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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

CATERPILLAR®

CATERPILLAR®

KEBU7504-02
December 2002

Operation and Maintenance Manual

CB-214D, CB-224D and CB-225D Vibratory Compactors

1TZ1-Up (Machine)
8RZ1-Up (Machine)
9FZ1-Up (Machine)

i01863142

Maintenance Interval Schedule

SMCS Code: 1000; 7000

When Required

Battery - Recycle 70
Circuit Breakers - Reset 72
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Every 3 Years

Seat Belt - Replace 95

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Cooling System Coolant (ELC) - Change 73

i01598251

Articulating and Oscillating Bearings - Lubricate

SMCS Code: 7057-086-BD; 7113-086-BD

Articulating Bearings

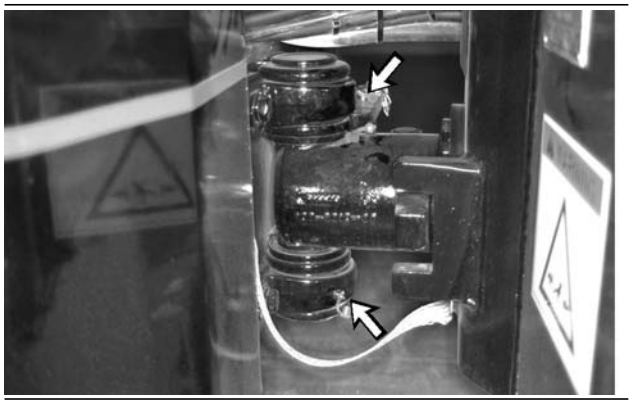

Illustration 113 g00645575

The hitch is located in the center pivot area.

1. Clean all fittings before servicing.

2. Clean all caps before servicing.

3. Lubricate the fittings for the articulation bearing.

Note: Use a small amount of grease. Excess grease can cause seal damage.

4. Install all caps after servicing.

Oscillating Bearings

Illustration 114 g00645589

1. Clean the fitting before servicing.

2. Clean the cap before servicing.

3. Lubricate the bearing that controls oscillation.

Note: Use a small amount of grease. Excess grease can cause seal damage.

4. Install the cap after servicing.

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Backup Alarm - Test

SMCS Code: 7406-081

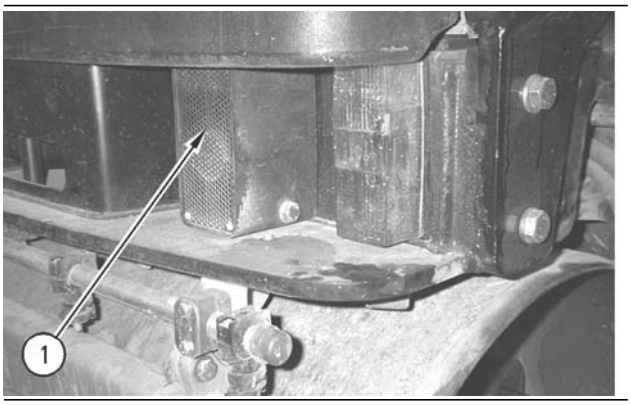

Illustration 115 g00647301

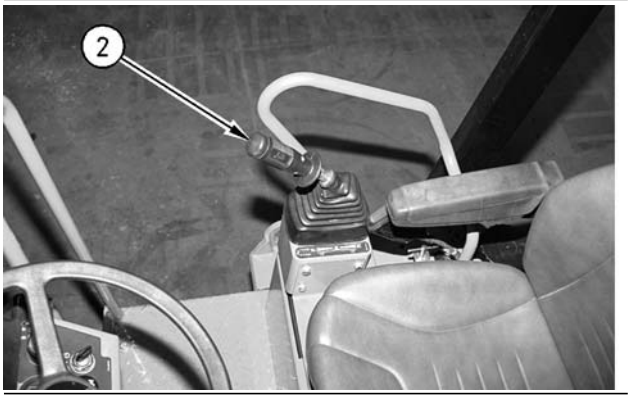

Illustration 116 g00647297

The back up alarm (1) is located at the rear of the machine.

Apply the parking brake. Turn the keyswitch ON . Move the propel control lever (2) to reverse. If the back up alarm does not operate, make any needed repairs.

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Battery - Clean/Check

SMCS Code: 1401-535

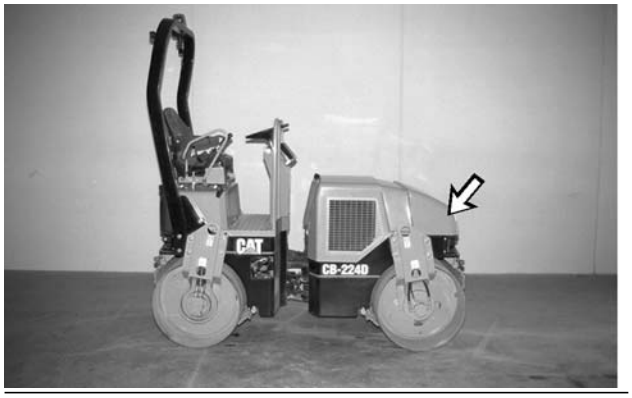

Illustration 117 g00647091

The battery is located under the engine access cover.

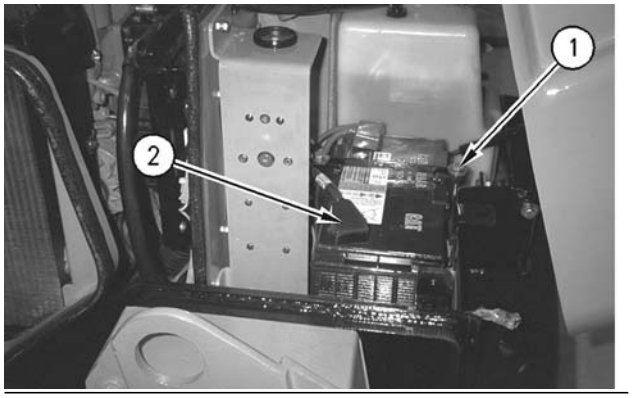

Illustration 118 g00647095

Note: Maintenance free batteries are included with a new machine. You do not need to check the electrolyte level in the maintenance free batteries.

1. Every 1000 hours tighten the retainers on the battery (1).
2. Clean the top of the batteries with a clean cloth for every 1000 hours of operation.
3. The battery terminals must be cleaned and coated with petroleum jelly for every 1000 hours of operation.

i00836435

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

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Battery or Battery Cable - Replace

SMCS Code: 1401-510; 1402-510

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.

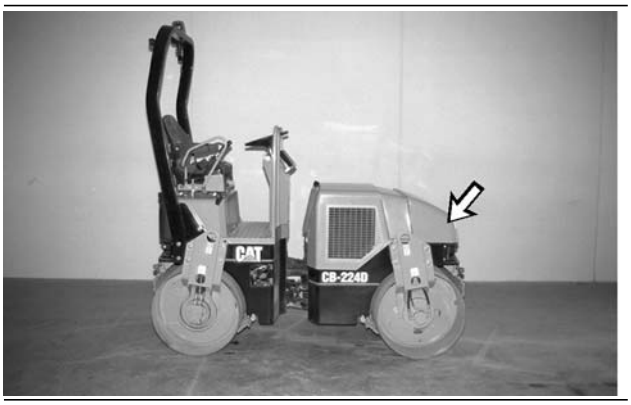

Illustration 119 g00647091

2. Open the battery compartment.

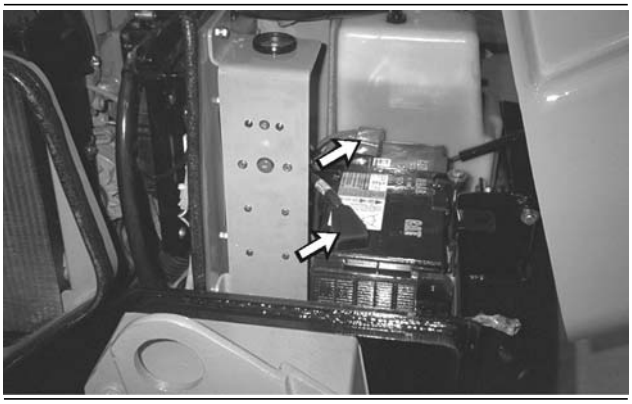

Illustration 120 g00668469

3. Do not allow the disconnected battery cables to contact the other cables. Do not allow the disconnected battery cables to contact the opposite terminal of either battery.
4. Disconnect the negative battery cable at the battery.

5. Disconnect the + battery cable from the battery.

6. Disconnect the cable from the starter motor.

7. Perform the necessary repairs. Replace the cables or the battery, as needed.

8. Reverse the above steps in order to reconnect the battery.

9. Install the battery compartment cover.

i01598238

Belts - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-040; 1357-510

Your engine can be equipped with a water pump belt, with a fan drive belt and with accessory drive belts. Your engine can also be equipped with an alternator belt. For maximum engine performance and maximum utilization of your engine, inspect the belts for wear and for cracking. Check the belt tension. Adjust the belt tension in order to minimize belt slippage. Belt slippage will decrease the belt life. Belt slippage will also cause poor performance of the alternator and of any driven equipment.

If new belts are installed, recheck the belt adjustment after 30 minutes of operation. If two belts or more are required for an application, replace the belts in belt sets. If only one belt of a matched set is replaced, the new belt will carry more load. This is due to the fact that the older belts are stretched. The additional load on the new belt could cause the new belt to break.

Open the engine compartment.

Alternator Belt and Water Pump Belt

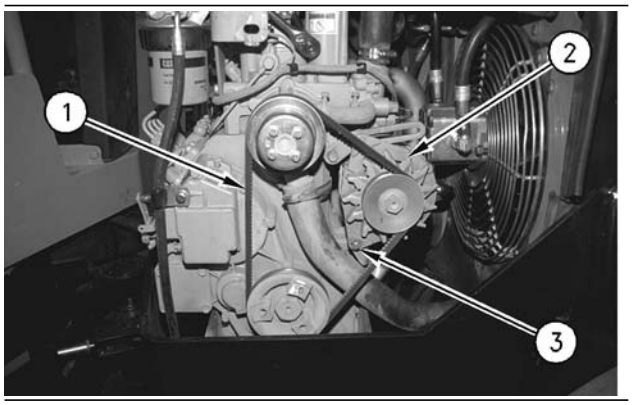

Illustration 121 g00642749

1. To check the belt tension, apply 110 N (25 lb) of force midway between the pulleys. Correctly adjusted belts will deflect 13 to 19 mm (1/2 to 3/4 inch).

2. In order to adjust alternator belt (1), loosen mounting bolt (3).

3. To achieve the correct adjustment, move the alternator inward or move alternator (2) outward, as required.

4. Tighten mounting bolt (3).

Note: The alternator shaft nut must be tightened to a torque of 50 ± 5 N·m (37 ± 4 lb ft).

5. If new belts are installed, check the belt adjustment again after 30 minutes of engine operation at the rated speed.

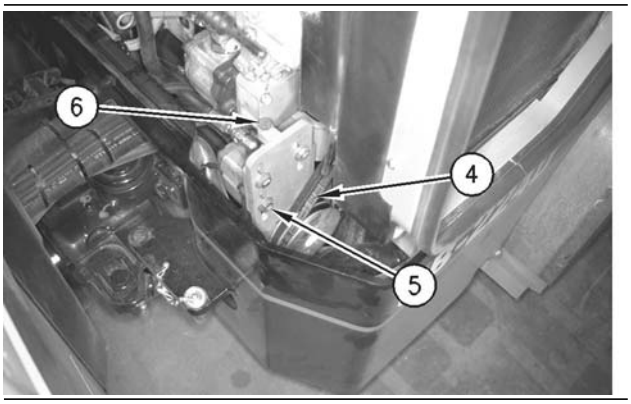

Illustration 122 g00664176

Close the engine compartment.

Inspect The Vibratory Pump Belt

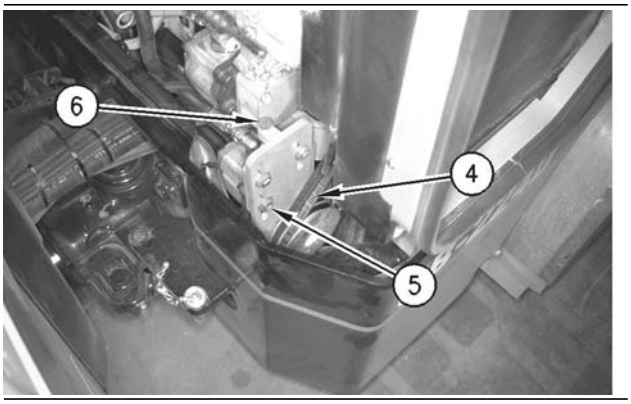

Illustration 123 g00664176

For maximum pump performance, inspect belts (4) for wear and for cracking. Check the belt tension and adjust the belt tension. Belt slippage will decrease the belt life. Belt slippage will delay drum vibration.

