Lubricants

Store lubricants in clean containers in an area protected from dust, moisture and other contamination.

When you handle lubricants, use clean containers.

### Oils and Air Temperature

SAE ENGINE OILS			
Air Temperature	John Deere TORQ-GARD SUPREME Oil	Other Oils	
		Single Viscosity Oil	Multi-Viscosity Oil
Above 32°F (0°C)	30	30	Not recommended.
32° to -10°F (0° to -23°C)	10W-20	10W	10W-30
Below -10°F (-23°C)	5W-20	5W	5W-20

If you use SAE 5W-20 or SAE 5W oil, your engine may use more oil. Check the oil level often.

45A:T80330 T301 IV18 290581

# Section 01 WHEELS

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Install Tire .....	0120-03
Install Wheel Assembly .....	0120-05

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**Group 0110**

# POWERED WHEELS AND FASTENINGS

## SPECIAL TOOLS

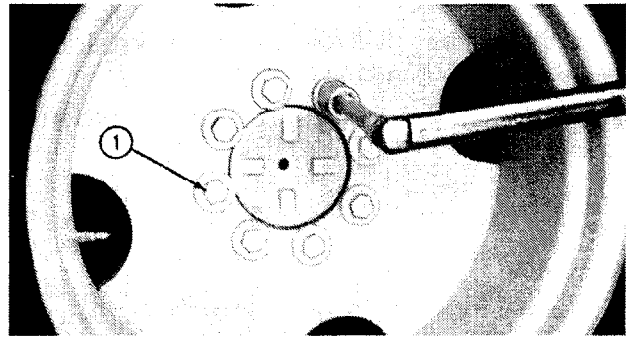
*NOTE: Order tools from your SERVICE-GARD™ Catalog, unless otherwise indicated.*

Number	Name	Use
D-05019ST	Heavy Duty Wheel Lift	Remove and install wheels
D-24206WK	Shop Stand	Support the unit while removing wheels

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## WHEEL SPECIFICATION

1. Cap screws torque .....(576 N·m) 425 lb-ft

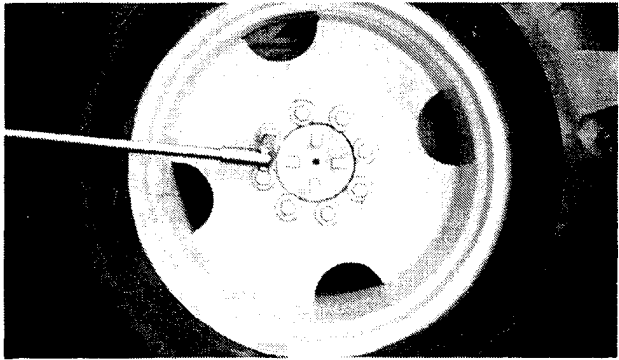


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## REMOVE WHEEL ASSEMBLY

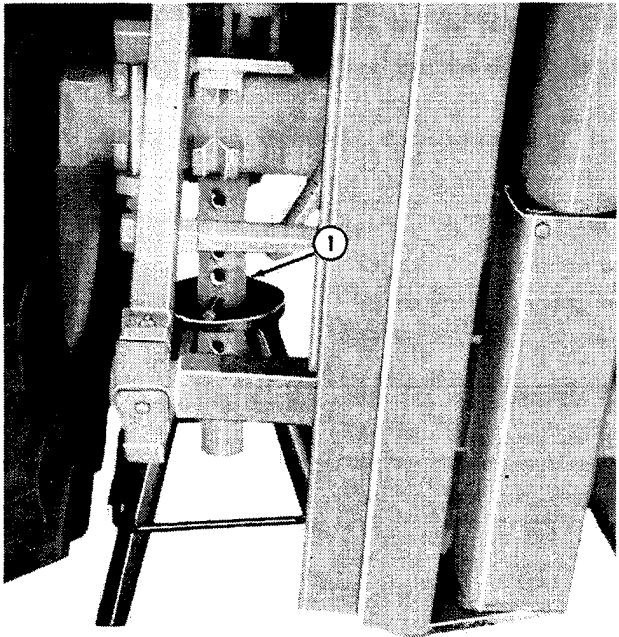
**⚠ CAUTION:** A drive forklift wheel weighs approximately (121 kg) 267 lbs.

1. Loosen cap screws before lifting the wheel off the ground.



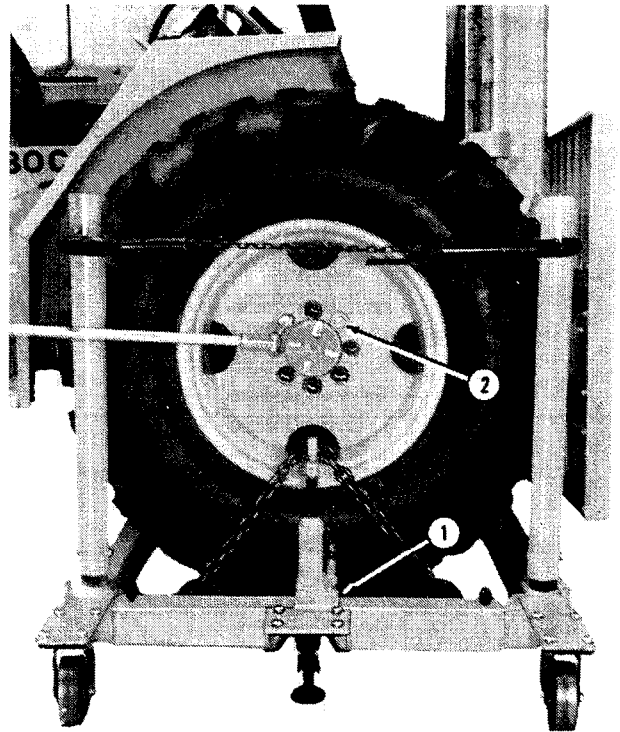
46A:T80630 T30:0110 03 210481

2. Lift the wheel off the ground using a service jack or hoist of at least (907 kg) 2-ton capacity.
3. Put a shop stand (1) such as D-24206WK under the axle housing.



46A:T80631 T30:0110 04 210481

4. Put the D-05019ST Wheel Lift (1) under wheel. Fasten safety chain around the upper portion of tire.
5. Remove the cap screws (2). Pull wheel assembly away from axle.
6. Inspect all parts for damage; replace parts as necessary.



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## REMOVE TIRE

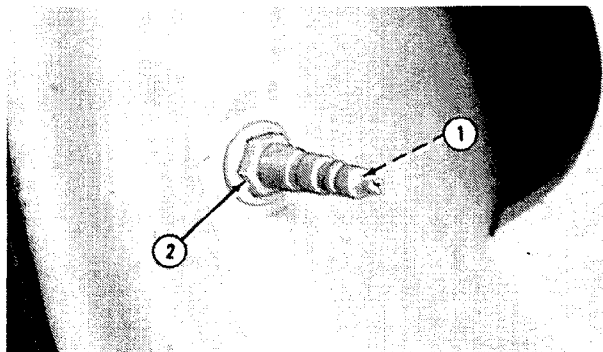
1. The tire can be removed without removing the wheel from the forklift. See the John Deere Off-The-Road Tire Maintenance Manual to remove the tire from the wheel.



**CAUTION:** Failure to follow proper procedures when demounting a tire from a wheel or rim can produce an explosion which may result in serious bodily injury. DO NOT attempt to demount a tire unless you have the proper equipment and experience to perform the job safely. Have it done by a qualified tire repair service.

T300110 06 210481

2. Always completely deflate the tire by removing the valve core (1) from valve before attempting any demounting operation. Check the valve stem by running a probe through it to make sure the valve stem is not plugged. Remove valve nut (2).
3. Inspect all parts for damage; replace parts as necessary.



46A/T80633 T300110 07 210481



## INSTALL TIRE

**⚠ CAUTION:** Failure to follow proper procedures when mounting a tire on a wheel or rim, can produce an explosion which may result in serious bodily injury. **DO NOT** attempt to mount a tire unless you have the proper equipment and experience to perform the job safely. Have it done by a qualified tire repair service.

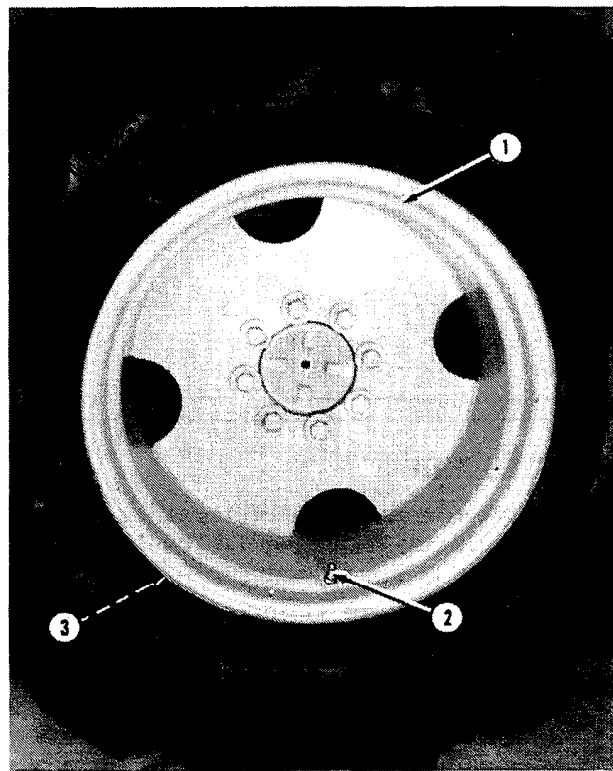
*NOTE:* See the John Deere Off-The-Road Tire Maintenance Manual to mount the tire on the wheel.

