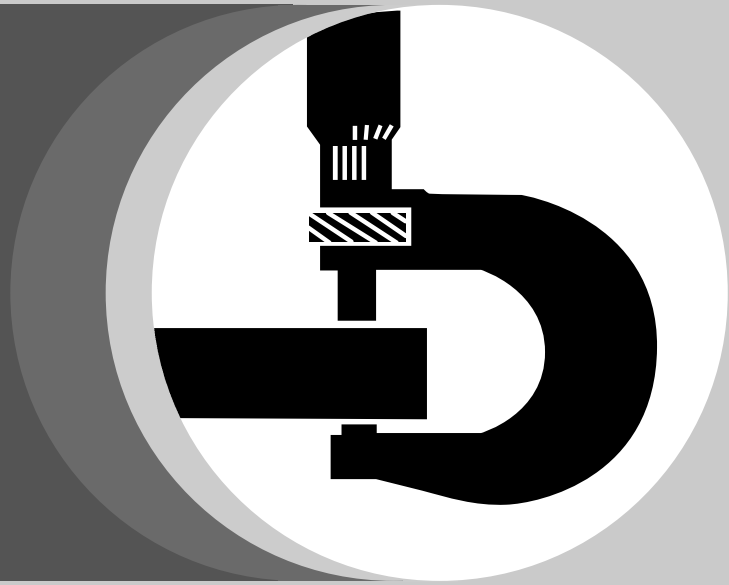
*POWER*TECH® 4.5L & 6.8L Diesel Engines

Base Engine

COMPONENT TECHNICAL MANUAL



For complete service information also see:

POWERTECH® **4.5 L and 6.8 L Diesel Engines—Level 4 Electronic Fuel Systems with Bosch VP44 Pump CTM170**

POWERTECH® **4.5 L and 6.8 L Diesel Engines—Mechanical Fuel Systems. CTM207**

Alternators and Starting Motors CTM77

OEM Engine Accessories. . . . . CTM67 (English Only)

Deere Power Systems Group
CTM104 (19JUN00)
LITHO IN U.S.A.
ENGLISH

JOHN DEERE

DEERE POWER

Introduction

Forward

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.

This manual (CTM104) covers only the base engine. It is one of three volumes on 4.5 L and 6.8 L engines. The following two companion manuals cover fuel system repair, operation and diagnostics:

- CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump
- CTM207—Mechanical Fuel Systems

CTM207 covers the fuel systems formerly included in CTM104.

Other manuals will be added in the future to provide additional information on electronic fuel systems as needed.

A complete set of all three manuals covering the 4.5 L and 6.8 L engines can be procured by ordering CTM350 Binder Set.

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.

Use this component technical manual in conjunction with the machine technical manual. An application listing in Section 01, Group 001 identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

Information is organized in sections and 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.

Before beginning repair on an engine, clean the engine and mount on a repair stand. (See Section 2, Group 010.)

This manual contains SI Metric units of measure followed immediately by the U.S. customary units of measure. Most hardware on these engines is metric sized.

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manual for information on components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Read each block of material completely before performing service to check for differences in procedures or specifications. Follow only the procedures that apply to the engine model number you are working on. If only one procedure is given, that procedure applies to all the engines in the manual.

CALIFORNIA PROPOSITION 65 WARNING
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

DPSG,OUO1004,2767 –19–18MAY00–1/1

John Deere Dealers

The changes listed below make your CTM obsolete. Repair, operation and diagnostics on 4.5L and 6.8 L diesel engines is now covered in three manuals. **Discard CTM104 dated 12OCT98 and replace with the following new manuals:**

- CTM104 4.5 L and 6.8 L Diesel Engines—Base Engine
- CTM207 4.5 L and 6.8 L Diesel Engines—Mechanical Fuel Systems
- CTM170 4.5 L and 6.8 L Diesel Engines—Level 4 Electronic Fuel System with Bosch VP44 Pump

Also, copy this page listing changes and route through your Service Department.

SECTION 01—GROUP 001 (Engine Identification)

- Updated engine model designation chart.
- Updated engine application charts.

SECTION 01—GROUP 002 (Fuels Lubricants and Coolants)

- Updated engine oil and coolant application guidelines.