In order to check the belt tension, apply 40 N (9 lb) of force to the belt. The force must be applied midway between the pulleys. The belts will deflect 5 to 6 mm (.02 to .24 inch)if the belts are adjusted correctly.

If new belts are installed, run the engine for 30 minutes. Check the tension of the belt. Tighten the belt if the belt is loose.

Adjust The Vibratory Pump Belt

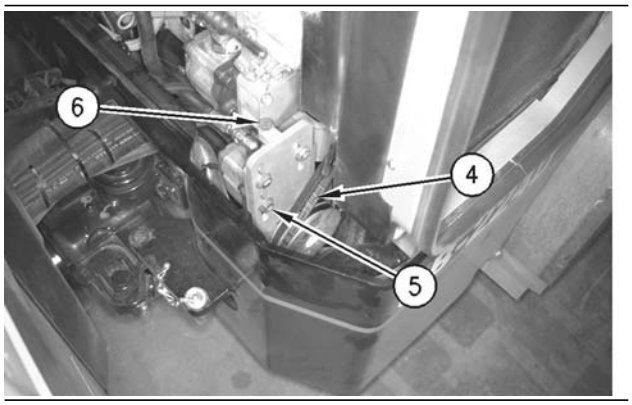

Illustration 124 g00664176

In order to adjust vibratory pump belts, loosen three mounting bolts (5).

In order to tighten the belts, turn adjusting bolt (6) clockwise. In order to loosen the belts, turn adjusting bolt (6) counterclockwise.

Tighten three mounting bolts (5).

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Circuit Breakers - Reset

SMCS Code: 1420-529

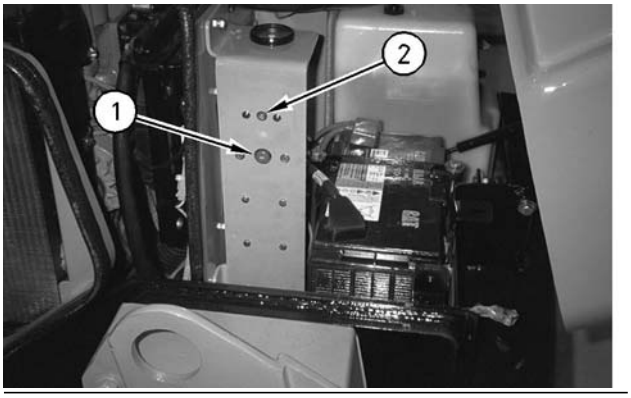

Illustration 125 g00640492

Circuit Breaker/Reset – Push in the button in order to reset the circuit breaker. If the electrical system is functioning properly, the button will remain depressed. If the button does not remain depressed, check the appropriate electrical circuit. Repair the electrical circuit, if necessary.

General Power (1) – 60 amp

Road and Work Lights (2) (If Equipped) – 20 amp

i01173766

Cooling System Coolant (ELC) - Change

SMCS Code: 1395-044-NL

⚠ WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not change the coolant until you read and understand the material in the Cooling System Specifications section.

NOTICE

Mixing Extended Life Coolant (ELC) with other products reduces the effectiveness of the coolant and shortens coolant life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specifications for premixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC. Failure to follow these recommendations could result in the damage to cooling systems components.

If ELC cooling system contamination occurs, refer to Operation and Maintenance, “Extended Life Coolant (ELC)” under the topic ELC Cooling System Contamination.

Drain the coolant whenever the coolant is dirty. Drain the coolant when foam is observed.

1. Stop the engine. Allow the cooling system to cool completely.

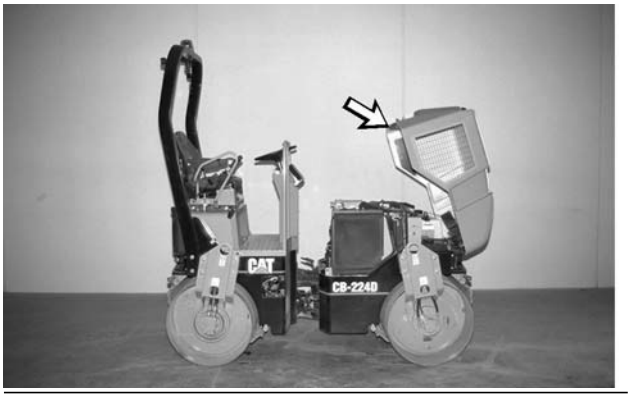

Illustration 126 g00640646

2. Open the engine access cover.
3. Slowly loosen the cooling system pressure cap in order to relieve system pressure. Remove the cooling system pressure cap.
4. Remove the lower hose that is connected to the radiator. Allow the coolant to drain into a suitable container.
5. Replace the lower drain hose. Fill the cooling system with clean water and with a 6 to 10% concentration of cooling system cleaner.
6. Start the engine. Run the engine for 90 minutes.
7. Stop the engine. Allow the cooling system to completely cool.
8. Remove the lower drain hose from the radiator. Drain the cleaning solution.

9. Flush the cooling system with water until the draining water is transparent.

10. Replace the lower drain hose.

11. Add the recommended amount of extender to the coolant system. Refer to Operation and Maintenance Manual, “Refill Capacities” for the proper amount.

Note: If you are using CaterpillarLong Life Coolant that contains some additive, do not add any supplemental coolant additive at this time. Also, do not change the coolant conditioner element if you are using CaterpillarLong Life Coolant that contains some additive.

12. Take off the cooling system pressure cap. Start the engine and run the engine. Leave the cap off until the thermostat opens and the coolant level stabilizes.

13. Maintain the coolant level to 1 cm of the bottom of the fill pipe.

14. Inspect the gasket on the cooling system pressure cap. Replace the cooling system pressure cap if the gasket is damaged.

15. Install the cooling system pressure cap.

16. Close the engine compartment.

i01599479

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352-544-NL

⚠ WARNING

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the fill cap is cool enough to touch with your bare hand.

Remove the fill cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

When a Caterpillar Extended Life Coolant (ELC) is used, an Extender must be added to the cooling system. See the Cooling System Specifications in the Special Publication, SEBU6250 for all cooling system requirements.

Use a **8T-5296** Coolant Test Kit to check the concentration of the coolant.

For additional information about the addition of Extender, see Special Publication, SEBU6250, “Cooling System Specifications” or consult your Caterpillar dealer.

NOTICE

Mixing ELC with other products that do not meet Caterpillar EC-1 specifications reduces the effectiveness of the coolant and shortens coolant service life.

Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specification for pre-mixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC.

Failure to follow these recommendations can result in shortened cooling system component life.

1. Stop the engine. Allow the cooling system to completely cool.

2. Open the engine compartment.

Illustration 127 g00640666

3. Slowly loosen the cooling system pressure cap in order to relieve system pressure. Remove the cooling system pressure cap.

4. If necessary, drain enough coolant from the radiator in order to allow the addition of the Extender.

5. Add the recommended amount of extender to the coolant system. Refer to the Special Publication, SEBU6250, “Extended Life Coolant (ELC)” for the proper amount.

6. Maintain the coolant level to 1 cm of the bottom of the fill pipe.

7. Inspect the gasket on the cooling system pressure cap. Replace the cooling system pressure cap if the gasket is damaged.

8. Install the cooling system pressure cap.

9. Close the engine compartment.

For additional information on the addition of extender, see Special Publication, SEBU6250, “Coolant Recommendations” or consult your Caterpillar dealer.

i01599483

Cooling System Coolant Sample - Obtain

SMCS Code: 1395-008

⚠ WARNING

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the fill cap is cool enough to touch with your bare hand.

Remove the fill cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Stop the engine. Allow the cooling system to completely cool.

2. Open the engine compartment.

Illustration 128 g00640849

3. Carefully loosen the cooling system pressure cap in order to relieve system pressure.

4. Open the radiator drain valve. Allow some coolant to drain into a suitable container before the sample is taken. Excessive sediment can drain away, and a more accurate sample results. Obtain a sample in an appropriate container. Close the radiator drain valve.

5. Send the coolant sample to an appropriate lab for analysis. See the Special Publication, SEBU6250, “S·O·S Coolant Analysis” section.

6. Refill the cooling system with coolant, as required. See Special Publications, SEBU6250, “Cooling System Specifications”.

7. Tighten the cooling system pressure cap.

8. Close the engine compartment.

i01172277

Cooling System Level - Check

SMCS Code: 1350-535-FLV

⚠ WARNING

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the fill cap is cool enough to touch with your bare hand.

Remove the fill cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

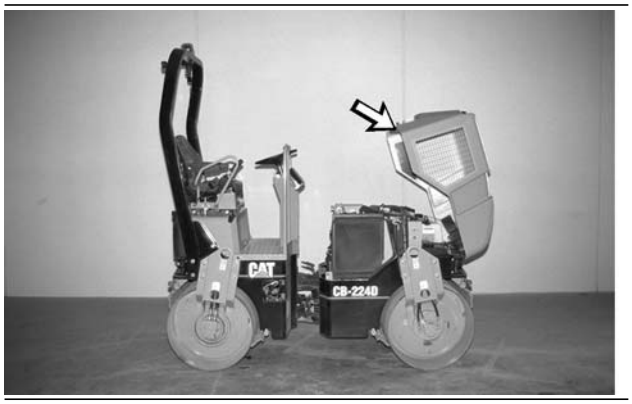

Illustration 129 g00640902

1. Open the access door on the right side of the machine.

Illustration 130 g00640906

2. Loosen the radiator filler cap slowly in order to relieve pressure. After pressure is relieved, remove the radiator cap.

3. Maintain the coolant level to 1 cm of the bottom of the fill pipe.

4. Inspect the radiator filler cap and the radiator cap seal for damage. Clean the cap with a clean cloth or replace the cap.

5. Install the cap.

6. Close the engine access cover.

i01174815

Cooling System Pressure Cap - Clean/Replace

SMCS Code: 1382-070; 1382-510

⚠ WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

Illustration 131 g00640920

1. Open the engine compartment.

Illustration 132 g00640929

2. Remove the cooling system pressure cap slowly in order to relieve pressure.

3. Inspect the cooling system pressure cap for foreign material, for deposits, and for damage. Clean the cooling system pressure cap with a clean cloth. If the cooling system pressure cap is damaged, replace the cooling system pressure cap.

4. Install the cooling system pressure cap.

5. Close the engine compartment.

i01175085

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510; 1393-010

⚠ WARNING

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the fill cap is cool enough to touch with your bare hand.

Remove the fill cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

Replace the water temperature regulator on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system.

The water temperature regulator should be replaced after the cooling system has been cleaned. Replace the water temperature regulator while the cooling system is completely drained. Replace the water temperature regulator while the cooling system coolant is drained to a level below the water temperature regulator housing.

NOTICE
Failure to replace the engine's water temperature regulator on a regularly scheduled basis could cause severe engine damage.

Note: If you are only replacing the water temperature regulator, drain the cooling system coolant to a level that is below the water temperature regulator housing.

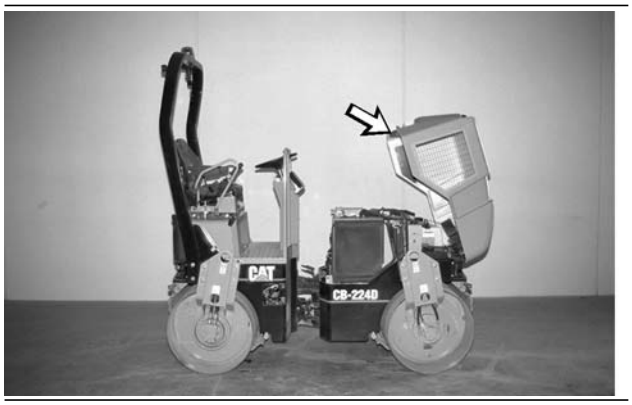

Illustration 133 g00641121

1. Open the engine compartment.

Illustration 134 g00641130

2. Remove the cooling system pressure cap in order to relieve the pressure in the cooling system.

3. Remove the water temperature regulator.

4. Remove the gasket and remove the water temperature regulator.

NOTICE
Former water temperature regulators may be used, if they meet test specifications and are not damaged or have excessive buildup or deposits.

NOTICE
Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a water temperature regulator.

Depending on load, failure to operate with a water temperature regulator could result in either an overheating or an overcooling condition.