T30:0110 00 210401

1. Make sure all parts are clean and free from rust or grease before assembly.
2. To prevent slipping of the wheel under load, the inside and outside of wheel (1) must be free of paint, rust, oil, grease, dirt or other foreign material before installation.
3. Install valve stem (2) in rim base and tighten valve core housing finger tight.

**⚠ CAUTION:** Serious bodily injury can occur from explosion when mounting and inflating tires if safe procedures are not followed.

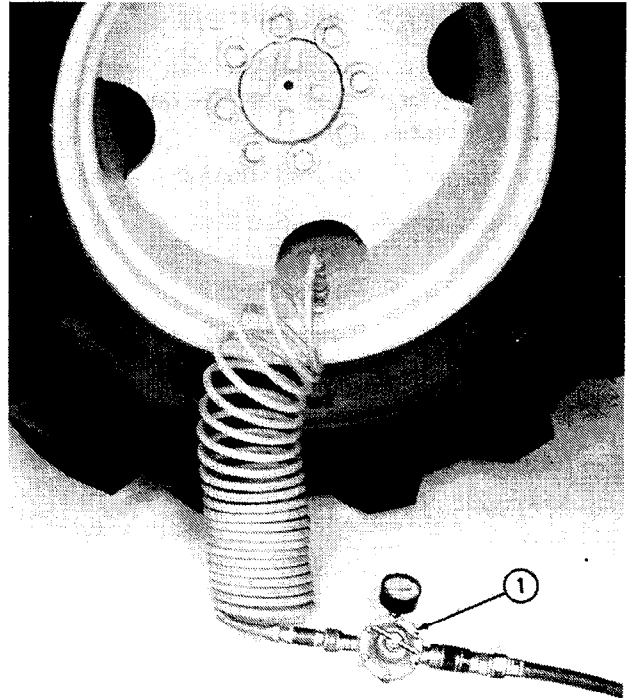
4. Before mounting tire on rim, add soap lubricant to beads of the tire (3).



46A:780634 T30:0110 09 210481

## Powered Wheels and Fastenings

5. Clear the area of all persons.
6. Use a pressure regulating valve (1) with clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of the tire while inflating.
7. Use only recommended air pressure. Pressure over this limit can cause an explosion.
8. Add air until side flange of tire slides out against the rim.



46A/T80635 T30:0110 10 210481

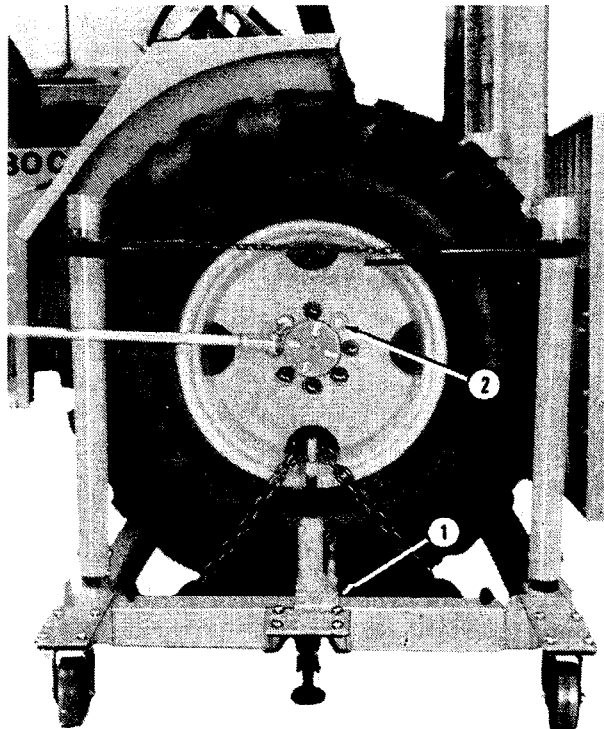
Tire Size	Type	Ply Rating	Operating Pressure
16.9-24	R-4	8	(190 ± 20 kPa)(1.9 ± 0.2 bar) 28 ± 3 psi
19.5L-24	R-4	8	(170 ± 10 kPa)(1.6 ± 0.1 bar) 24 ± 2 psi

9. Check air pressure in both drive tires with an accurate gauge having (10 kPa) (0.01 bar) or 1 psi graduations. Be sure that tire pressures are equal for both drive tires.

T30:0110 11 210481

### INSTALL WHEEL ASSEMBLY

1. Thoroughly clean the cap screws, washers, and the tapped holes in the flanged axle. Use compressed air to dry all parts and tapped holes.
2. Install the wheel using a D-05019ST Wheel Lift (1).
3. Install cap screws (2).

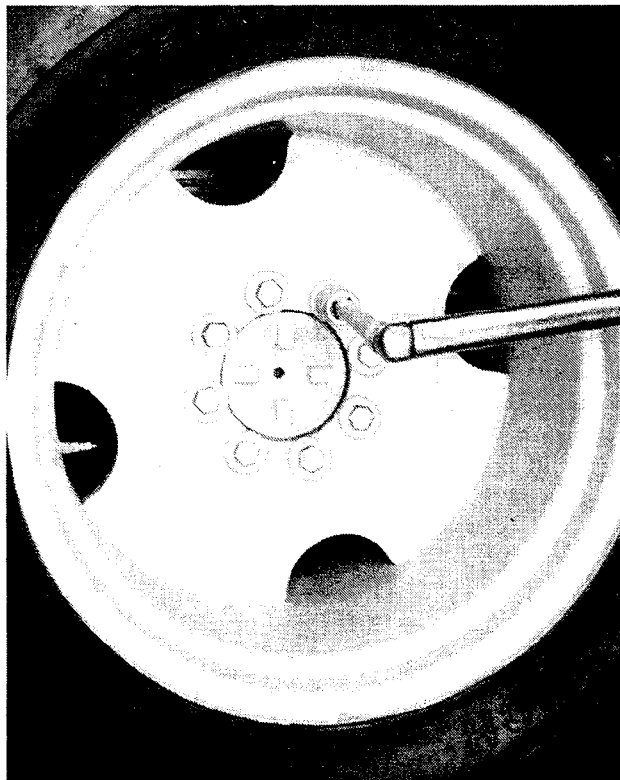


46A:T80632 T30:0110 12 210481

4. Tighten cap screws to (285 N·m) 210 lb-ft.
5. Lower the forklift to the ground.

**IMPORTANT:** If a power wrench is used, be sure that the cap screws are engaged to prevent stripping. Operate the wrench slowly to prevent thread damage.

6. Cross tighten the cap screws to (576 N·m) 425 lb-ft.



46A:T80636 T30:0110 13 210481

**Group 0120**

# NON-POWERED WHEELS AND FASTENINGS

## SPECIAL TOOLS

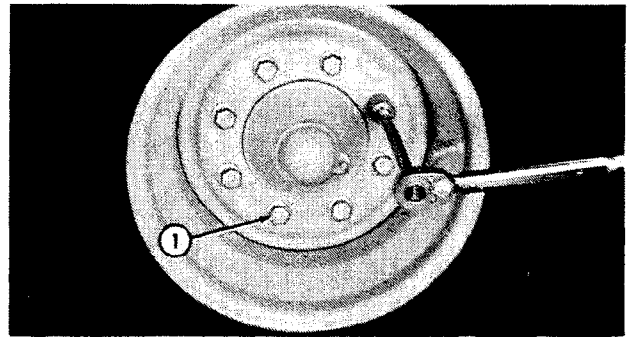
*NOTE: Order tools from your SERVICE-GARD™ Catalog, unless otherwise indicated.*

Number	Name	Use
D-01182AA	Shop Stand	Support the unit while removing wheels.