SECTION 02—GROUP 010 (Engine Rebuild)

- Updated engine lifting procedure and safety precautions.
- Updated sealant application guidelines.
- Added engine break-in procedure.

SECTION 02—GROUP 020 (Cylinder Head and Valves)

- Revised rocker arm support torque specifications.

SECTION 02—GROUP 030 (Cylinder Block, Liners, Pistons and Rods)

- Updated procedure for determining piston-to-liner clearance.
- Added sealant requirements and torque specifications for plugs and caps in cylinder block, located in procedure for inspection and cleaning of cylinder block.
- Revised procedure for measuring cylinder liner standout (height above block).
- Revised procedure for installing cylinder liners in block.

SECTION 02—GROUP 040 (Crankshaft, Main Bearings and Flywheel)

- Revised procedure and specifications for removal and installation of vibration damper.
- Revised procedure for removal and installation of front oil seal and wear sleeve.
- Revised procedure for installation of flywheel.
- Revised procedure and specifications for installation of flywheel housing.
- Added procedure for removal and installation of crankshaft timing wheel on engines with Bosch VP44 fuel injection pump.

SECTION 02—GROUP 050 (Camshaft, Balancer Shafts and Timing Gear Train)

- Revised idler gear end play specifications.
- Updated timing gear backlash specifications.
- Revised procedure for removal and installation of balancer shafts.
- Revised idler gear bushing and idler gear shaft specifications.
- Revised procedure for installation of upper idler shaft in front plate.
- Revised procedure for installation of camshaft.
- Revised procedure for installation of timing gear cover.
- Revised procedure for installation of crankshaft front wear sleeve and oil seal.

SECTION 02—GROUP 060 (Lubrication System)

- Revised procedure for removal and installation of oil filter base.
- Revised procedure for removal and installation of oil cooler assembly.
- Revised oil pan drain plug specifications.

DPSG,OUO1004,1108 –19–07OCT99–1/2

SECTION 02—GROUP 070 (Cooling System)

- Added procedure for removal and installation of water manifold/thermostat cover on 6010 Series Tractors.
- Revised torque specification for water pump pulley.
- Revised procedure for installation of fan assembly.
- Revised procedure for installation of fan drive assembly.
- Added procedure for removal and installation of cold start advance switch.

SECTION 02—GROUP 080 (Air Intake and Exhaust System)

- Revised turbocharger lube line torque specifications.
- Added procedure for removal and installation of ether start aid.

SECTION 02—GROUP 090 (Fuel System)

NOTE: Repair procedures for fuel systems has been moved to Section 02, Group 090 in two other technical manuals: CTM207—Mechanical Fuel Systems and CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump.

SECTION 02—GROUP 100 (Starting and Charging Systems)

- Starting and charging systems are now covered in this new section/group.

SECTION 03—GROUP 120 (Base Engine Operation)

- Base engine theory of operation is covered in this new section/group.

NOTE: Fuel system theory of operation has been moved to Section 03, Group 130 in two other technical manuals: CTM207—Mechanical Fuel Systems and CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump.

SECTION 04—GROUP 150 (Observable Diagnostics and Tests)

- Base engine observable tests and diagnostics is covered in this new section/group.
- Added dynamometer test procedure and specifications.

NOTE: Fuel system testing and diagnostics has been moved to Section 04, Group 150 in two other technical manuals: CTM207—Mechanical Fuel Systems and CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump.

SECTION 5 (Tools and Other Materials)

- All essential tools, service tools, dealer fabricated tools and other materials listed throughout this manual are consolidated in this section for ease of reference.

SECTION 6 (Specifications)

- All repair, test and diagnostic specifications listed throughout this manual are consolidated in this section for ease of reference.