NOTICE
If the water temperature regulator is installed incorrectly, it will cause the engine to overheat.

5. Install a new water temperature regulator.

6. Add the cooling system coolant. Maintain the level of the coolant to 1 cm from the bottom of the fill pipe.

7. Inspect cooling system pressure cap and the gasket for damage. Replace the pressure cap if the pressure cap or the gasket are damaged.

8. Install the cooling system pressure cap.

9. Close the engine compartment.

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Drum Scrapers - Inspect/Adjust/Replace

SMCS Code: 6607-025; 6607-040; 6607-510

Inspect Scrapers

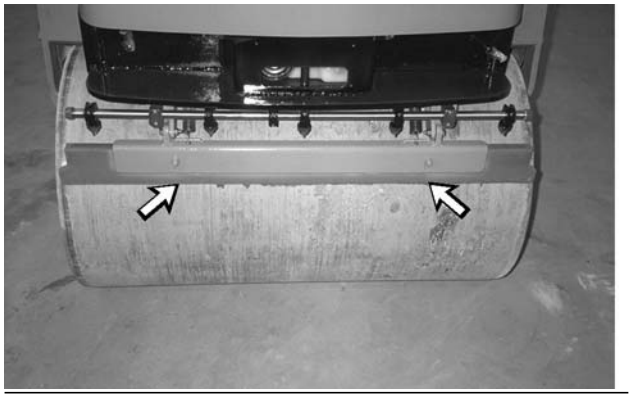

Illustration 135 g00640988

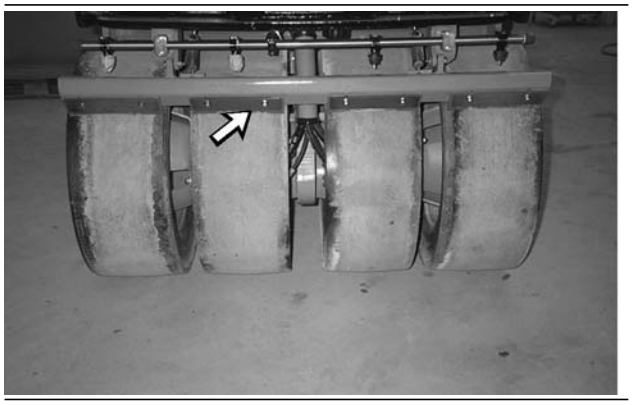

Illustration 136 g00641016

1. Remove dirt and debris from scrapers.
2. The drum scraper should be adjusted vertical to the ground. The drum scraper should be adjusted in order to touch the width of the drum. The inner drum scrapers are not adjustable in the same way as the outer drum scrapers. The inner drum scrapers can be adjusted with the adjustable spring mounts. The adjustable spring mounts are located inside the front and rear frames. The tension on the spring mounts should be adjusted in order to prevent bouncing of the tire or the drum scraper when the vibration system is active. The tire scrapers should be adjusted slightly above the surface of the tire. The scraper should not touch the tire.

Replace Scrapers

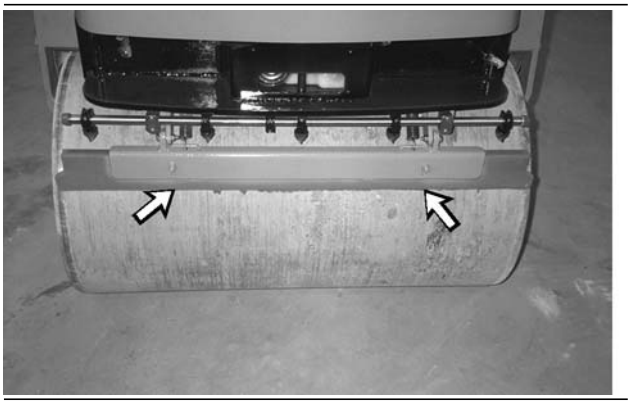

Illustration 137 g00641022

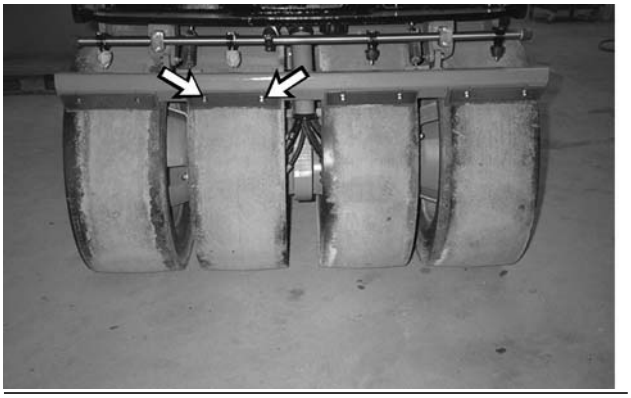

Illustration 138 g00641029

1. Loosen the bolts and remove the damaged scraper.
2. Install the new scraper and tighten the bolts.
3. Adjust the scraper in order to touch the drum.
4. Adjust the scraper slightly above the tires.

i01599485

Eccentric Weight Housing Oil - Change

SMCS Code: 5622-044-OC; 6606-044-OC

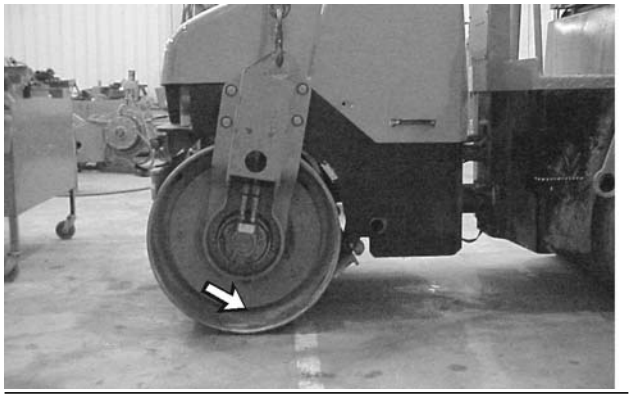

Illustration 139 g00664963

Use water drain hole in order to orient the oil drain hole.

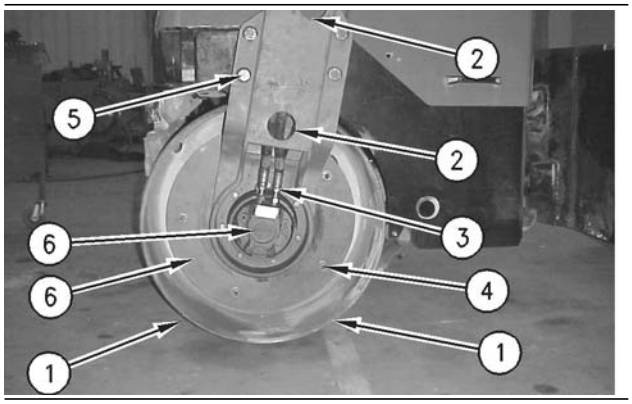

Illustration 140 g00664835

1. Block drums (1).

2. Secure the support with an appropriate strap or chain (2).

3. Remove four hoses on hydraulic motor (3).

4. Remove five bolts that secure the plate to rubber mounts (4).

5. Remove four bolts on support (5).

6. Remove the plate and remove motor assembly (6).

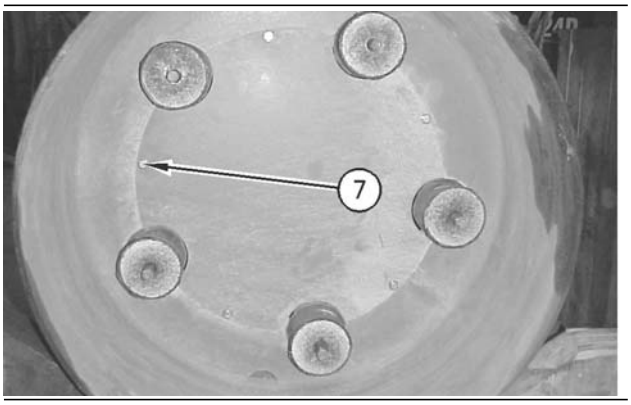

Illustration 141 g00664882

7. Remove five bolts on plate (7).

Note: Use Caterpillar **4C-9506** Retaining Compound when you reassemble bolts (7).

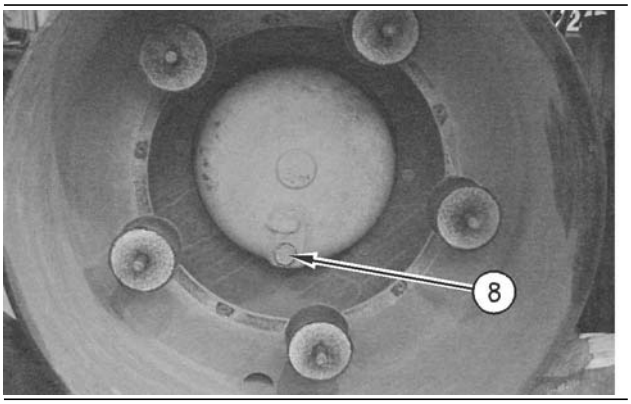

Illustration 142 g00664862

8. Remove drain plug (8).

9. Drain the oil in a suitable container.

10. Clean drain plug (8).

11. Rotate the drum by 90°.

12. Fill the drum to the appropriate level.

13. Install the drain plug.

14. Reverse the process in order to reassemble the drum.

i01598268

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070-PY; 1054-510-PY

NOTICE
Do not clean the filter elements by bumping or tapping them. Do not use filter elements with damaged pleats, gaskets or seals. Engine damage can result.

Make sure the cleaned filter elements are completely dry before installing into the filter housing. Water remaining in the elements can cause false indications of contamination in Scheduled Oil Sampling test results.

The filter elements can be cleaned by using the following methods:

- pressure air
- pressure water

When you use pressure air, the maximum air pressure is 205 kPa (30 psi). When you use pressure water, the maximum water pressure is 280 kPa (40 psi).

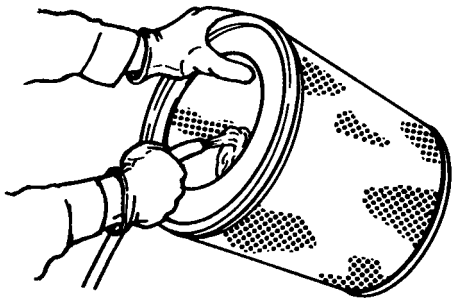

Illustration 143 g00038608

1. When you clean the inside pleats and the outside pleats, direct the air along the pleats.

2. Inspect the filter elements after you clean the filter elements. Do not use a filter if the pleats, the gaskets or the seals are damaged.

3. Cover the clean filter elements. Store the elements in a clean, dry location.

Replace the primary element after the primary element has been cleaned six times. Also replace the primary element if the primary element has been in service for one year.

Remove the Primary Element

1. Open the engine compartment.

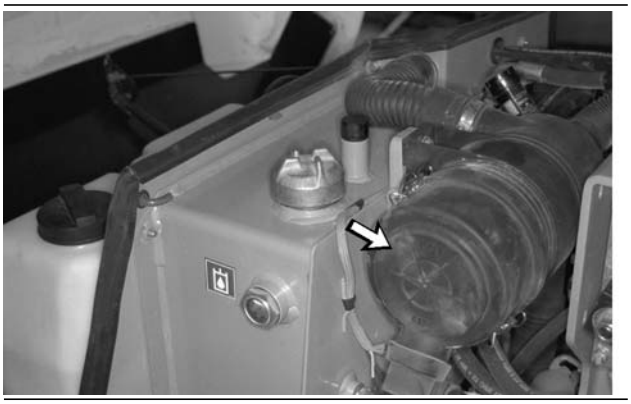

Illustration 144 g00641094

2. Open the air filter housing.

Illustration 145 g00641099

3. Remove the primary filter element.

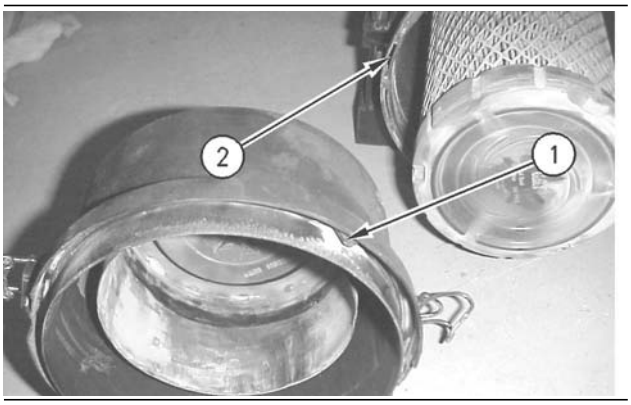

Illustration 146 g00664907

4. Install tabs (1) in slots (2).

5. Reverse the steps in order to install the primary filter element.

6. Close the engine compartment.

i01598276

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

NOTICE
Always replace the secondary filter element. Never attempt to reuse it by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time.

