## 8570, 8770, 8870 and 8970 Tractors Repair

#### For complete service information also see:

8570, 8770, 8870, and 8970 Tractors	
Operation and Tests	TM1550
6076 Engine	
Serial Number (500000- )	CTM42
6101 Engine	CTM20
Radial Piston Pumps	CTM7
Engine Accessories	CTM11
1600 Series Ayles	CTM18

John Deere Waterloo Works TM1549 (10MAR93)

LITHO IN U.S.A. ENGLISH 8570, 8770, 8870 and 8970 Tractors Repair



### Introduction

#### **FOREWORD**

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.



This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and diagnostics. Repair sections tell how to repair the components. Diagnostic sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Binders, binder labels, and tab sets can be ordered by John Deere dealers direct from the John Deere Distribution Service Center. This manual is part of a total product support program.

FOS MANUALS—REFERENCE

TECHNICAL MANUALS—MACHINE SERVICE

COMPONENT MANUALS—COMPONENT SERVICE

Fundamentals of Service (FOS) Manuals cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Component Technical Manuals are concise service guides for specific components. Component technical manuals are written as stand-alone manuals covering multiple machine applications.

RX,TM1433,IFC -19-08FEB91

#### HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



-UN-23AUG88

DX,FLAME

DX,SPARKS

-19-04JUN90

#### PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



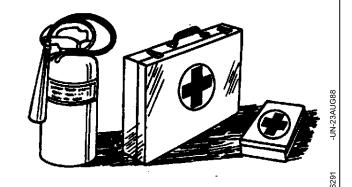
-19-03MAR93

#### PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



#### PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

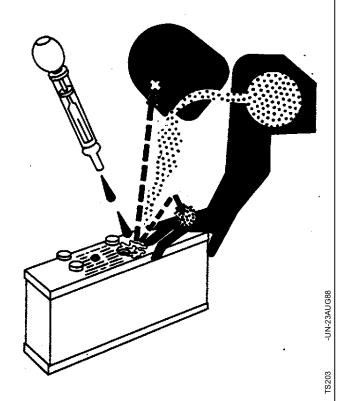
- 1. Filling batteries in a well-ventilated area.
- 2. Wearing eye protection and rubber gloves.
- 3. Avoiding breathing fumes when electrolyte is added.
- 4. Avoiding spilling or dripping electrolyte.
- 5. Use proper jump start procedure.

If you spill acid on yourself:

- 1. Flush your skin with water.
- 2. Apply baking soda or lime to help neutralize the acid.
- 3. Flush your eyes with water for 10—15 minutes. Get medical attention immediately.

If acid is swallowed:

- 1. Drink large amounts of water or milk.
- 2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
- 3. Get medical attention immediately.



X,POISON

19-04JUN9

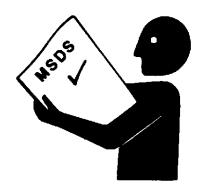
#### HANDLE CHEMICAL PRODUCTS SAFELY

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



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DX,MSDS,NA -19-03MAR93

#### AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



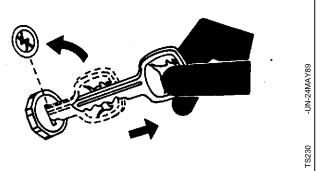
DX,FLUID

-19-03MAR93

#### PARK MACHINE SAFELY

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.

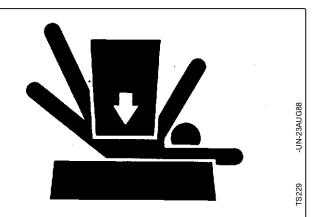


-19-04JUN90

#### SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



DX,LOWER

-19-04JUN90

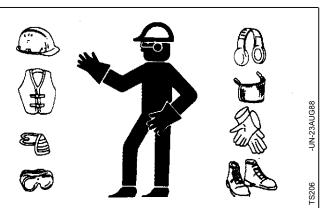
#### WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



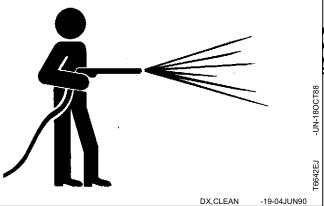
DX,WEAR

-19-10SEP90

#### **WORK IN CLEAN AREA**

Before starting a job:

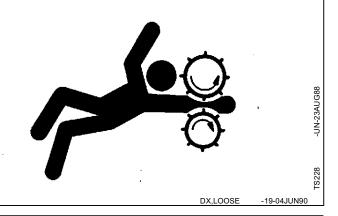
- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- · Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



#### SERVICE MACHINES SAFELY

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

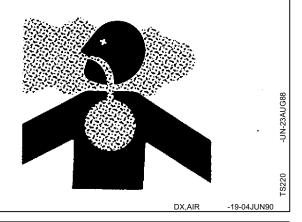
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



#### **WORK IN VENTILATED AREA**

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area.