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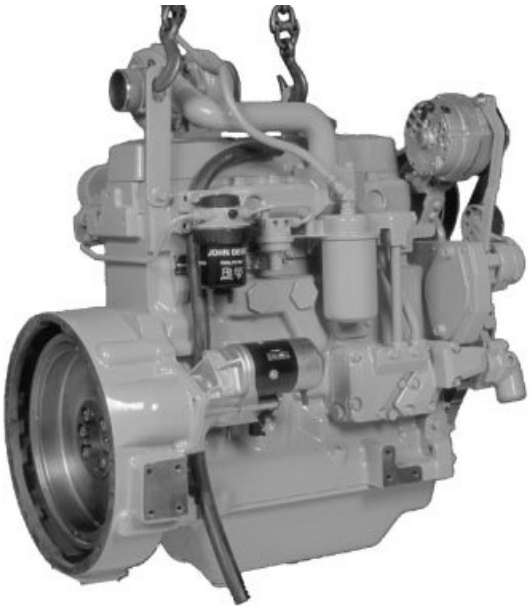
POWERTECH® 4.5 L Engine

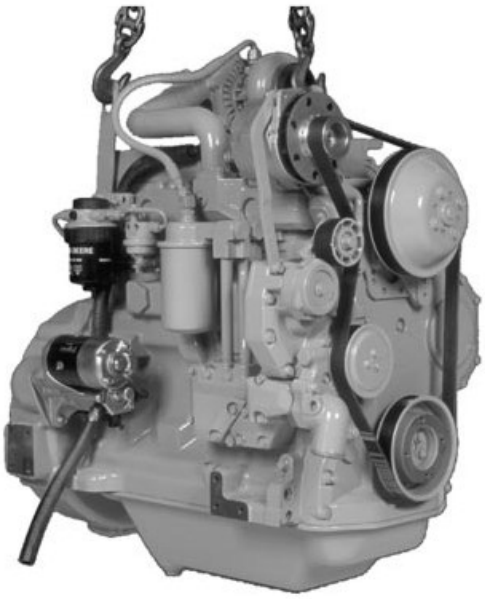


RG7636 –UN–23NOV97

3/4 Right Rear View

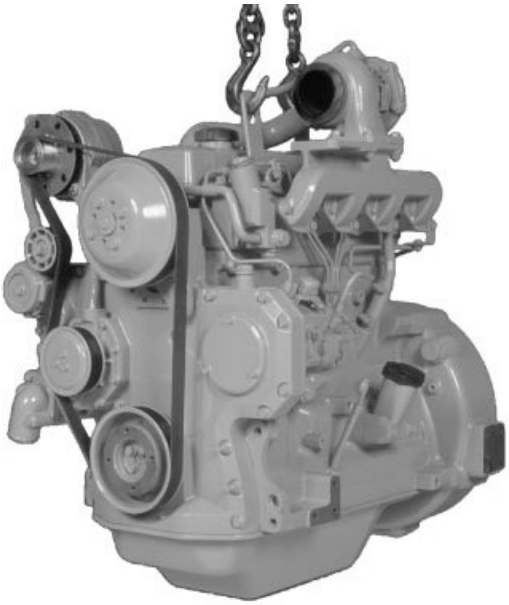
RG7638 –UN–23NOV97

3/4 Left Rear View



RG7639 –UN–23NOV97

3/4 Right Front View



RG7637 –UN–23NOV97

3/4 Left Front View

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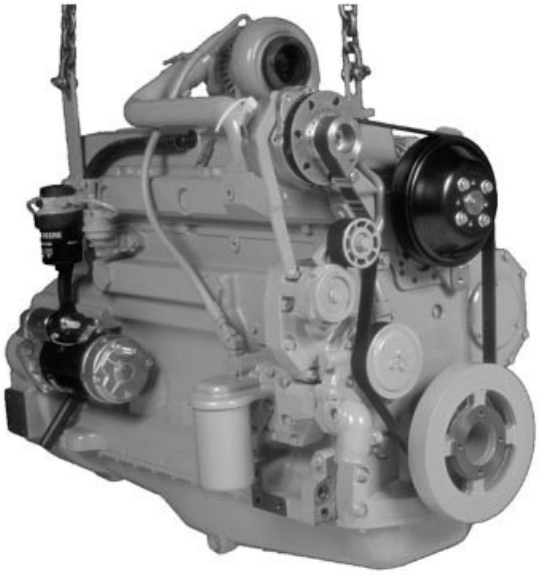
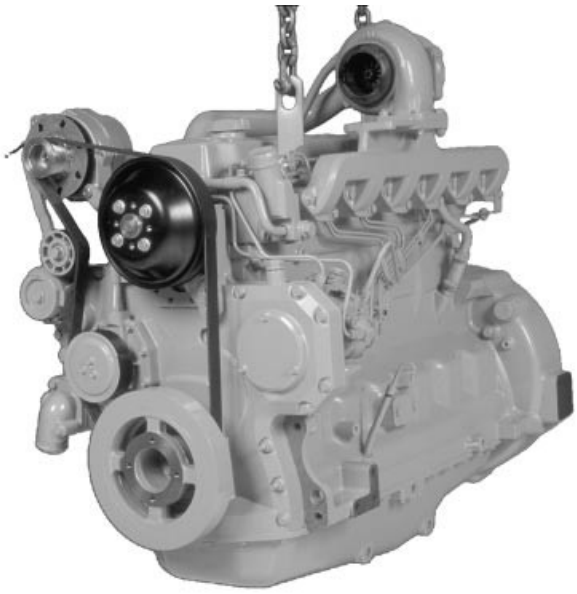
POWERTECH® 6.8 L Engine