T30:0120 01 210481

## WHEEL SPECIFICATION

1. Cap screws torque .. (136 ± 14 N·m) 100 ± 10 lb-ft



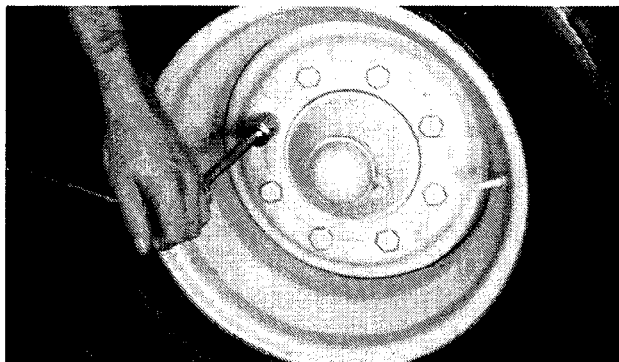
46A:T80637 T30:0120 02 210481

## REMOVE WHEEL ASSEMBLY



**CAUTION:** A front forklift wheel weighs approximately (27 kg) 60 lbs.

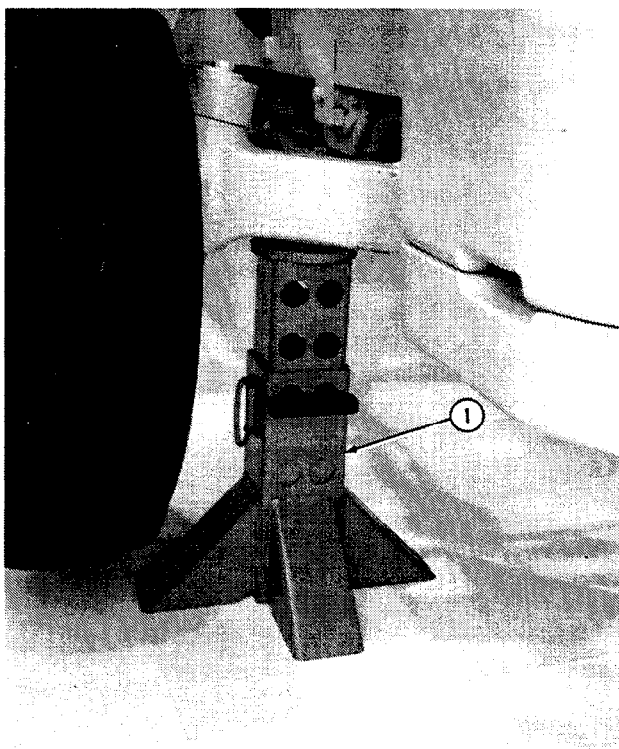
1. Loosen cap screws before lifting the wheel off the ground.



46A:T80638 T30:0120 03 210481

2. Lift the wheel off the ground using a service jack or hoist of at least (907 kg) 2-ton capacity.

3. Put a shop stand such as D-01182AA under the axle.



46A:T80639 T30:0120 04 210481

## Non-Powered Wheels and Fastenings

4. Remove the cap screws. Pull wheel assembly away from wheel hub.
5. Inspect all parts for damage; replace parts as necessary.



46A:T80640 T30:0120 05 210481

### REMOVE TIRE

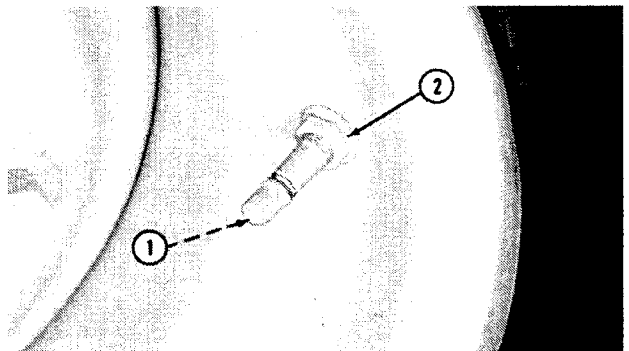
1. The tire can be removed without removing the wheel from the forklift. See the John Deere Off-The-Road Tire Maintenance Manual to remove the tire from the wheel.



**CAUTION: Failure to follow proper procedures when demounting a tire from a wheel or rim can produce an explosion which may result in serious bodily injury. DO NOT attempt to demount a tire unless you have the proper equipment and experience to perform the job safely. Have it done by a qualified tire repair service.**

T30:0120 06 210481

2. Always completely deflate the tire by removing the valve core (1) from valve before attempting any demounting operation. Check the valve stem by running a probe through it to make sure the valve stem is not plugged. Remove valve nut (2).
3. Inspect all parts for damage; replace parts as necessary.



46A:T80641 T30:0120 07 210481

## INSTALL TIRE

**⚠ CAUTION:** Failure to follow proper procedures when mounting a tire on a wheel or rim, can produce an explosion which may result in serious bodily injury. **DO NOT** attempt to mount a tire unless you have the proper equipment and experience to perform the job safely. Have it done by a qualified tire repair service.

*NOTE:* See the John Deere Off-The-Road Tire Maintenance Manual to mount the tire on the wheel.

1. Make sure all parts are clean and free from rust or grease before assembly.

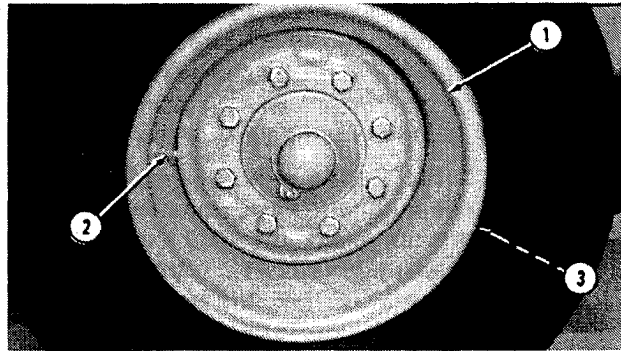
T30:0120 08 210461

2. To prevent slipping of the wheel under load, the inside and outside of wheel (1) must be free of paint, rust, oil, grease, dirt or other foreign material before installation.

3. Install valve stem (2) in rim base and tighten valve core housing finger tight.

**⚠ CAUTION:** Serious bodily injury can occur from explosion when mounting and inflating tires if safe procedures are not followed.

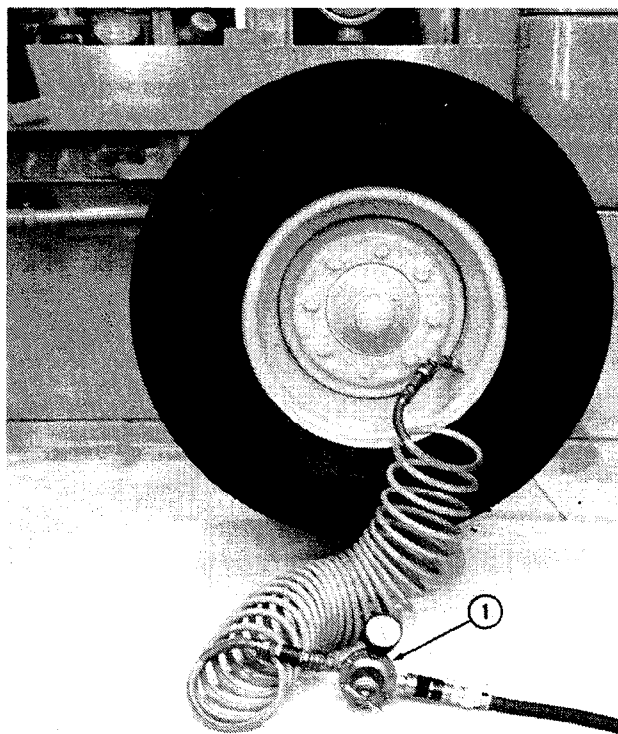
4. Before mounting tire on rim, add soap lubricant to beads of the tire (3).



46A:T60642 T30:0120 09 210481

## Non-Powered Wheels and Fastenings

5. Clear the area of all persons.
6. Use a pressure regulating valve (1) with clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of the tire while inflating.
7. Use only recommended air pressure. Pressure over this limit can cause an explosion.
8. Add air until side flange of tire slides out against the rim.



46A/T80667 T30:0120 10 210481

Tire Size	Type	Ply Rating	Operating Pressure
7.50-16	F-3	10	(410 ± 40 kPa)(4.1 ± 0.4 bar) 60 ± 6 psi
11L-15	F-3	8	(300 ± 30 kPa)(3 ± 0.2 bar) 44 ± 4 psi

9. Check air pressure in both front tires with an accurate gauge having (10 kPa) (0.01 bar) or 1 psi graduations. Be sure that tire pressures are equal for both tires.

T30:0120 11 210481



### INSTALL WHEEL ASSEMBLY

1. Thoroughly clean the cap screws and the tapped holes in the wheel hub. Use compressed air to dry all parts and tapped holes.
2. Install the wheel.

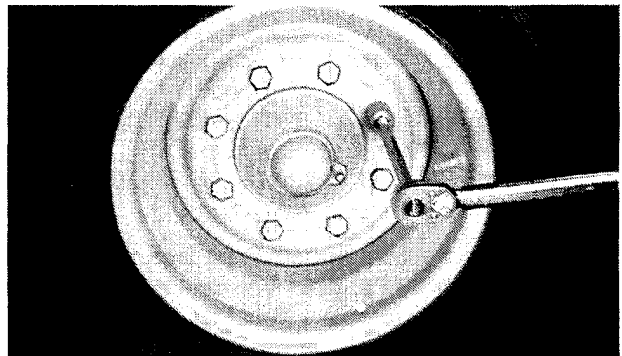


46A:T80640 T30:0120 12 210481

3. Install and tighten cap screws to ( $68 \pm 7$  N·m)  $50 \pm 5$  lb-ft.
4. Lower the forklift to the ground.

**IMPORTANT:** If a power wrench is used, be sure that the cap screws are engaged to prevent stripping. Operate the wrench slowly to prevent thread damage.