The secondary filter element should also be replaced if the yellow piston in the filter element indicator enters the red zone after installation of a clean primary element, or if the exhaust smoke is still black.

1. Open the engine compartment.
2. Release the spring clips and remove the air cleaner cover.
3. Remove the primary element.

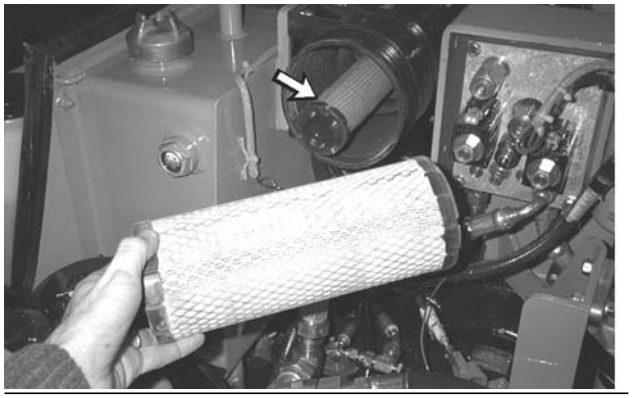

Illustration 147 g00664372

4. Remove the secondary filter.
5. Cover the air inlet opening. Clean the inside of the air cleaner housing.
6. Inspect the gasket between the air inlet pipe and the air cleaner housing. Replace the gasket between the air inlet pipe and the air cleaner housing if the gasket is damaged.
7. Uncover the air inlet opening. Install a new secondary element.
8. Install the primary element and the air cleaner housing cover.
9. Reset the air filter service indicator.
10. Close the engine compartment.

i01172537

Engine Air Filter Service Indicator - Inspect

SMCS Code: 7452-040

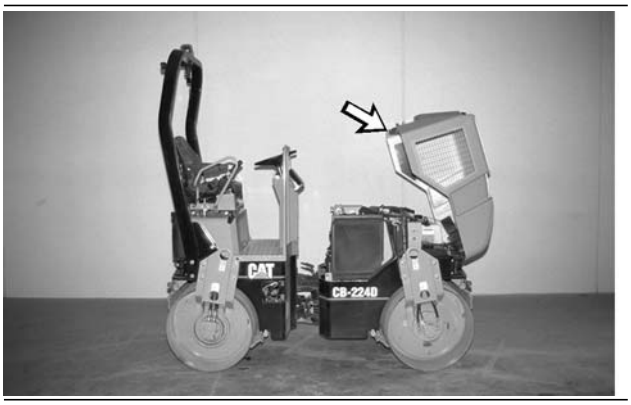

Illustration 148 g00641163

1. Open the engine compartment access door.
2. Start the engine.
3. Run the engine at high idle.

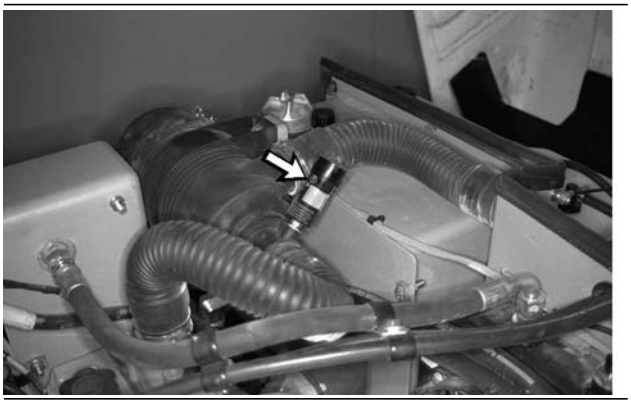

Illustration 149 g00641169

4. If the yellow piston in the engine air filter service indicator enters the red zone, service the air cleaner.
5. Stop the engine.

Note: See the Operation and Maintenance Manual, “Engine Air Filter Primary Element - Clean/Replace”. See the Operation and Maintenance Manual, “Engine Air Filter Secondary Element - Replace”.

6. Close the engine compartment access door.

i01174213

Engine Cylinder Head Bolts - Check

SMCS Code: 1100-535-BC

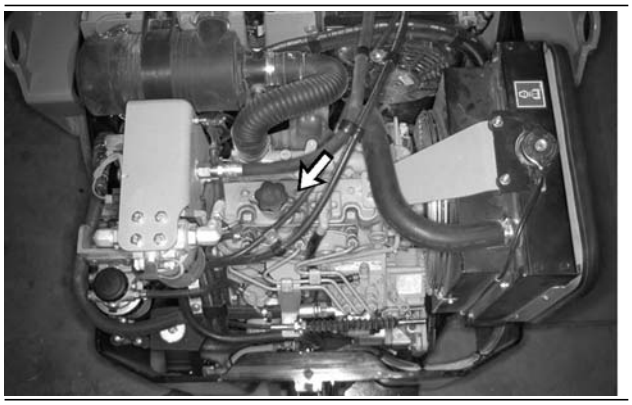

Illustration 150 g00644696

This maintenance is recommended by Caterpillar as part of a lubrication and preventive maintenance schedule in order to help provide maximum engine life.

NOTICE
Only qualified service personnel should perform this maintenance. Refer to the Service Manual or your Caterpillar dealer for the complete valve lash adjustment procedure.

Operation of Caterpillarengines with improper valve adjustments can reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

i01175128

Engine Mounts - Inspect

SMCS Code: 1152-040

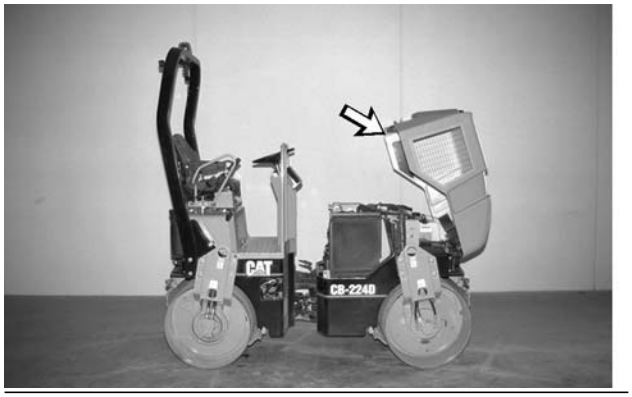

Illustration 151 g00641190

Open the engine compartment.

There are three engine mounts. There is one engine mount at the front of the engine. There are two engine mounts at the rear of the engine.

Engine vibration can be caused by improper mounting of the engine. Engine vibration can be caused by loose engine mounts or deteriorated engine mounts.

Inspect the engine mounts for deterioration.

Replace any engine mount that is deteriorated.

Inspect the engine mounts for correct bolt torque.

Tighten the mounts if the mounts are loose.

Close the engine compartment.

i01599492

Engine Oil Level - Check

SMCS Code: 1348-535-FLV

NOTICE
Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

Stop the engine in order to check the oil level. DO NOT check the oil level when the engine is running.

Park the machine on a level surface.

1. Open the engine compartment.

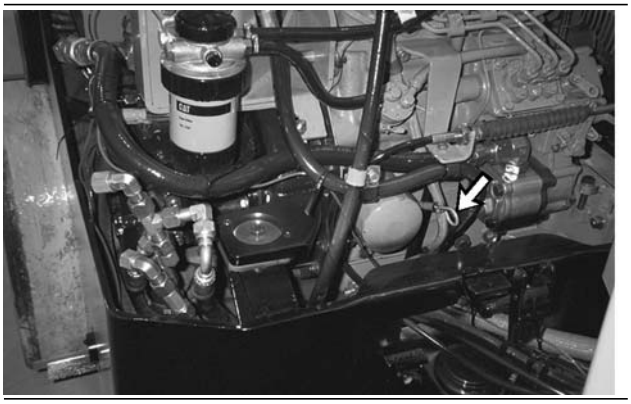

Illustration 152 g00641670

2. Remove dipstick (1). Wipe the dipstick with a clean cloth. Insert the dipstick. Remove the dipstick and note the oil level. Insert the dipstick.

Note: Refer to the Operation and Maintenance Manual, “Lubricant Viscosities and Capacities (Refill)” for the correct amount of oil that is used when the oil is changed. The correct amount of oil determines the correct level of the oil in the FULL range on the dipstick.

NOTICE
Do not overfill the crankcase. The oil level must not reach the top of the **FULL** range mark or above the **FULL** range mark.

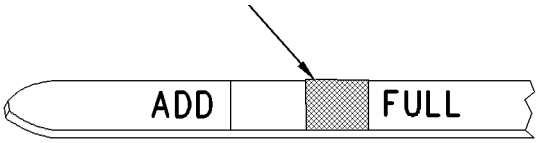

Illustration 153 g00367841

3. Maintain the oil level on the dipstick between the MINIMUM mark and the MAXIMUM mark . Add oil if the oil level is too low.

Note: Operating your engine with the oil level above the FULL mark in the FULL Range could cause the crankshaft to dip into the oil. This could result in excessively high operating temperatures. The high operating temperatures could result in reduced lubricating characteristics of the oil. This could cause damage to the bearings and loss of engine power.

Add The Engine Oil

1. Open the engine compartment.

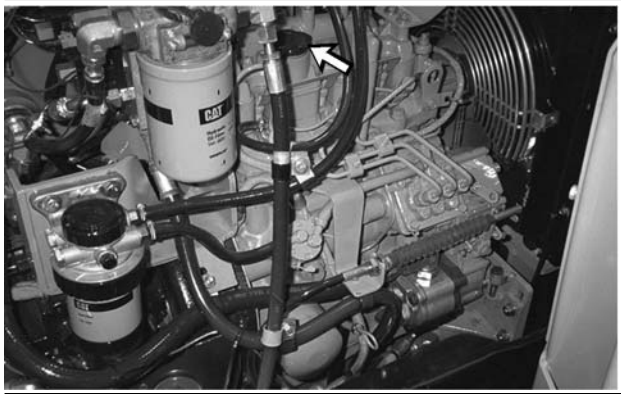

Illustration 154 g00641674

2. Remove the oil filler plug.

3. Add the oil.

4. Clean the oil filler plug. Install the oil filler plug.

5. Close the engine compartment.

i01175145

Engine Oil Sample - Obtain

SMCS Code: 1000-008

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

Obtain the Sample and the Analysis

In addition to a good preventive maintenance program, Caterpillar recommends using S·O·S oil analysis at regular scheduled intervals in order to monitor the condition of the engine and the maintenance requirements of the engine.

Each oil sample should be taken when the oil is warm and when the oil is well mixed. The sample should be taken at this time in order to ensure that the sample is representative of the oil in the crankcase.

Obtain the S·O·S Sample

Use the following method in order to obtain an S·O·S sample:

- Use a 1U-5718 Vacuum Pump or use an equivalent pump that is inserted into the sump.

To avoid contamination of the oil samples, the tools and the supplies that are used for obtaining oil samples must be clean.

Consult your Caterpillar dealer for complete information and assistance in establishing an S·O·S program for your engine.

If you fill the engine too fast with oil, the oil may saturate the engine breather. If the breather is saturated with oil, oil will blow out of the breather hose until the breather is free of oil. Add the engine oil at a rate of 2 L/min (0.5283 US gpm). This will help prevent saturating the breather with oil.

i01173632

Engine Oil and Filter - Change

SMCS Code: 1318-510

Run the engine in order to warm up the oil. Stop the engine before you drain the oil. When the oil is warm the waste particles are suspended in the oil. The waste particles will be removed when the oil is drained.

As the oil cools, the waste particles settle to the bottom of the oil pan. The waste particles will not be removed if the oil is too cool.

The waste particles can recirculate through the engine lubrication system if the recommended procedure is not followed.