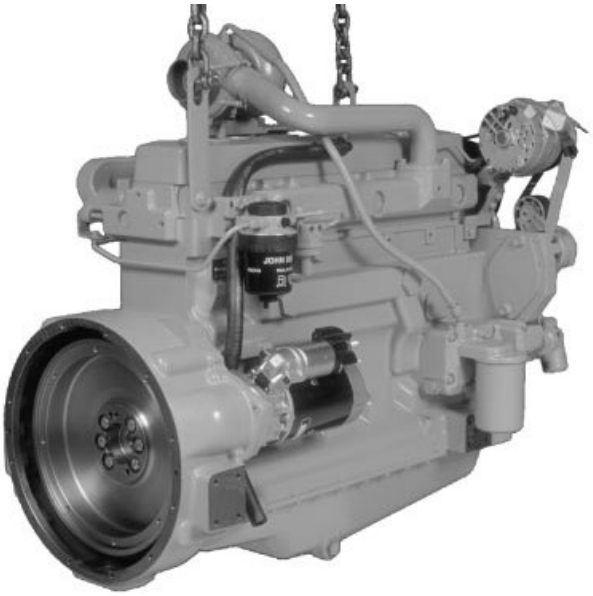
RG7641 –UN–23NOV97

3/4 Right Front View



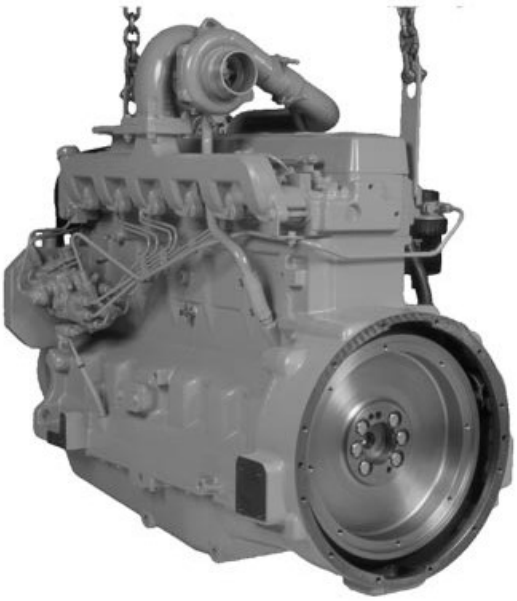
RG7640 –UN–23NOV97

3/4 Left Front View



RG7643 –UN–23NOV97

3/4 Right Rear View



RG7642 –UN–23NOV97

3/4 Left Rear View

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Contents

All information, illustrations and specifications in this 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.

Section 01
General Information

Contents

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.

TS227 –UN–23AUG88

Avoid Fires

DX,FLAME –19–29SEP98–1/1

Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.

TS1356 –UN–18MAR92

Store Safely

DX,FIRE3 –19–16APR92–1/1

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Service Cooling System Safely

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

TS281 –UN–23AUG88

Cooling System

DX,RCAP –19–04JUN90–1/1

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 voltmeter or hydrometer.

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

TS204 –UN–23AUG88

Battery Explosions

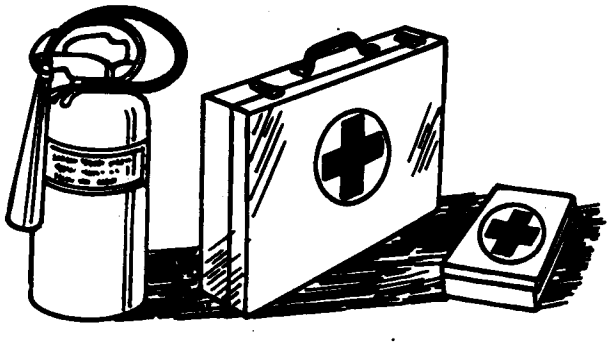
DX,SPARKS –19–03MAR93–1/1

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.