5. Cross tighten the cap screws to ( $136 \pm 14$  N·m)  $100 \pm 10$  lb-ft.



46A:T80658 T30:0120 13 210481

# Section 02

# AXLES AND SUSPENSION SYSTEMS

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**SPECIAL TOOLS**

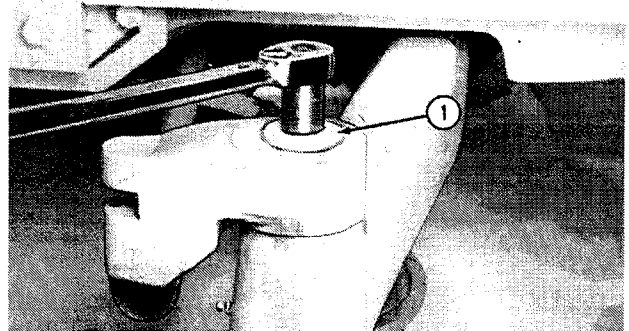
*NOTE: Order tools from your SERVICE-GARD™ Catalog, unless otherwise indicated.*

Number	Name	Use
D-01045AA	Bushing, Bearing and Seal Driver Set	To install bushings, bearing cups and oil seal cup.
D-01047AA	17½ and 30-Ton Puller Set	To remove axle pivot pin.
D-24206WK	Shop Stand	Supports the unit.

T30:0230 72 180681

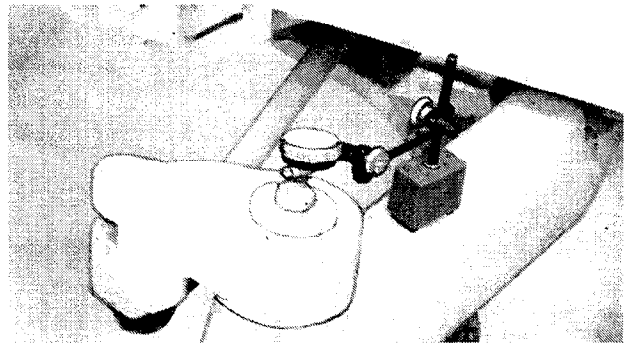
**SPINDLE AND KNUCKLE SPECIFICATIONS**

1. Cap screws torque .....(230 N·m)  
170 lb-ft



47A:T80769 T30:0230 73 180681

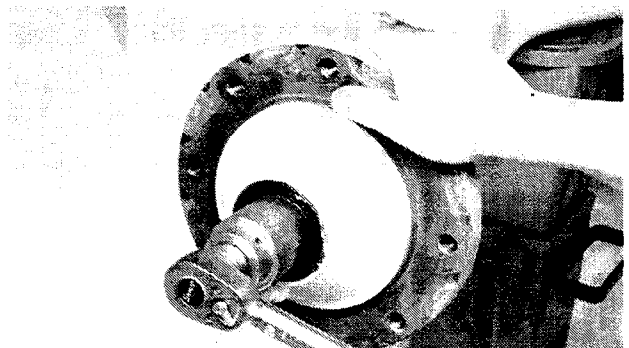
2. Install washers to get an end play of (0.13 to 0.14 mm)  
0.005 to 0.045 in.



47A:T80770 T30:0230 74 180681

**WHEEL HUB SPECIFICATION**

1. Slotted nuts torque .....(47 N·m)  
35 lb-ft

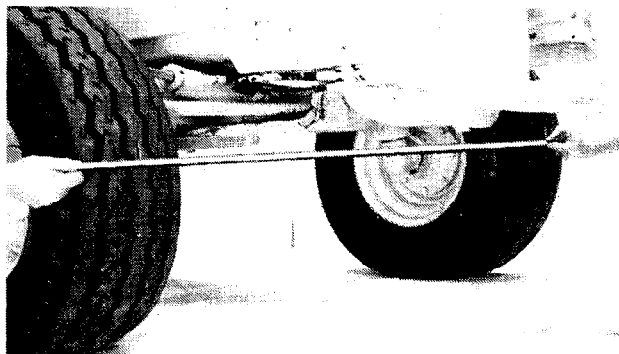


47A:T80772 T30:0230 75 180681

## Non-Powered Wheel Axles

### TOE-IN SPECIFICATION

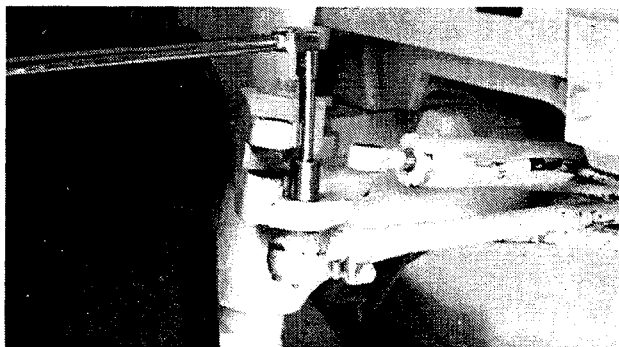
1. The distance between the front marks must be  $(6.5 \pm 3 \text{ mm})$   $0.25 \pm 0.12 \text{ in.}$  less than the distance between the rear marks.



47A:T80833 T30:0230 78 180681

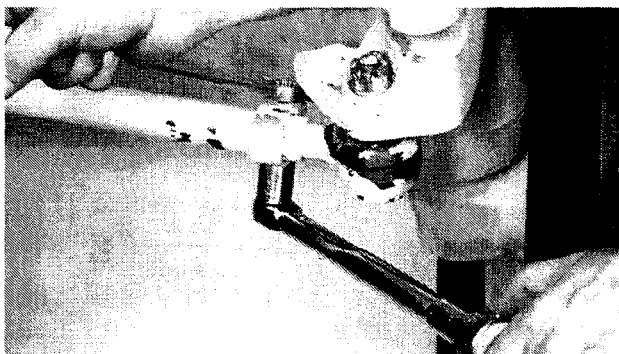
### TIE ROD SPECIFICATIONS

1. Nuts torque .....(75 N·m)  
55 lb-ft



47A:T80808 T30:0230 76 180681

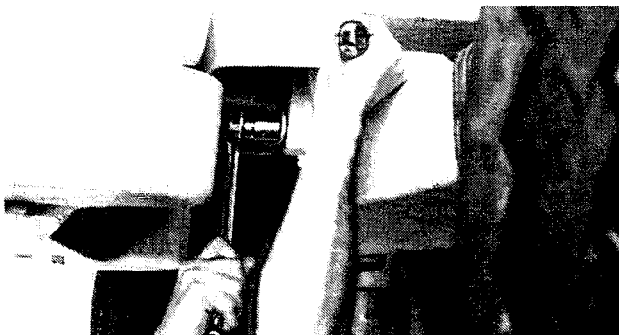
2. Cap screw torque ..... (54 +7 -0 N·m)  
40 +5 -0 lb-ft



47A:T80933 T30:0230 77 180681

### NON-POWERED AXLE SPECIFICATIONS

1. Cap screw and nut torque .....(298 N·m)  
220 lb-ft
2. Install shims to get  $(0.00 \text{ to } 0.38 \text{ mm})$   $0.000 \text{ to } 0.015 \text{ in.}$  of play.

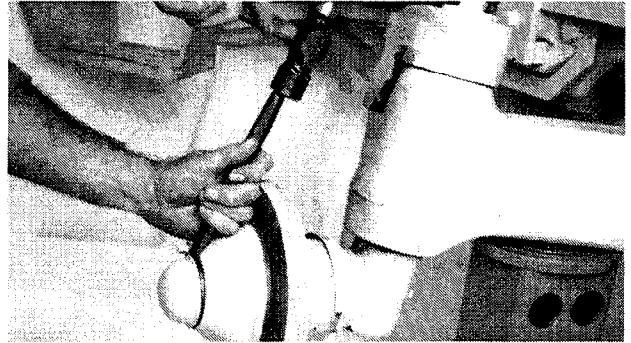


47A:T82056 T30:0230 79 180681

*Non-Powered Wheel Axles*

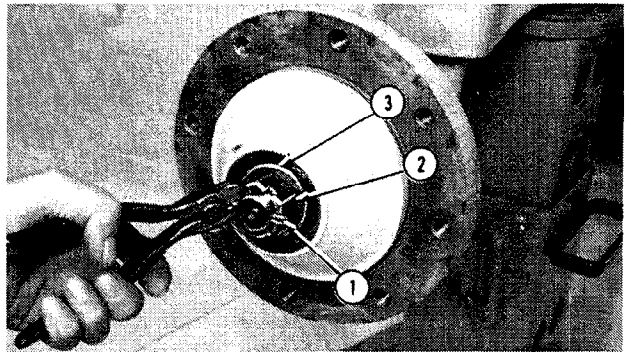
**REMOVE HUB ASSEMBLY**

1. To remove rear wheels (Group 0120).
2. Remove cap.



47A:T80751 T30:0230 01 050581

3. Remove cotter pin (1), slotted nut (2) and special washer (3).



47A:T80752 T30:0230 02 050581

4. Remove outer bearing.



47A:T80753 T30:0230 03 060581

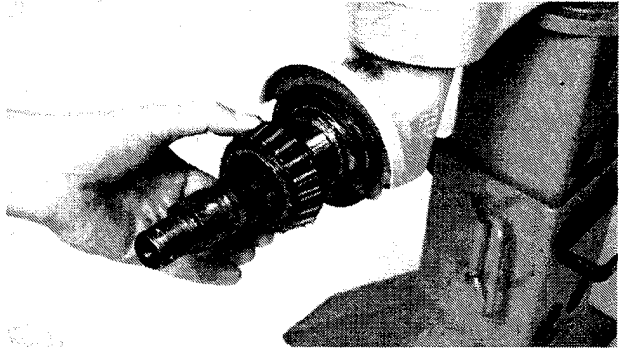
5. Remove hub.