#### **ILLUMINATE WORK AREA SAFELY**

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



DX,LIGHT

-19-04JUN90

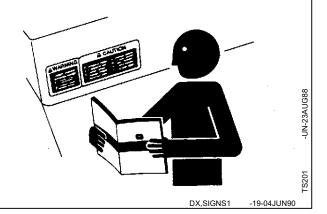
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TM1549 (10MAR93)

85-87-88-8970 Tractors Repair

#### **REPLACE SAFETY SIGNS**

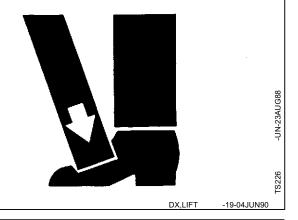
Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



#### **USE PROPER LIFTING EQUIPMENT**

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



#### SERVICE TIRES SAFELY

Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.



DX,RIM

-19-24AUG90

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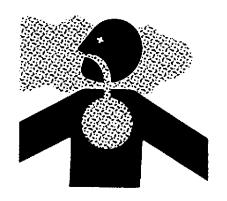
#### **AVOID HARMFUL ASBESTOS DUST**

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.

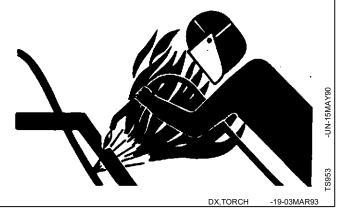


DX,DUST

-19-15MAR91

## AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.



## REMOVE PAINT BEFORE WELDING OR HEATING

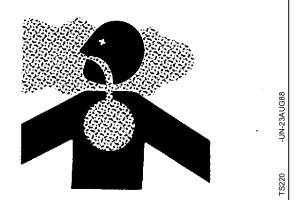
Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



DX,PAINT -19-03MAR93

#### **USE PROPER TOOLS**

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.



(,REPAIR -19-04JUN90

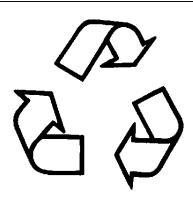
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



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DX,DRAIN

-19-03MAR93

#### LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



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DX,LIVE

-19-25SEP92

# Group 05 Machine Specifications

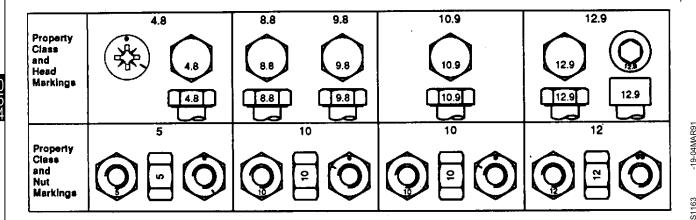
GENERAL SPECIFIC	CATIONS								
	8570	8770	8870	8970					
Power:									
Engine (Factory observed) Rated speed	250 hp (186 kW) 2100 rpm	300 hp (224 kW) 2100 rpm	350 hp (261 kW) 2100 rpm	400 hp (298 kW) 2100 rpm					
Governed speed range	900—2260 rpm	900—2260 rpm	900—2260 rpm	800—2260 rpm					
Operating speed range	1500—2100 rpm	1500—2100 rpm	1500—2100 rpm	1500—2100 rpm					
Engine:									
Engine.									
Туре	in-line 6-c	in-line 6-cylinder,							
and air-to-air aftercooled diesel valve									
				turbocharged and water- to-air aftercooled					
Displacement	466 in. <sup>3</sup> (7.6 L)	619 in. <sup>3</sup> (10.1L)	619 in. <sup>3</sup> (10.1L)	855 in. <sup>3</sup> (14.0L)					
Bore	4.56 in. (116 mm)	5.12 in. (130 mm)	5.12 in. (130 mm)	5.50 in. (140 mm)					
Stroke Compression ratio	4.75 in. (121 mm) 15.8:1	5.00 in. (127 mm) 15.75:1	5.00 in. (127 mm) 15.75:1	6.00 in. (152 mm) 14.0:1					
Lubrication	full-flow filtration	full-flow filtration	full-flow filtration	full-flow filtration					
	w/bypass	w/bypass	w/bypass	w/bypass					
Fred Creaters									
Fuel System:									
Injection pump type	in-line	in-line	in-line	Cummins Pressure-Time					
Fuel filter	Spin-on	primary filter with separator	bowl/	Spin-on throwaway					
Number fuel filters	2	Clamp-on final filter 2	2	1					
Air cleaner	dry-type with secondary	dry-type with secondary	dry-type with secondary	dry-type with secondary					
	element	element	element	element					
Cooling System:									
Fan	viscous drive	viscous drive	viscous drive	viscous drive					
Number of thermostats	2	3	3	1					
Electrical System:									
Type	12 volt	12 volt	12 volt	12 volt					
Alternator	negative ground 120 amp								
Batteries	two 12 volt	two 12 volt	two 12 volt	three 12 volt					
Cold cranking amps	1850	1850	1850	2775					
Capacities:									
Fuel tank	220 gal (835L)	220 gal (835L)	220 gal (835L)	220 gal (835L)					
Cooling system	58 qt (55L)	58 qt (55L)	58 qt (55L)	72 qt (68.1L)					
Crankcase Transmission (all types)	24.3 qt (23L) 10 gal (37.8L)	33.8 qt (32L) 10 gal (37.8L)	33.8 qt (32L) 10 gal (37.8L)	36 qt (34L) 10 gal (37.8L)					
Hydraulic system:	10 gai (37.6L)	10 gai (37.6L)	10 gai (37.6L)	10 gai (37.6L)					
Total:									
Standard Axle	38 gal (144L)	38 gal (144L)	38 gal (144L)	40 gal (151L)					
Optional Axle Hydraulic reservoir	— 14 gal (53L)	— 14 gal (53L)	40 gal (151L) 14 gal (53L)	— 14 gal (53L)					
riyaradile 16561VUII	it yai (UJL)	it gai (UUL)	it gai (JJL)	17 gai (UUL)					
				DV45404005 4 40 0 (55000					
				RX15491005,1 -19-04FEB93					