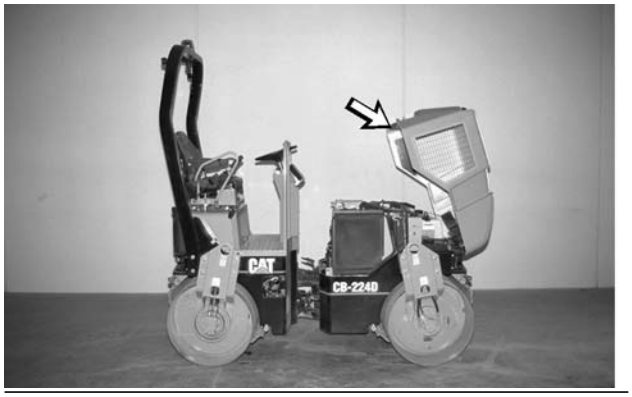

Illustration 155 g00641681

1. Open the engine compartment.

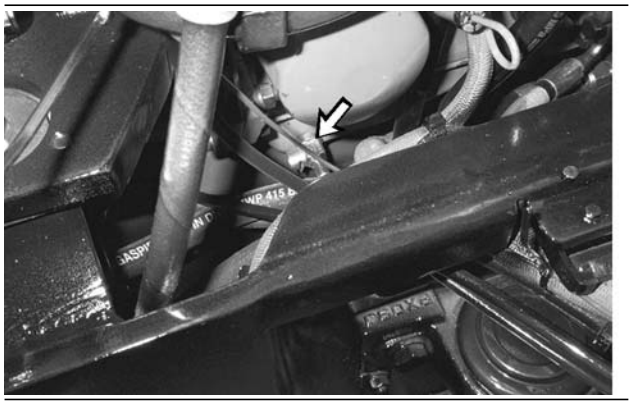

Illustration 156 g00641685

2. Place a suitable container under the drain hose. The drain hose is located below the front frame. Open the drain valve.

3. Allow the oil to completely drain.

4. Close the drain valve.

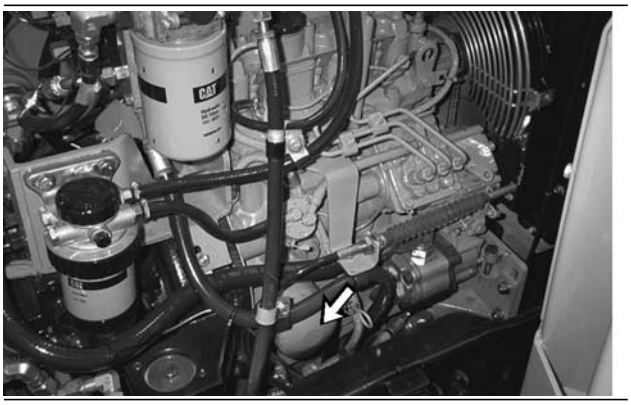

Illustration 157 g00641690

5. Remove the filter element. Discard the used filter element.

6. Clean the filter housing base. All of the old filter seal must be removed from the filter housing base.

7. Apply a thin coat of engine oil to the seal of the new filter element.

8. Install the new filter by hand. When the gasket contacts the filter base, tighten the filter element for an additional 3/4 turn. This will tighten the filter sufficiently.

Every new oil filter has rotation index marks that are spaced at 90 degree increments. Use the rotation index marks as a guide for tightening the oil filter.

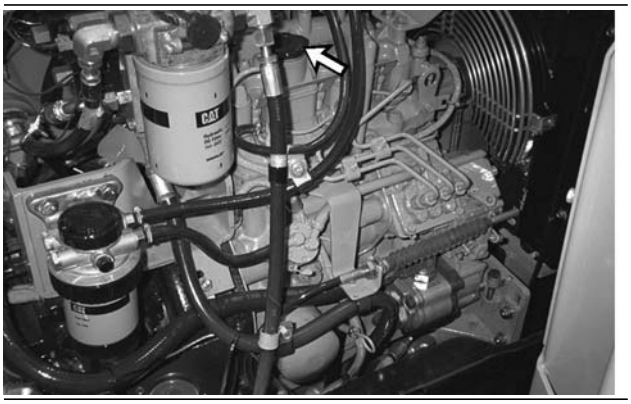

Illustration 158 g00641702

9. Remove the oil filler plug. Fill the crankcase with new oil. See Operation and Maintenance Manual, “Refill Capacities”. See Operation and Maintenance Manual, “Lubricant Viscosities”. Clean the oil filler cap and install the oil filler cap.

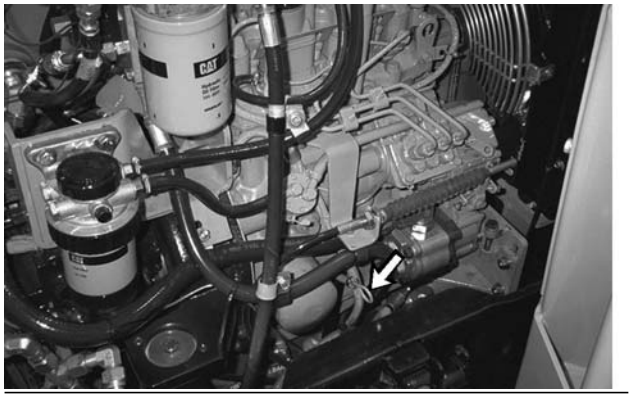

Illustration 159 g00641717

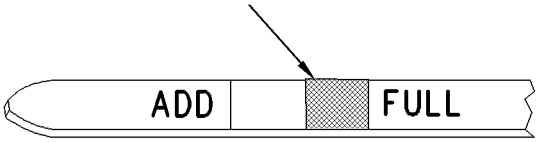

Illustration 160 g00367841

10. Before you start the engine, check the oil level on the dipstick. The oil level must be within the FULL RANGE on the dipstick.

11. Start the engine. Run the engine for two minutes. Inspect the machine for leaks. Stop the machine.

12. Wait for ten minutes in order to allow the oil to drain back into the crankcase. Check the oil level. Maintain the oil level within the FULL RANGE on the dipstick.

13. Close the engine compartment.

i01633611

Engine Valve Lash - Check

SMCS Code: 1105-535

This maintenance is recommended by Caterpillar as part of a lubrication and preventive maintenance schedule in order to help provide maximum engine life.

NOTICE
Only qualified service personnel should perform this maintenance. Refer to the Service Manual or your Caterpillar dealer for the complete valve lash adjustment procedure.

Operation of Caterpillar engines with improper valve adjustments can reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

i01598322

Fuel System Water Separator Element - Replace

SMCS Code: 1263-510-FQ

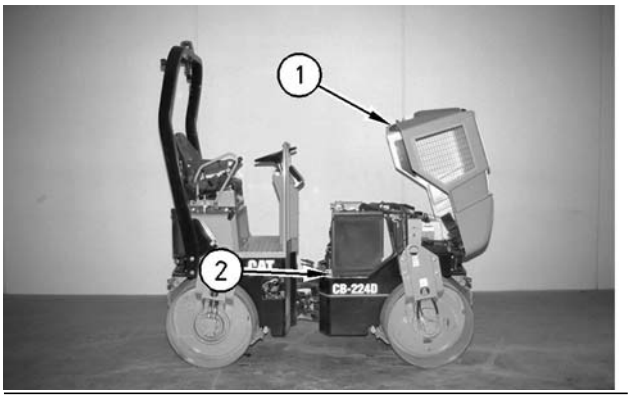

Illustration 161 g00644804

1. Release the latch for engine cover (2). Lift engine access cover (1). Lift the access cover for the engine. The cover must lock in place.

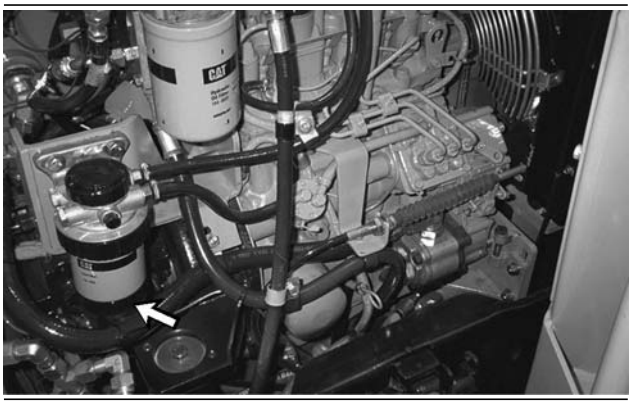

Illustration 162 g00828962

2. Turn the valve in a counterclockwise direction. Drain the fuel into a suitable container.

Note: Dispose of the waste in a proper manner.

3. Close the valve.

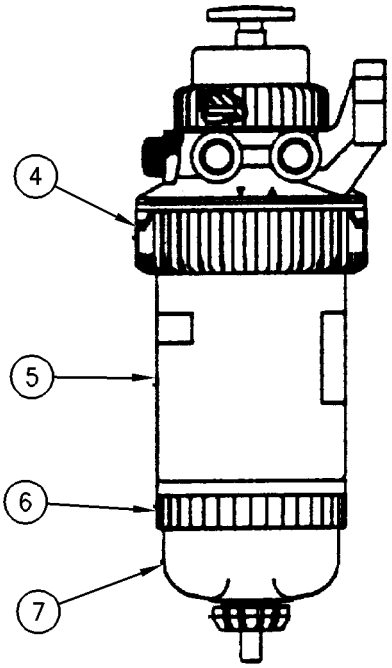

Illustration 163 g00828959

4. Hold bowl (7) while you loosen the collar (6). Remove the bowl (7) and the collar (6).

5. Loosen the collar (4). Remove the element (5). Discard the element in a proper manner.

6. Clean the parts. Inspect the parts for damage. Replace the damaged parts or replace the worn parts.

7. Clean the filter mounting base. All of the old seal must be removed.

8. Apply a light coat of diesel fuel to the seal of the new filter.

9. Install the new filter. Use only your hand for installation of the filter. When the gasket contacts the filter base, turn the filter by 270 degrees more. This will tighten the filter sufficiently. Tighten the collar (4).

10. Install the bowl (7) and tighten the collar (6).

11. Start the engine and check the fuel system for leaks.

12. Close the engine compartment.

i01219595

Fuel System Water Separator - Drain

SMCS Code: 1263-543

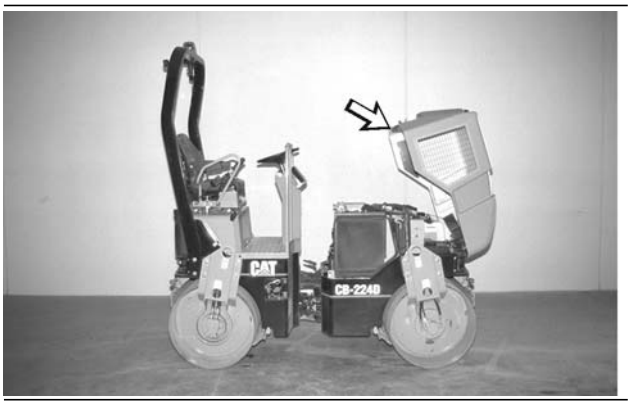

Illustration 164 g00649720

1. Lift the engine access cover.

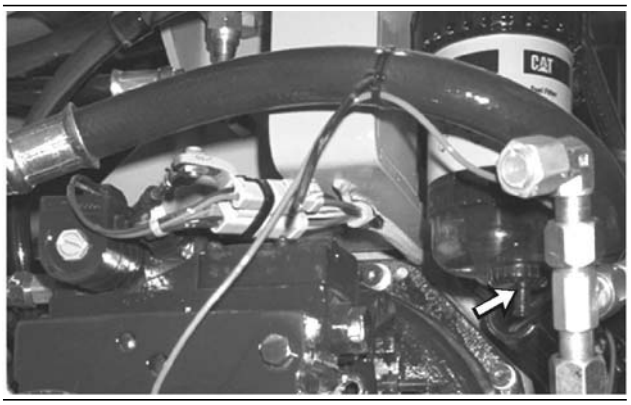

Illustration 165 g00649727

Note: Attach a rubber drain tube to the nozzle from the filter in order to avoid spilling water on the muffler.

2. Turn the drain valve counterclockwise in order to open the drain valve.

3. Drain the water and the sediment into a suitable container.

Note: Always dispose of drained fluids in accordance with local regulations.

4. Close the drain valve.

5. Remove the rubber drain tube.

6. Close the access cover.

i01199496

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR; 1273-070-Z2

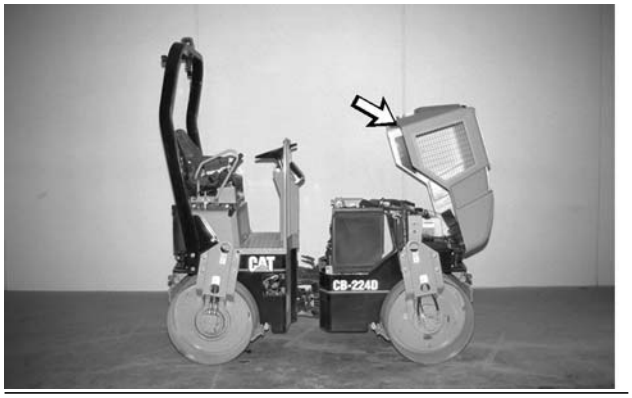

Illustration 166 g00642092

1. Open the engine compartment.

Illustration 167 g00642098

2. Remove fuel tank cap.

Illustration 168 g00642098

3. Remove the filler screen.

4. Wash the filler screen in clean, nonflammable solvent. Dry the filler screen with pressure air.

5. Inspect the cap and the filler screen. Replace the cap if the cap is damaged. Replace the filler screen if the filler screen is damaged.