47A:T80754 T30:0230 04 060581

*Non-Powered Wheel Axles*

6. Remove inner bearing.



47A:T80755 T30:0230 05 060581

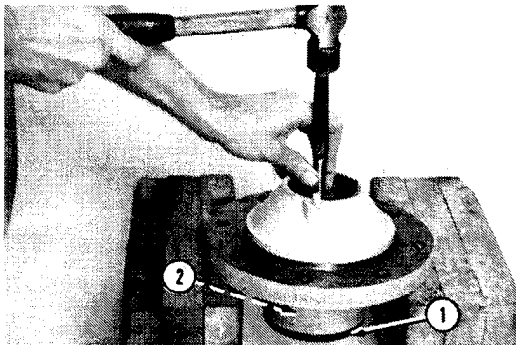
7. Remove grease seal.



47A:T80756 T30:0230 06 060581

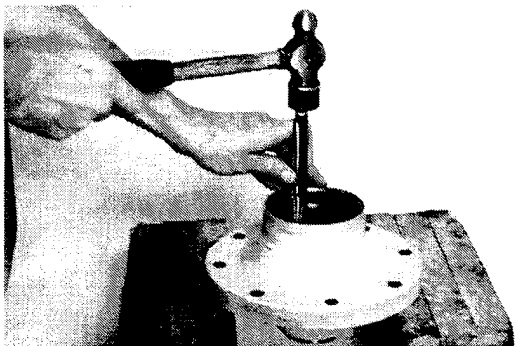
**DISASSEMBLE HUB**

1. Remove seal cup (1) and inner bearing cup (2).



47A:T80757 T30:0230 07 060581

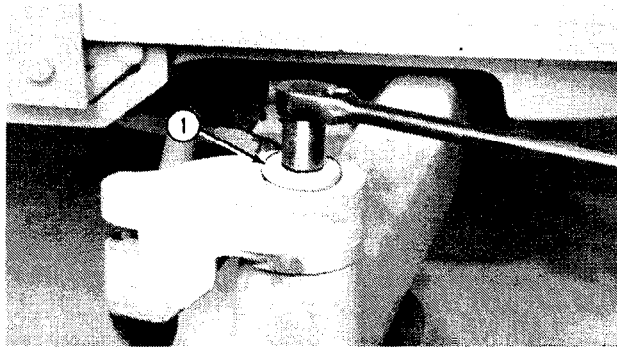
2. Turn hub over and remove the outer bearing cup.



47A:T80758 T30:0230 08 060581

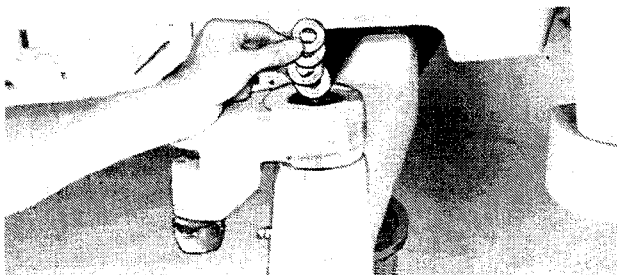
### REMOVE SPINDLE AND KNUCKLE ASSEMBLY

1. Remove cap screw, lock washer and special washer (1).



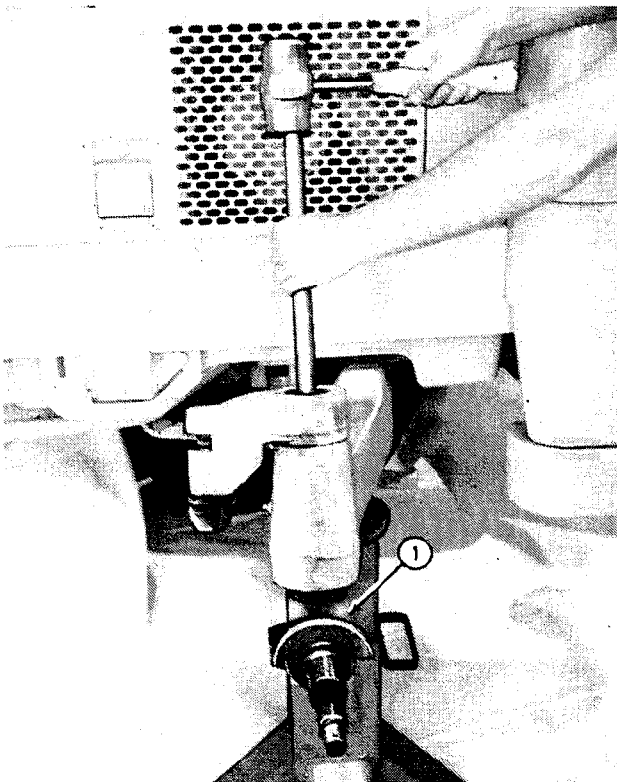
47A:T80762 T30:0230 09 060581

2. Remove thrust washers.



47A:T80766 T30:0230 10 060581

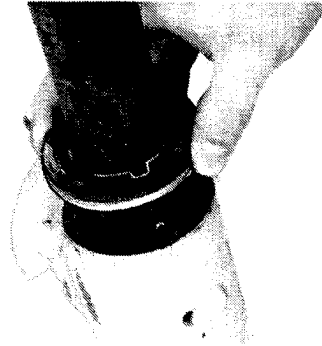
3. Remove spindle and knuckle (1) with brass drift.



47A:T80763 T30:0230 11 060581

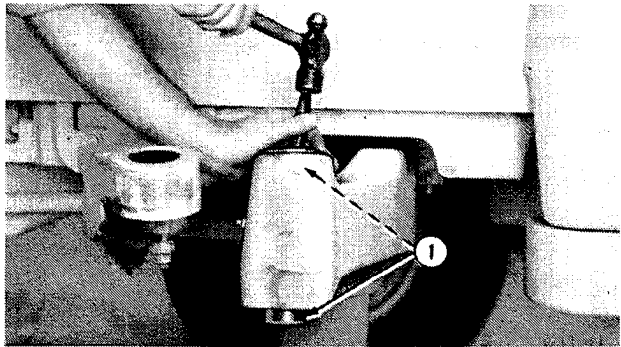
*Non-Powered Wheel Axles*

4. Remove special washers.



47A/T80764 T30:0230 12 060581

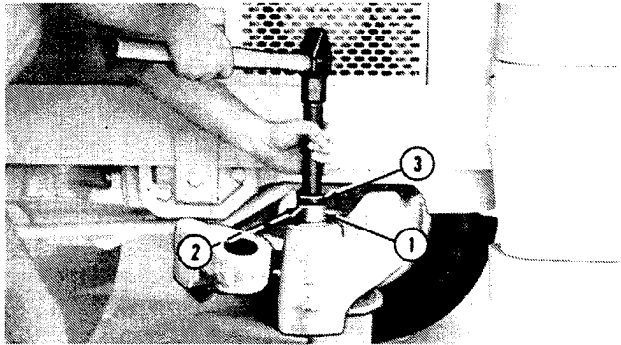
5. Remove bushings (1).



47A/T80765 T30:0230 13 060581

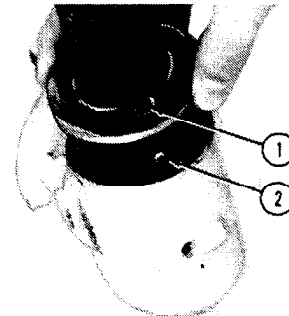
**INSTALL SPINDLE AND KNUCKLE ASSEMBLY**

1. Install new bushings (1) with 27511 disk (2), 27513 disk (3) and handle from the D-01045AA Bushing, Bearing and Seal Driver Sets.