### **Hydraulic System:** Hitch Lift Capacity: 8870: **Brakes:** ..... Hydraulically Operated Wet Disk 8870 and 8970 . . . . . Mounted in Front and Rear Axle Assemblies **Transmissions:** 12-Speed Syncro: 24-Speed POWRSYNC: 12-Speed Powershift (8770, 8870 and 8970): Type ...... Electronically Activated Wet Clutch Gear Selections . . . . . . . Power Take-Off: Type ...... Fully Independent RX15491005,2 -19-14JAN93

RX15491005,3 -19-22DEC92

	8570 (18.4-38 duals)	8770 (20.8-38 duals)	8870 (20.8-38 duals)	8970 (20.8-42 duals)
Wheelbase	134.0 in. (3400 mm)			
Overall Length	268.9 in. (6830 mm)			
Width:	200.9 111. (0030 11111)	200.9 III. (0030 IIIII)	200.9 III. (0030 IIIII)	200.9 III. (0030 IIIII)
Standard Axle	119.8 in. (3042 mm)	119.8 in. (3042 mm)	119.8 in. (3042 mm)	128.0 in. (3240 mm)
Optional Axle	<u>.</u>	<u> </u>	128.0 in. (3240 mm)	<u> </u>
Height				
Top of SOUND-GARD	134.3 in. (3410 mm)	135.8 in. (3440 mm)	135.8 in. (3440 mm)	137.4 in. (3491 mm)
Top of Hood	95.9 in. (2436 mm)	97.1 in. (2466 mm)	97.1 in. (2466 mm)	99.1 in. (2517 mm)
Top of Muffler	151.7 in. (3852 mm)	152.8 in. (3882 mm)	152.8 in. (3882 mm)	154.8 in. (3933 mm)
Turning Radius	14.6 ft (4.45 m)			
Crop Clearance (axle)	18.8 in. (477 mm)	20.0 in. (507 mm)	20.0 in. (507 mm)	22.0 in. (558 mm)
Estimated Shipping Weight				
(No PTO - No Hitch)	29564 lb (13 410 kg)	31438 lb (14 260 kg)	31438 lb (14 260 kg)	31879 lb (14 460 kg
Tires (standard)	18.4R-38 in.	20.8R-38 in.	20.8R-38 in.	20.8R-42 in.

#### METRIC BOLT AND CAP SCREW TORQUE VALUES



		Clas	s 4.8			Class 8	.8 or 9.8	3		Class	s 10.9			Class	s 12.9				
Size	Lubri	cateda	Dr	'y <sup>a</sup>	Lubricate		Drya		Lubricateda		Drya		Lubricateda		Drya				
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft			
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5			
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35			
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70			
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120			
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190			
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300			
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410			
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580			
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800			
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000			
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500			
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000			
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750			
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500			

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

DX,TORQ2 -19-16APR92

<sup>&</sup>lt;sup>a</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

#### 10 05

#### UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2 <sup>b</sup>	5 5.1 5.2	\$ 2
SAE Grade and Nut Markings	NO MARK	Ž		

		Gra	de 1			Grad	de 2 <sup>b</sup>		G	irade 5,	5.1, or 5	5.2		Grade	e 8 or 8.2				
Size	Lubri	cateda	Dr	'y <sup>a</sup>	Lubri	cateda	Dr	'ya	Lubri	icateda	Dr	'ya	Lubri	cateda	Di	rya			
	N⋅m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft			
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5			
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26			
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46			
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75			
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115			
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160			
5/8	67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225			
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400			
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650			
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975			
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350			
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950			
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550			
1_1/2	1000	725	1250	025	aan	725	1250	030	2250	1650	2850	2100	3600	2650	4550	3350			

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

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DX,TORQ1 -19-15MAR91

<sup>&</sup>lt;sup>a</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

<sup>&</sup>lt;sup>b</sup> Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

#### **ABBREVIATIONS**

Abbreviations are used in place of some words.

AQS—Air Quality System

CTM—Component Technical Manual

ECU—Engine Control Unit

EFI—Electronic Fuel Injection

ID—Inside Diameter

MST—Manual Shift Transmission

OD—Outside Diameter

ORS—O-Ring Seal

PST—Power Shift Transmission

PTO—Power Take-Off

SCV—Selective Control Valve

SMV—Slow Moving Vehicle

SGB—SOUND-GARD Body

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