6. Install the filler screen.

7. Apply a thin film of fuel to the gasket of the fuel tank cap.

8. Install fuel tank cap.

9. Close the engine compartment.

i01173199

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

Illustration 169 g00642111

1. The drain plug is located under the left front side of the machine.

Illustration 170 g00642118

2. Remove the clamp and the drain plug. Allow the water and sediment to drain into a suitable container.

3. Install the drain plug and tighten the clamp.

Note: Dispose of all fluids according to local regulations.

i01172231

Fuses - Replace

SMCS Code: 1417-510

Fuse – The fuses protect the electrical system from damage that is caused by overloaded circuits. Change the fuse if the element separates. If the element of the new fuse separates, check the circuit. Repair the problem before you operate the machine.

NOTICE

Replace fuses with the same type and size. Improper use of fuses could result in electrical damage. Frequent replacement of fuses may indicate another type of electrical problem. Contact your Caterpillar dealer.

The compartment for the fuses is located on the right side of the machine. There are four screws that hold the cover on the compartment.

In order to access the compartment for the fuses, remove the four screws. Remove the cover.

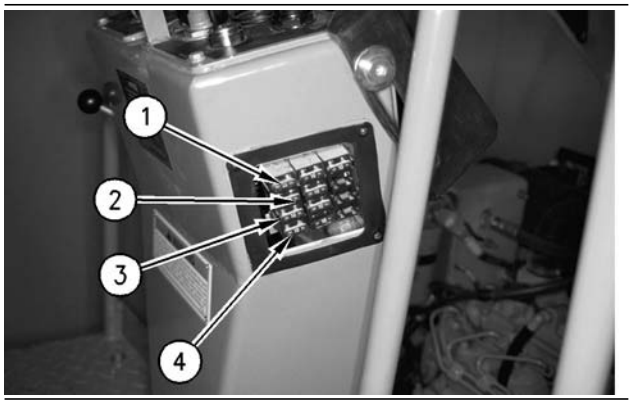

Illustration 171 g00640358

Oil Cooler Fan (1) – 15 amp

Brake and Neutralizer (2) – 10 amp

Gauges and Horn (3) – 10 amp

Vibratory System and Flow Divider (4) (If Equipped) – 10 amp

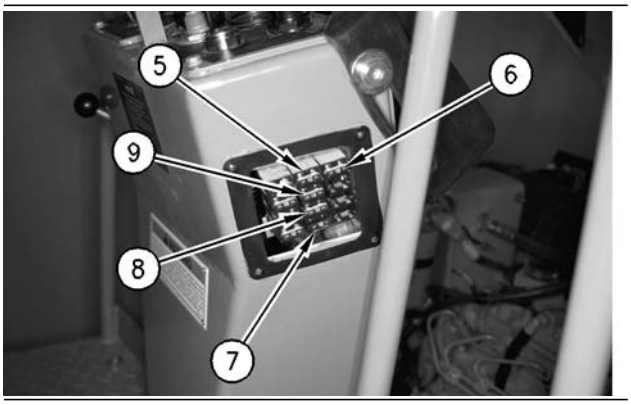

Illustration 172 g00640381

Flashers (5) – 10 amp

Keyswitch (6) – 10 amp

Backup Alarm and Beacon Light (7) (If Equipped) – 10 amp

Emulsion Spray System (8) (If Equipped) – 10 amp

Water Spray System (9) – 10 amp

i01173639

Hydraulic Oil Cooler - Clean

SMCS Code: 1374-070

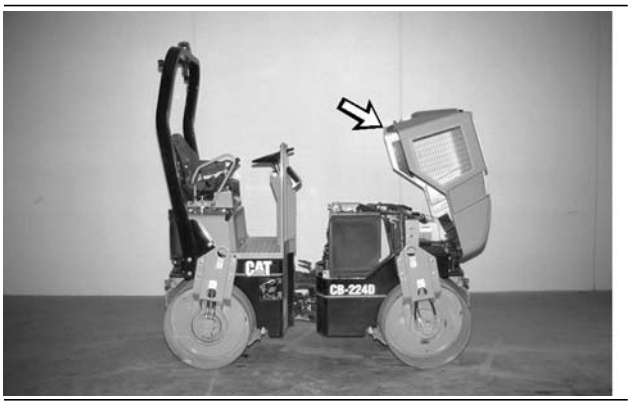

Illustration 173 g00644941

1. Lift the engine access cover.

Illustration 174 g00644962

2. Inspect the condition of the oil cooler. Clean the oil cooler. Compressed air, high pressure water or steam can be used. Remove debris from the oil cooler.

3. Close the engine access cover.

i01205889

Hydraulic System Oil - Change

SMCS Code: 5056-044; 5095-044

NOTICE

Take extreme care to insure the cleanliness of the hydraulic oil. Keep the hydraulic oil clean in order to extend the component life and assure the maximum performance.

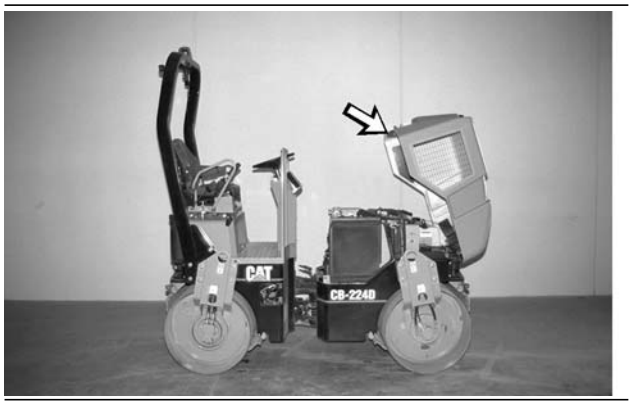

Illustration 175 g00645039

1. Open the engine access cover.

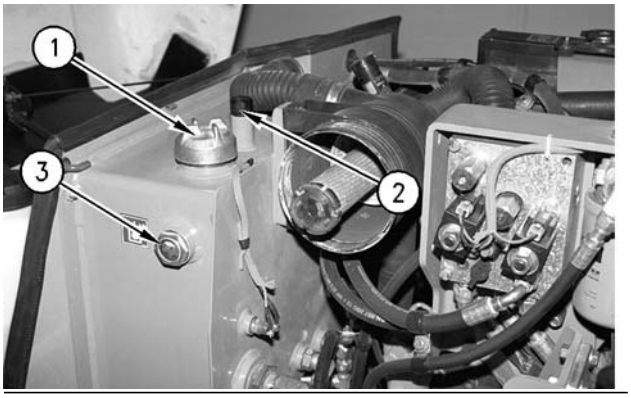

Illustration 176 g00645058

2. Slowly remove the hydraulic tank filler cap (1) in order to relieve the system pressure.

3. Remove the hydraulic tank cap (1). Remove the screen.

4. Wash the hydraulic tank cap (1) in clean, nonflammable solvent. Wash the screen in clean, nonflammable solvent.

5. Check the vent (2) for the hydraulic tank for cleanliness. Clean the vent for the hydraulic tank with clean, nonflammable solvent.

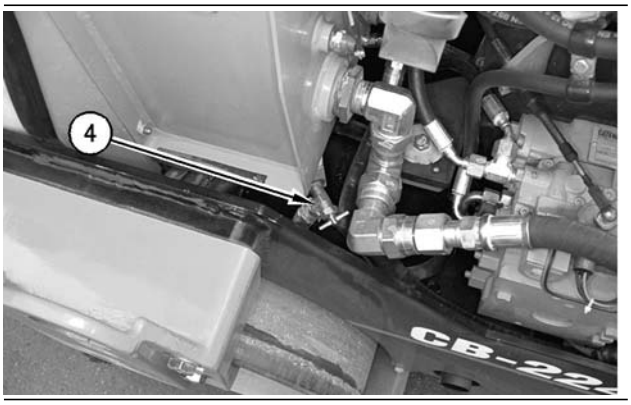

Illustration 177 g00645106

Note: The hydraulic oil tank drain (4) is located on the left side of the engine compartment. A drain hose is connected to the drain on the left side of the frame.

6. Open the hydraulic oil drain (4) in order to drain the oil. Drain the oil in a suitable container.

7. Inspect the inside of the hydraulic tank. Clean the inside of the hydraulic tank.

8. Remove the suction strainer inside the hydraulic tank. Install a new suction strainer in the hydraulic tank.

9. Close the oil drain.

10. Install the screen in the hydraulic tank.

11. Refill the hydraulic tank with clean, filtered hydraulic oil. Refer to the Operation and Maintenance Manual, “Refill Capacities and Lubricant Viscosities”.

12. Park the machine on level ground. Check the hydraulic oil level. The oil level should be visible in the sight gauge (3).

Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

13. Install the cap (1) for the hydraulic oil tank.

14. Close the engine access cover.

i01599682

Hydraulic System Oil Filter - Replace

SMCS Code: 5068-510

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, Caterpillar Tools and Shop Products Guide for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Take extreme care to insure the cleanliness of the hydraulic oil. Keep the hydraulic oil clean in order to extend the component life and assure the maximum performance.

1. Open the engine access cover.

Illustration 178 g00645431

2. The hydraulic oil filter is located on the left side of the machine.

Illustration 179 g00645516

3. Clean the hydraulic oil filter location.

4. Remove the filter with a strap type wrench.

5. Clean the filter housing base. Remove any existing gasket material.

6. Apply a light coat of hydraulic oil to the gasket on the new filter.

7. Use your hand to install the new filter. When the seal contacts the base, tighten the filter element for an additional three quarters of a turn.

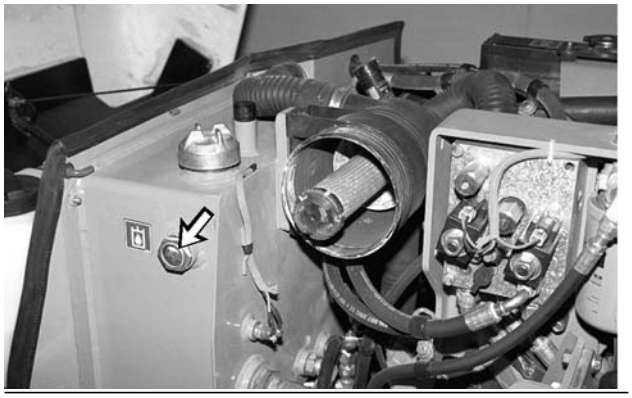

Illustration 180 g00645520

8. With the machine on level ground, check the hydraulic oil level in the sight gauge. The sight gauge is located on the right side of the machine. The oil level should be visible in the sight gauge.

9. Add required oil.

10. Close the engine access cover.

i01172713

Hydraulic System Oil Level - Check

SMCS Code: 5050-535-FLV; 5095-535-FLV

Illustration 181 g00642185

1. Open the engine compartment.

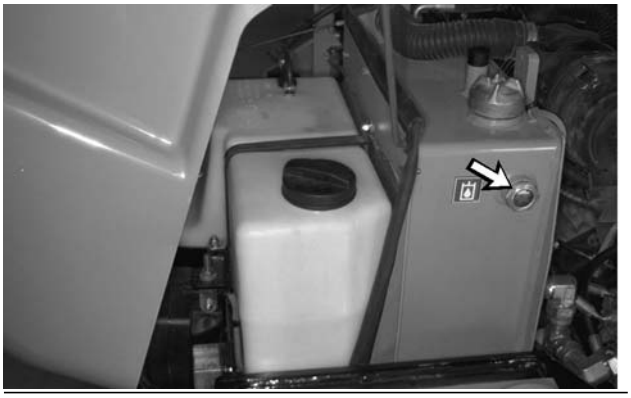

Illustration 182 g00642189

2. Observe the level of the hydraulic oil in the sight gauge when the oil is warm. Maintain the oil level to the mark on the sight gauge.

3. If necessary, add oil.

   Refer to the Operation and Maintenance Manual, “Refill Capacities”. Refer to the Operation and Maintenance Manual, “Lubricant Viscosities.”.

i01175229

Hydraulic System Oil Sample - Obtain

SMCS Code: 5095-008; 7542-008

Illustration 183 g00664339

Use a oil sample gun or similar equipment to obtain an oil sample from the hydraulic tank.

i01598337

Hydraulic Tank Breather - Replace

SMCS Code: 5056-510-BRE

Open the engine compartment.