47A/T80766 T30:0230 14 060581

2. Install washers, with slot on washers (1) in alignment with spring pin (2).

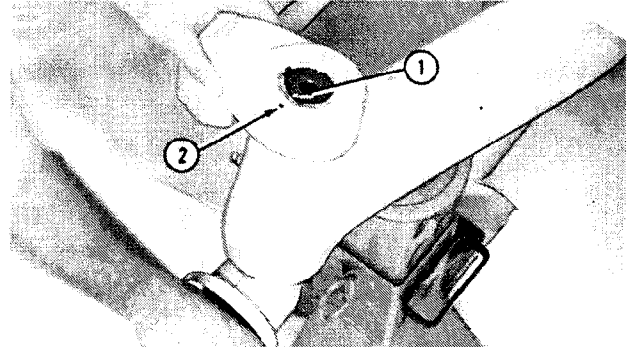


47A/T80927 T30:0230 15 060581



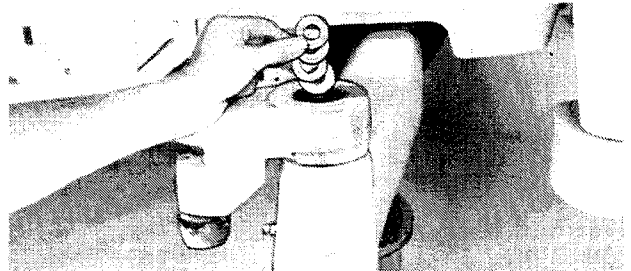
## Non-Powered Wheel Axles

3. Install spindle and knuckle assembly with punch marks on spindle (1) and steering arm (2) in alignment.



47A:T80767 T30:0230 16 060581

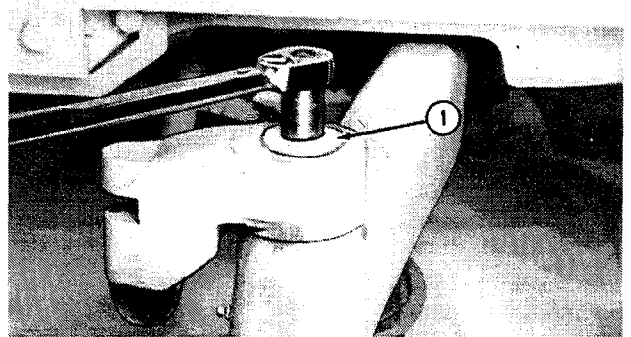
4. Install a nominal thickness of thrust washers.



47A:T80768 T30:0230 17 060581

5. Install special washer (1), lock washer and cap screw. Tighten cap screw to (230 N-m) 170 lb-ft.

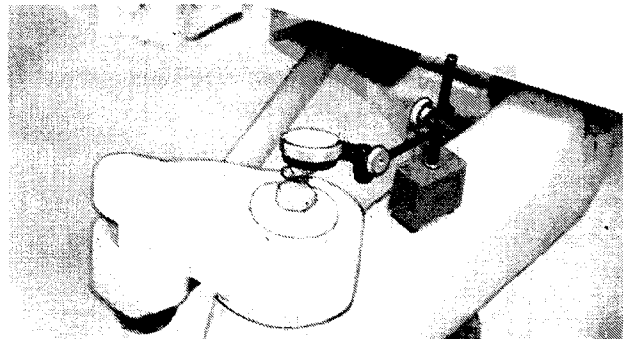
*NOTE: Steering arm must turn freely.*



47A:T80769 T30:0230 18 060581

### ADJUST FOR SPINDLE AND KNUCKLE END-PLAY

1. Use a dial indicator to measure endplay on the spindle and knuckle assembly.
2. Add or remove thrust washers to obtain (0.13 to 1.14 mm) 0.005 to 0.045 in. end play.
3. Tighten cap screw to (230 N-m) 170 lb-ft.
4. Put multi-purpose grease in grease fittings to lubricate the knuckle bushings.

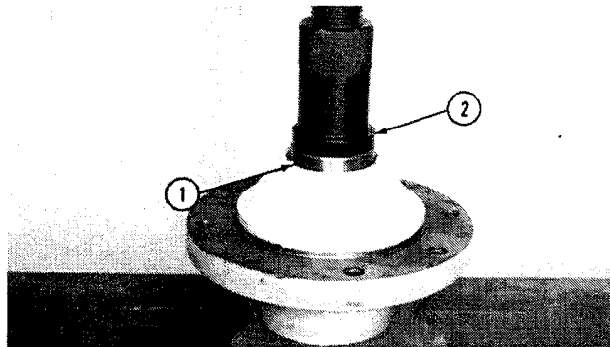


47A:T80770 T30:0230 19 060581

## Non-Powered Wheel Axles

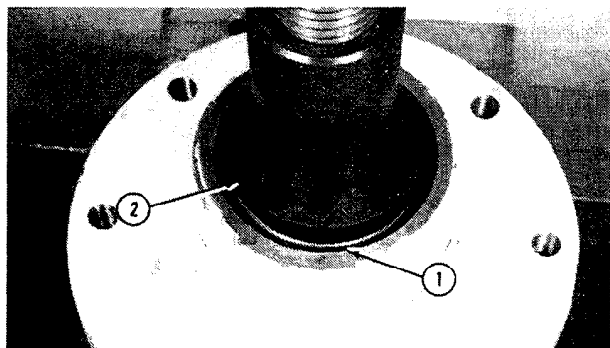
### ASSEMBLE HUB

1. Use a press and 27525 Disk (2) from the D-01045AA driver set to install outer bearing cup (1).



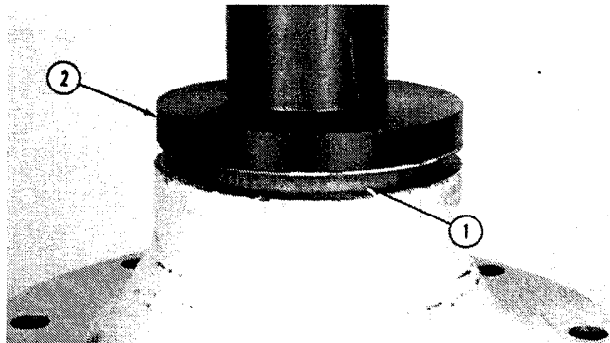
47A:T80759 T30:0230 20 060501

2. Use a press and 27534 Disk (2) to install inner bearing cup (1).
3. Put multi-purpose grease on the inner and outer bearing cups.



47A:T80760 T30:023021 060501

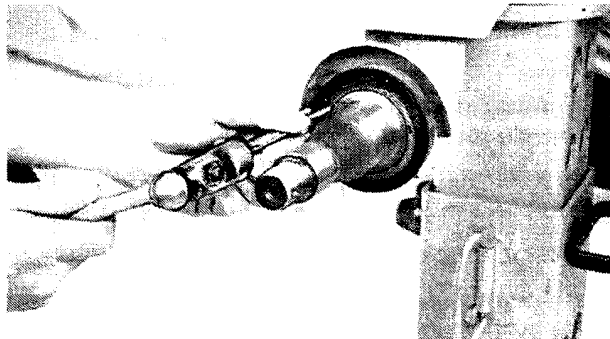
4. Use a press and 27551 Disk (2) to install seal cup (1).



47A:T80761 T30:0230 22 060501

### INSTALL HUB ASSEMBLY

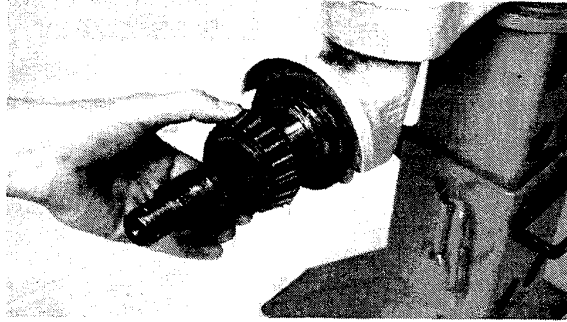
1. Install grease seal with "stamped side" facing driver. The seal must be tight against the bottom.
2. Put multi-purpose grease on lip of seal.



47A:T80771 T30:0230 23 060501

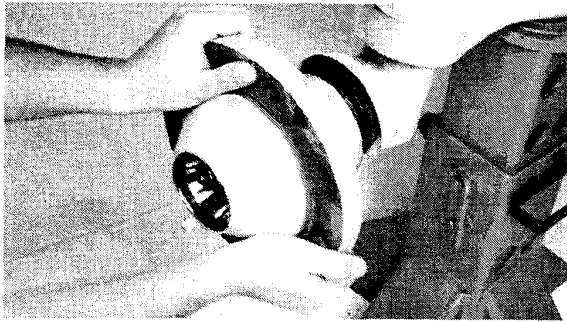
## Non-Powered Wheel Axles

3. Install inner bearing.



47A/T80755 T30:0230 24 060581

4. Install hub.



47A/T80754 T30:0230 25 060581

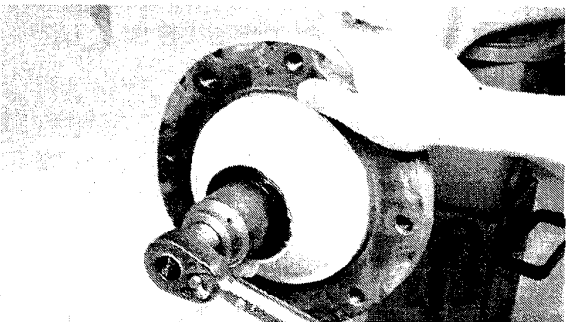
5. Install outer bearing.