TS291 –UN–23AUG88

First Aid Kit

DX,FIRE2 –19–03MAR93–1/1

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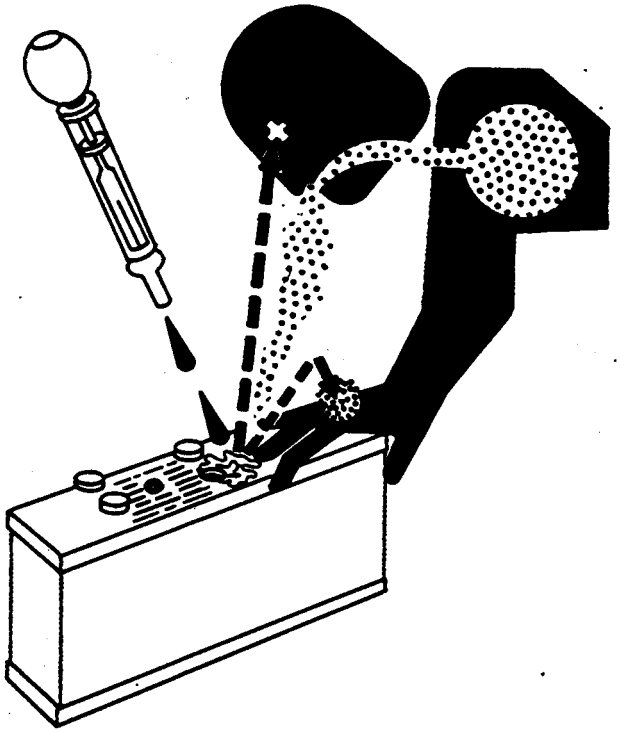
Handling Batteries Safely

TS204 –UN–23AUG88

CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

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

Always remove grounded (-) battery clamp first and replace it last.



TS203 –UN–23AUG88

CAUTION: 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 15—30 minutes. Get medical attention immediately.**

If acid is swallowed:

1. **Do not induce vomiting.**
2. **Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).**
3. **Get medical attention immediately.**

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**

DPSG,OUO1004,2758 –19–11MAY00–1/1

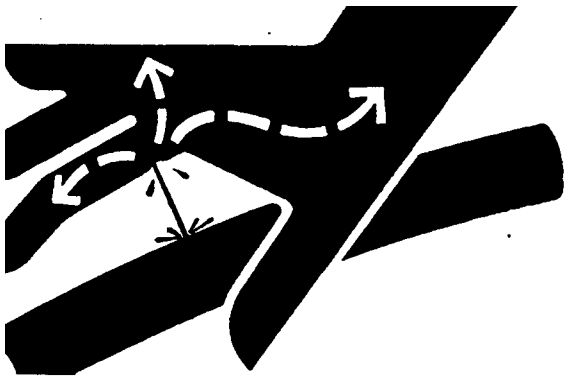
Avoid High-Pressure Fluids

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.



X9811 –UN–23AUG88

High-Pressure Fluids

DX,FLUID –19–03MAR93–1/1

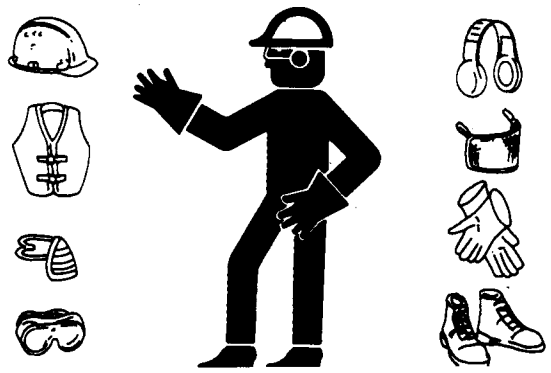
Wear Protective Clothing

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.



TS206 –UN–23AUG88

Protective Clothing

DX,WEAR –19–10SEP90–1/1