Illustration 184 g00642290

The vent is located on the top of the hydraulic tank.

Remove the vent from the hydraulic tank.

Install the new vent.

Close the engine compartment.

i01598343

Hydraulic Tank Strainer - Clean

SMCS Code: 5056-070-STR

1. Open the engine compartment.

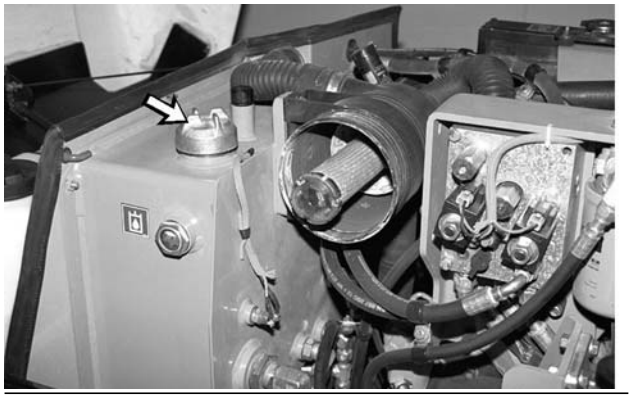

Illustration 185 g00642332

2. Remove the hydraulic oil filler cap. Pull the screen outward.

3. Clean the screen in clean, nonflammable solvent. Dry the screen with pressure air.

4. Install the screen and install the cap.

5. Close the engine compartment.

i01172765

Indicators and Gauges - Test

SMCS Code: 7450-081

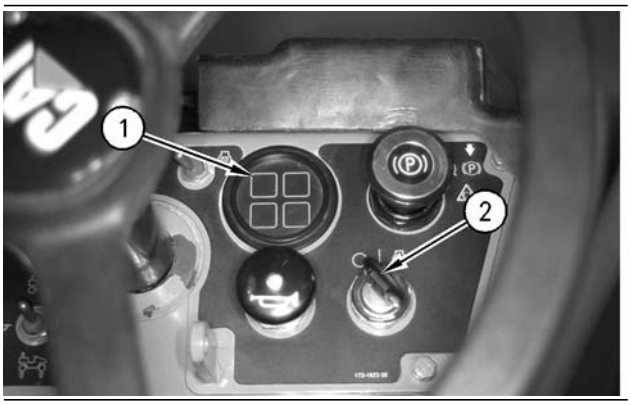

Illustration 186 g00642350

Look for gauges (1) that are broken. Look for indicator lights that are inoperative. Look for switches (2) that are broken.

Start the engine.

Sound the horn.

Look for inoperative gauges.

Turn on all of the machine lights. Check for proper operation.

Stop the engine.

Make all necessary repairs before you operate the machine.

i01172850

Neutral Start Switch - Test ((If Equipped))

SMCS Code: 1424-025; 1424-081

⚠ WARNING

The machine may lurch forward if the neutral start switch is out of adjustment. Be sure the area is clear of all personnel and equipment before performing this test.

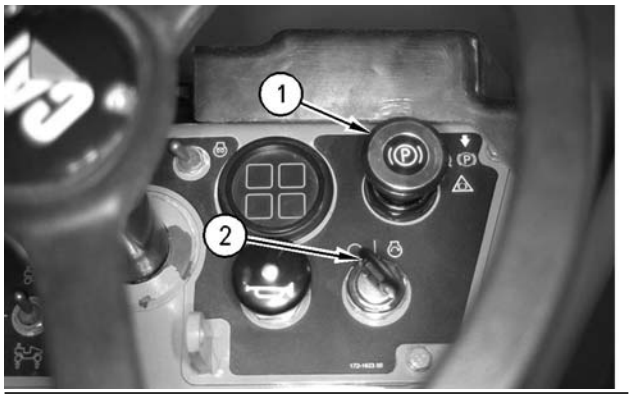

Illustration 187 g00642400

1. Depress the parking brake knob (1).

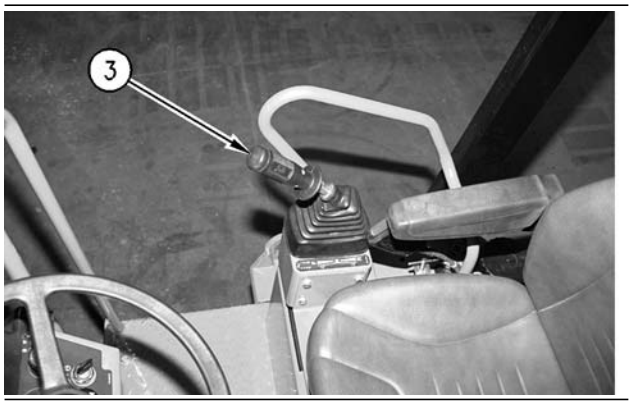

Illustration 188 g00642403

2. Move the propel lever to the FORWARD position. Hold the engine start switch (2) in the START position. Slowly move the propel lever (3) toward the NEUTRAL position.

3. If the engine starts before you move the propel lever to the NEUTRAL position, the neutral start switch requires adjustment. Do not operate the machine until the repairs have been made. Consult your Caterpillar dealer for instructions.

i01719384

Oil Filter - Inspect

SMCS Code: 1308-507; 3004-507; 3067-507; 5068-507

Inspect a Used Filter for Debris

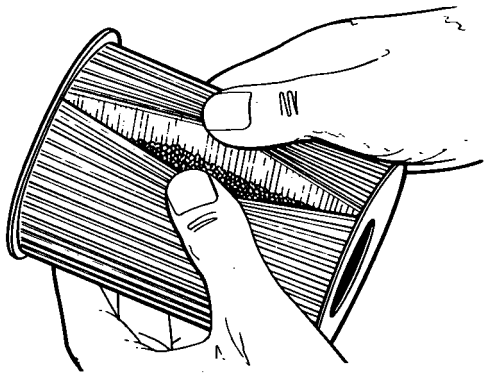

Illustration 189 g00100013

The element is shown with debris.

Use a 4C-5084 Filter Cutter or a 175-7546 Oil Filter Cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

Ferrous metals can indicate wear on steel parts and on cast iron parts.

Nonferrous metals can indicate wear on the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This could be caused by friction and by normal wear. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i01172256

Radiator Core - Clean

SMCS Code: 1353-070-KO

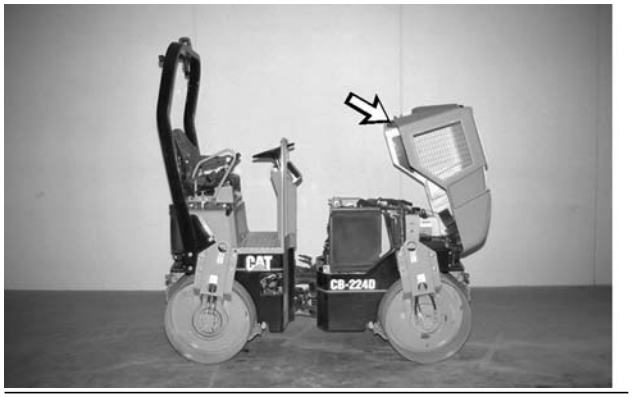

Illustration 190 g00647708

Open the engine compartment.

The radiator core is located on the left front of the machine.

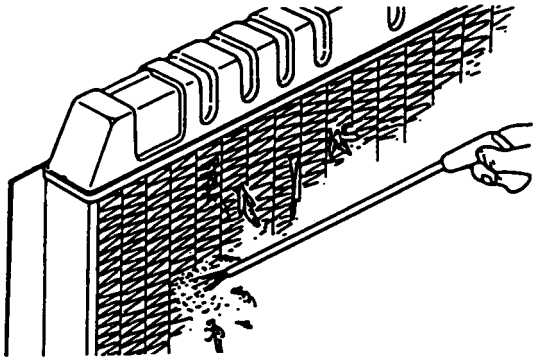

Illustration 191 g00101939

Inspect the radiator core for debris. If necessary, clean the radiator.

Compressed air is preferred, but high pressure water or steam can be used to remove dust and general debris from a radiator. Clean the radiator according to the condition of the radiator.

See Special Publication, SEBD0518, “Know Your Cooling System” for more information about cleaning radiator fins.

Close the engine compartment.

i01822494

Seat Belt - Inspect

SMCS Code: 7327-040

Always check the condition of the seat belt and the condition of the seat belt mounting hardware before you operate the machine. Replace any parts that are damaged or worn before you operate the machine.

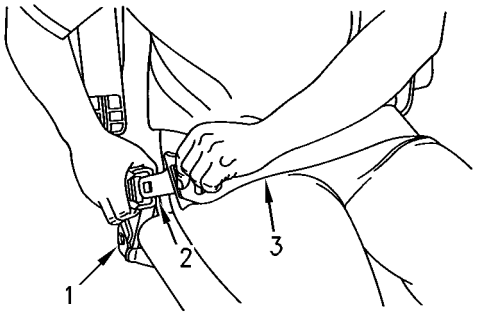

Illustration 192 g00932801
Typical example

Check the seat belt mounting hardware (1) for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

Check buckle (2) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect the seat belt (3) for webbing that is worn or frayed. Replace the seat belt if the seat belt is worn or frayed.

Contact your Caterpillar dealer for the replacement of the seat belt and mounting hardware.

Note: Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to each seat belt.

i01828538

Seat Belt - Replace

SMCS Code: 7327-510

Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to each seat belt.

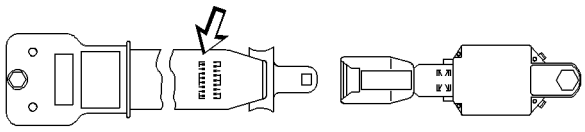

Illustration 193 g00215958
Typical example

Contact your Caterpillar dealer for the replacement of the seat belt.

i01175636

Speed and Direction Control - Lubricate

SMCS Code: 5462-086; 5910-086

Illustration 194 g00645832

Open the engine access cover.

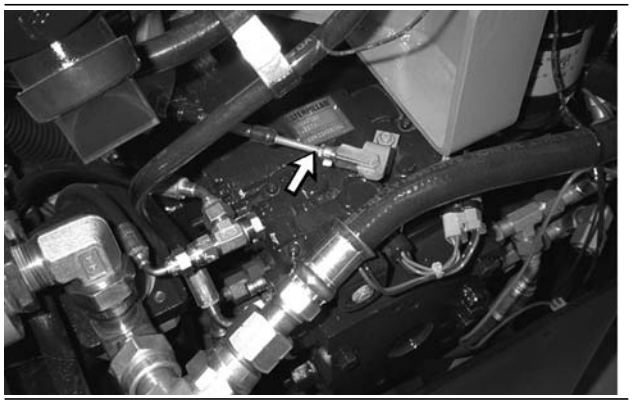

Illustration 195 g00645888

Use engine oil in order to clean the linkage for directional control. Use engine oil in order to lubricate the directional control linkage.

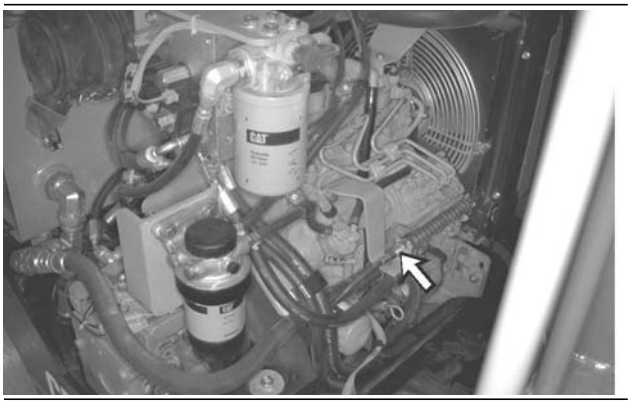

Illustration 196 g00645892

Use engine oil in order to clean the throttle linkage. Use engine oil in order to lubricate the throttle linkage.

Close the engine access cover.

i01173643

Steering Cylinder Ends - Lubricate

SMCS Code: 4303-086-BD

Illustration 197 g00645908

Illustration 198 g00645962

The steering cylinder is located in the pivot area. The steering cylinder is on the right side of the engine compartment.

Clean all of the fittings before servicing.

Clean all of the caps before servicing.

Clean all of the plugs before servicing.