47A/T80753 T30:0230 26 060581

### ADJUST WHEEL HUB BEARINGS

1. Install special washer and slotted nut.
2. Tighten slotted nut to (47 N-m) 35 lb-ft.
3. Turn hub several times and tighten nut again to (47 N-m) 35 lb-ft.

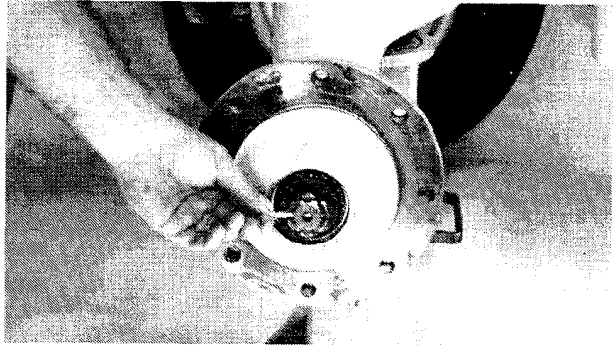


47A/T80772 T30:0230 28 010681

## Non-Powered Wheel Axles

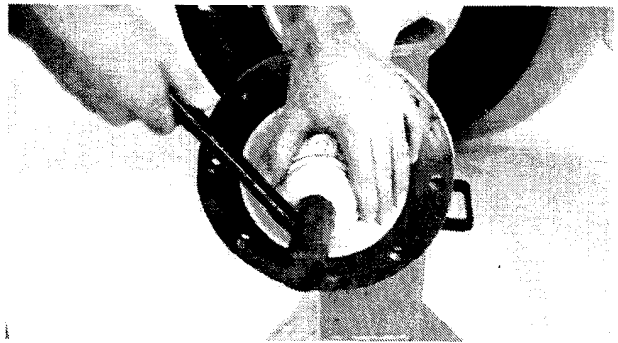
### CONTINUE TO INSTALL HUB ASSEMBLY

1. If hole in knuckle is aligned with slot in nut when nut is tightened to specified torque, turn nut counterclockwise one slot and install cotter pin.



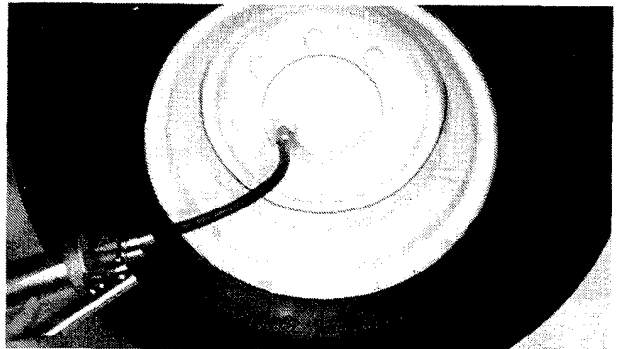
47A:T80773 T30:0230 29 010681

2. Install cap.



47A:T80774 T30:0230 30 060181

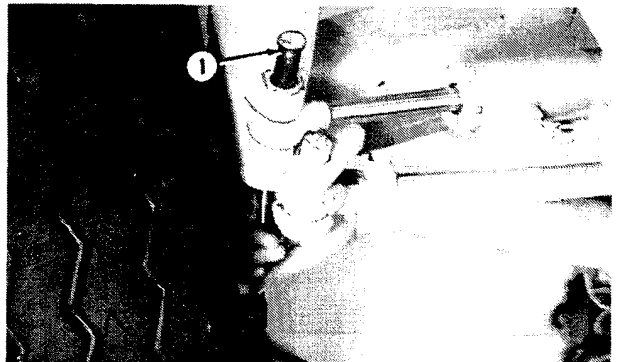
3. Install wheels (Group 0120).
4. Fill hub assembly with multi-purpose grease.



47A:T80797 T30:0230 31 010681

### REMOVE TIE ROD (RIGHT SIDE SHOWN)

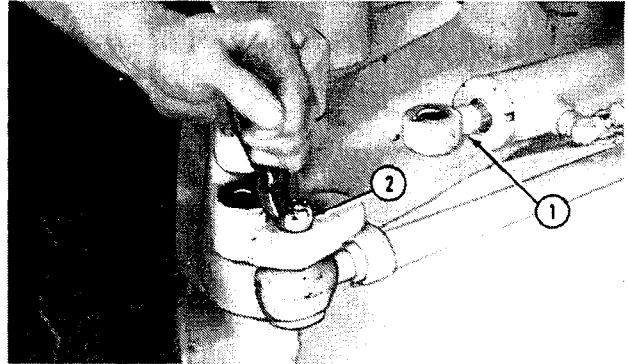
1. Remove pin (1).



47A:T80804 T30:0230 32 010681

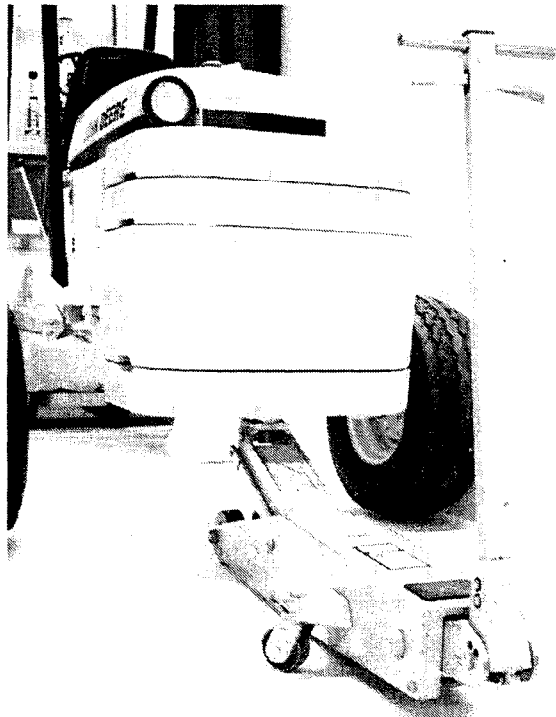
## Non-Powered Wheel Axles

2. Put the steering cylinder (1) in the retracted position.
3. Remove cotter pin and loosen nut (2).



47A:T80805 T30:0230 33 010681

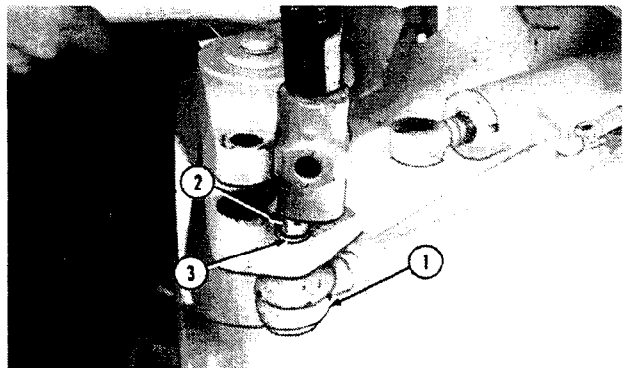
4. Put a service jack under counterweight. Lift unit high enough to gain access for removal of tie rod and sockets.



47A:T80934 T30:0230 27 010681

**IMPORTANT: Be careful not to damage socket threads during removal.**

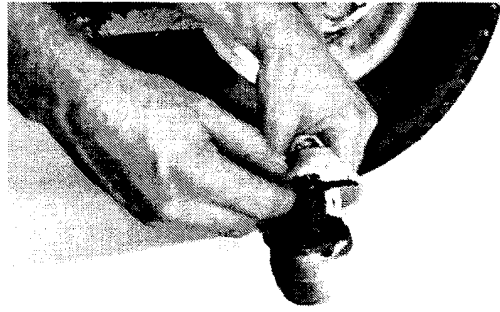
5. Hit on nut (2) to loosen socket (1).
6. Remove nut and washer (3). Pull socket from steering arm.



47A:T80806 T30:0230 34 010681

## Non-Powered Wheel Axles

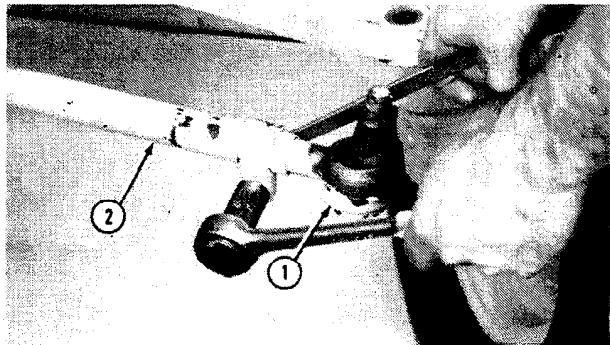
7. Remove cover only if replacement is necessary.