Lubricate the fitting at each end of the steering cylinder.

i01175630

Throttle Control - Lubricate

SMCS Code: 1265-086

Illustration 199 g00647931

1. Open the engine access cover.
2. Clean the throttle control linkage with a clean rag.
3. Lubricate the throttle control linkage with engine oil.
4. Close the engine access cover.

i01254240

Tire Inflation - Check

SMCS Code: 4203

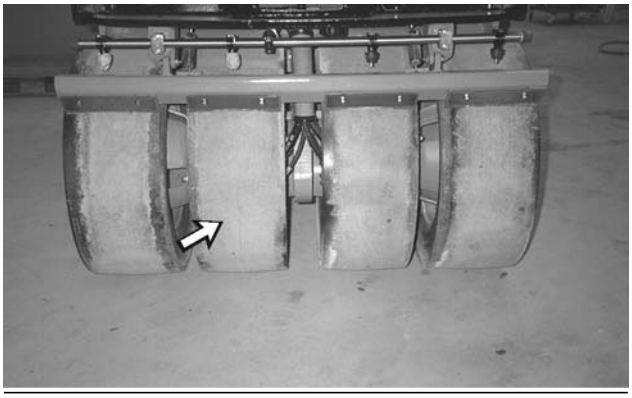

Illustration 200 g00668495

If necessary, inflate the tires.

For normal operating conditions, inflate the tires to the proper pressure:

- The proper pressure for the CB-225D is 260 kPa (38 psi).

The tire inflation pressure is based on the weight of a machine that is ready to work and the machine is without attachments. The pressure is based on the rated payload, and in average operating conditions. Pressures for each application may vary. Consult your Caterpillar dealer for more information about proper tire inflation pressures.

i01172928

Tire Scraper - Inspect/Adjust/ Replace

SMCS Code: 6607-025; 6607-040; 6607-510

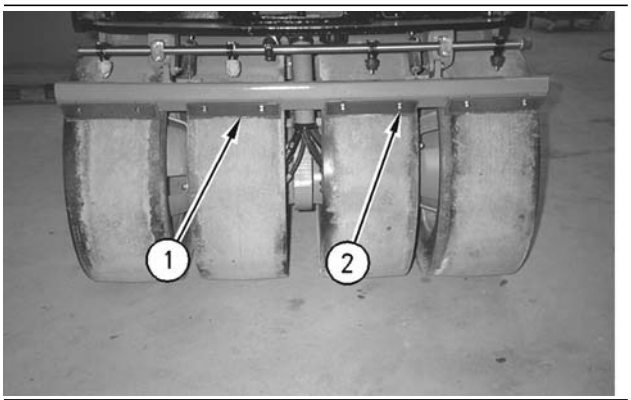

Illustration 201 g00646008

1. Clean the tire scrapers (1).

2. Adjust the tire scrapers (1).

3. Replace the tire scrapers if the tire scrapers are damaged.

4. Loosen the bolts (2) that fasten the tire scrapers.

5. Remove the damaged tire scraper (1).

6. Install the new tire scraper.

7. Tighten the bolts on the new tire scraper.

8. Adjust the new tire scraper so that the new tire scraper rides just above the tires.

i01172970

Walk-Around Inspection

SMCS Code: 1000-040; 7000-040

NOTICE

Accumulated grease or oil on a machine is a fire hazard. Remove this debris with steam cleaning or high pressure water at least every 1000 service hours or at any time there is a significant amount of oil spilled on the machine.

Note: Check the machine for leaks. If a leak is found, find the source of the leak. Repair the leak before you start the machine. Check the fluid levels more frequently if you suspect a leak.

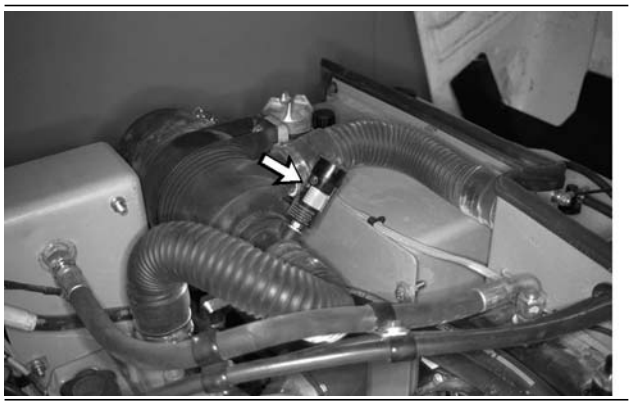

Illustration 202 g00642776

Check the air filter service indicator. When the indicator is red, service the air filter element.

Illustration 203 g00642781

Inspect the lights for broken bulbs or broken lenses. Replace the bulbs or the lenses if the bulbs or the lenses are broken.

Remove any trash in the engine compartment.

Inspect the cooling system for leaks, damaged hoses, or trash. Repair any leaks. Remove any trash from the radiator.

Inspect the engine attachments for wear or damage. Replace any components that are worn or damaged.

Inspect the hydraulic system for leaks. Inspect the following components: the hydraulic tank, the cylinder rod seals, the hoses, the lines, and the fittings. Repair any leaks. Repair any damaged components or worn components.

Inspect the rear axle for any leaks.

Inspect the tires for damage. Check the tires for proper inflation. Replace missing valve caps.

Make sure that all covers and guards are firmly in place. Check the guards and covers for damage.

Inspect the steps, walkways, and handholds for damage or wear. Check the steps, walkways and handholds for cleanliness. Inspect the Rollover Protective Structure (ROPS) for damage. If repair is necessary, consult your Caterpillar dealer. Tighten any loose bolts.

Inspect the operator compartment for cleanliness. Keep the operator compartment clean.

i01175290

Water Spray Nozzles - Clean

SMCS Code: 6609-070

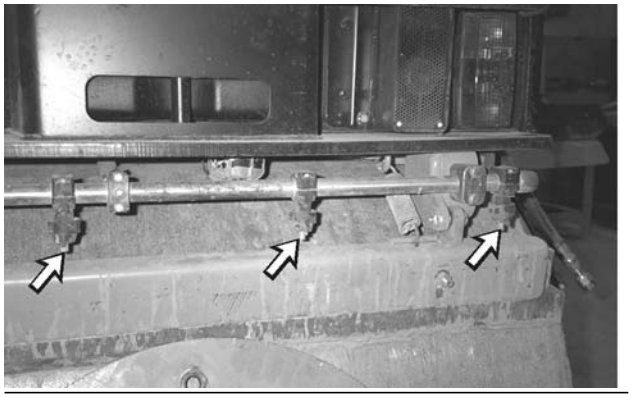

Illustration 204 g00646119

1. Remove the cap from the spray nozzle.

2. Remove the screen from the spray nozzle.

3. Remove the nozzle from the spray nozzle.

4. Wash the screen in a clean, nonflammable solvent.

5. Wash the nozzles in a clean, nonflammable solvent.

6. Install the screen.

7. Install the nozzles.

8. Install the caps.

9. Rotation of the nozzle may be required in order to establish a correct spray pattern.

i01175293

Water Spray System - Drain

SMCS Code: 5612-543

The water system must be drained prior to frost or freezing conditions.

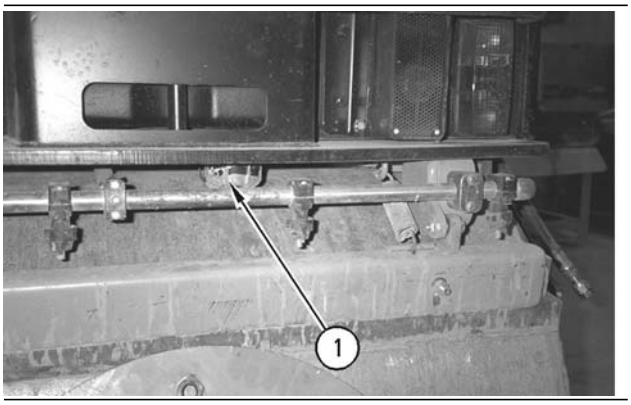

Illustration 205 g00646124

1. Remove the drain plug (1) in order to drain the main water tank.

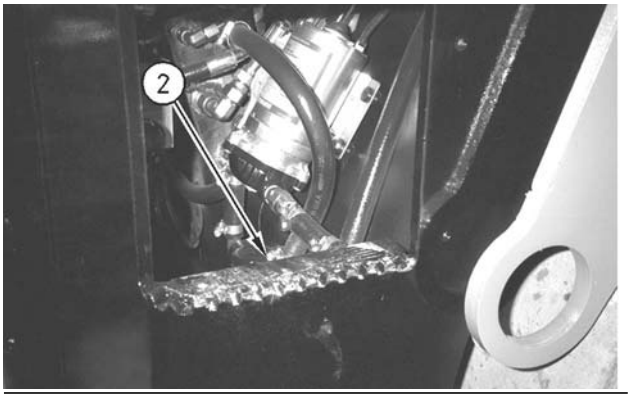

Illustration 206 g00646126

Left side step

2. Open the drain cock (2) in order to drain the lines for the spray bar.

Note: On the CB-225 machines, the pump for the water spray system is located on the right side of the machine. The pump can be accessed through the step on the right side of the machine. Use the drain cock that is located by the step on the left side of the machine in order to drain the emulsion tank.

Illustration 207 g00646136

3. Access the water filter through the step on the left side. Access the water filter through the step on the right side on the CB-225D machine.

4. Remove the strainer.

5. Allow the water in the water line to drain.

6. Clean the strainer.

7. Install the strainer.

i01173028

Water Spray System Filter - Clean

SMCS Code: 5612-070-FI

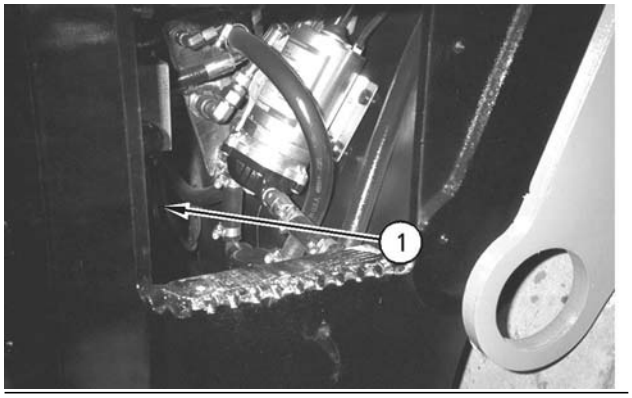

Illustration 208 g00646179

1. Remove filter bowl (1). Remove the screen.

Note: The water filter for the CB214D and the CB-224 machines is located in the step on the left side of the machine. The water filter for the CB-225D machine is located in the step on the right side of the machine.

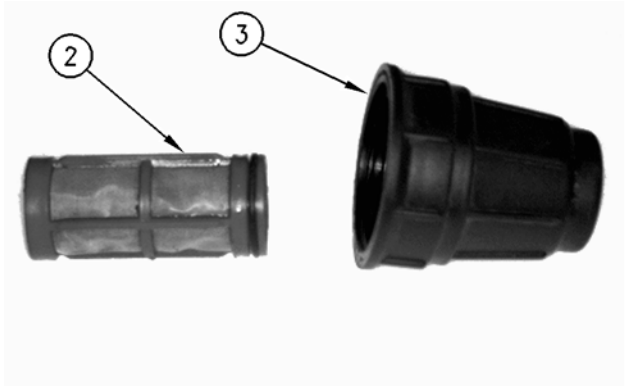

Illustration 209 g00646201

2. Clean the filter bowl (3) with water or compressed air.

3. Clean the screen (2) with water or compressed air.

4. Install filter bowl (3).

5. Install screen (2).

i01173206

Water Tank Strainer - Clean and Inspect

SMCS Code: 5613-571-STR

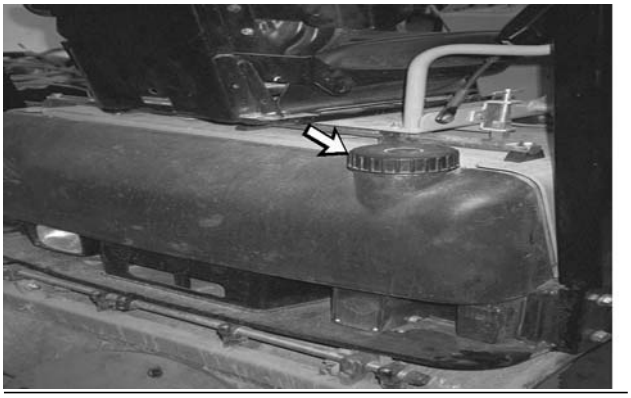

Illustration 210 g00646212

1. Remove the filler cap.

2. Remove the strainer.

3. Clean the filler cap with clean water or compressed air.

4. Clean the strainer with clean water or compressed air.

5. Install the strainer.

6. Fill the tank with clean water.

7. Install the filler cap.

i01250213

Wheel Nuts - Tighten

SMCS Code: 4201-527-NT; 4210-527

Illustration 211 g00665858

Tighten wheel nuts to 165 ± 15 N·m (121.7 ± 11 lb ft).