47A/T80807 T30:0230 35 010681

8. Loosen clamp. Remove socket (1) from tube (2).

9. Inspect parts for wear or damage; replace if necessary.

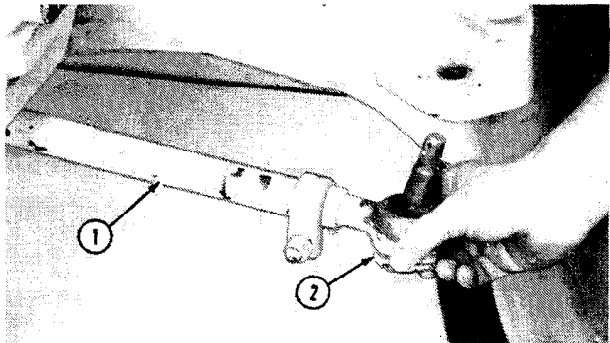


47A/T80928 T30:0230 36 010681

### INSTALL TIE ROD

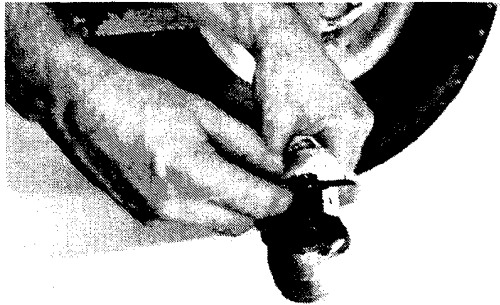
1. Slide clamp onto tube (1).

2. Install socket (2). Tighten clamp cap screw finger tight until the toe-in adjustment is made.



47A/T80929 T30:0230 37 010681

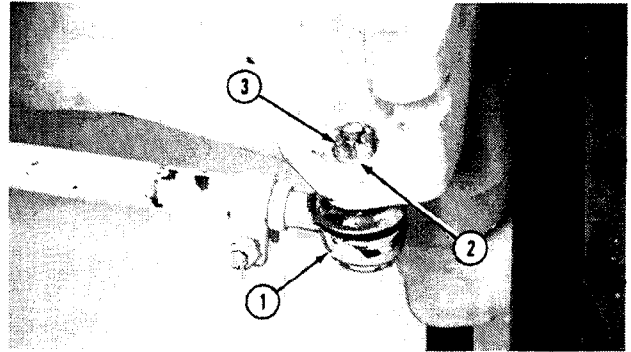
3. Install cover.



47A/T80807 T30:0230 38 010681

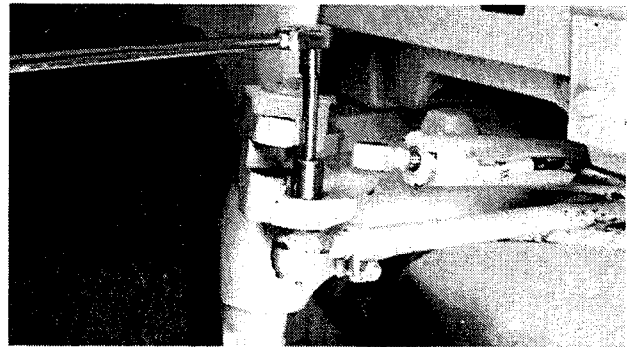
## Non-Powered Wheel Axles

4. Connect socket (1) and fasten with washer (2) and nut (3).



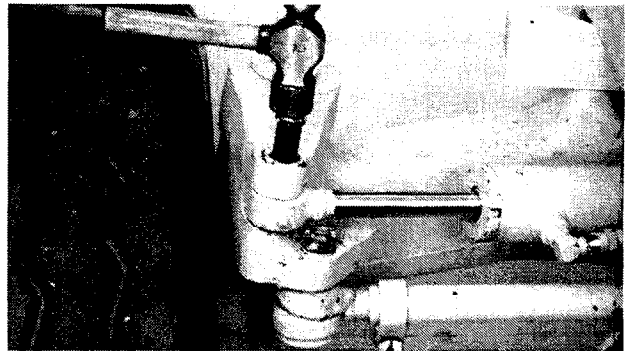
47A:T80930 T30:0230 39 010681

5. Tighten nut to (75 N·m) 55 lb-ft.
6. Tighten nut to nearest slot and install cotter pin.



47A:T80808 T30:0230 40 010681

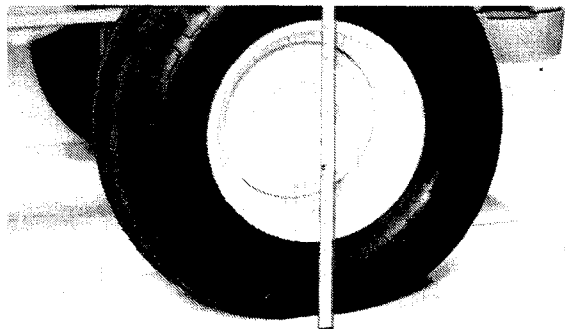
7. Connect steering cylinder and fasten with pin and cotter pin.



47A:T80931 T30:0230 42 010681

### ADJUST TOE-IN

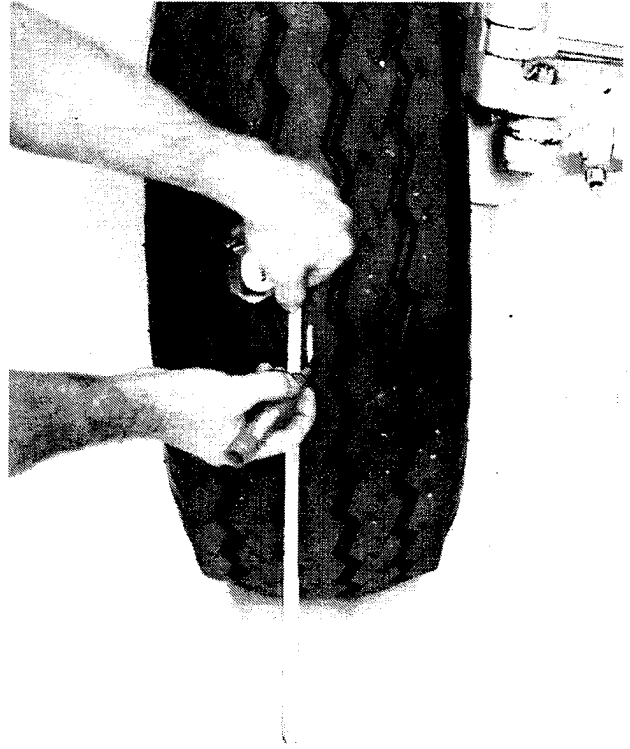
1. Put the rear wheels in a straight ahead position.
2. Measure the distance from the ground to the center of the wheel hub.



47A:T80809 T30:0230 43 010681

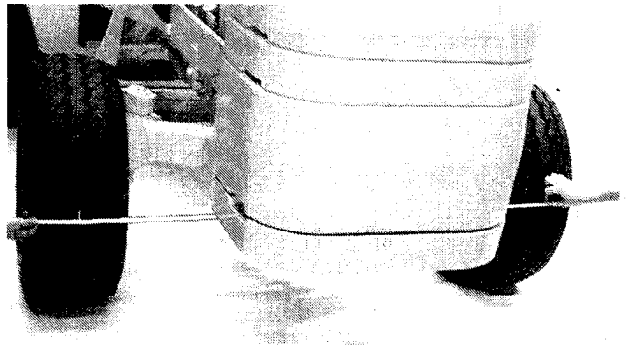
## Non-Powered Wheel Axles

3. Using the same dimension from the previous step, make a mark on the front and rear center of each tire.



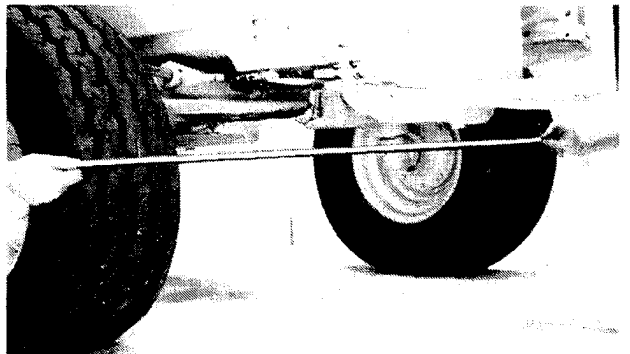
47A:T80932 T30:0230 44 010681

4. Measure the distance between rear marks.



47A:T80810 T30:0230 45 010681

5. Measure the distance between front marks.
6. The distance between the front marks must be  $(6.5 \pm 3 \text{ mm})$   $0.25 \pm 0.12 \text{ in.}$  less than the distance between the rear marks.



47A:T80811 T30:0230 46 010681



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