## WATER PUMP

The centrifugal-type water pump is installed at the front of the engine block. The inlet for the pump is connected to the bottom of the radiator by a hose. From the pump, coolant passes through the passages in the engine block to the top of the radiator. The thermostat controls the flow of coolant through the engine and radiator.

## FAN AND FAN SHROUD

The fan is used to provide airflow through the radiator at all engine speeds. The fan is a pusher-type or puller-type and can be installed on the water pump or on a separate hub. The fan is driven by a drive belt from the engine crankshaft.

The fan shroud ensures the air flow from the fan goes through the core of the radiator.

# Cooling System Checks

## RADIATOR

### WARNING

**During engine operation, be careful not to touch the fan, pulleys, or drive belts. Contact with these parts can cause serious injury.**

**NOTE:** The Repair procedures for the radiator are in the **Frame** section of the **Service Manual**.

To check for water flow restrictions in the radiator, run the engine until it is warm. Shut the engine OFF and feel the radiator. The temperature must be even across the radiator. (The radiator will be hotter near the top radiator hose.) Cold spots on the radiator indicate restrictions.

If the radiator has leaks, have it repaired by trained personnel.

## THERMOSTAT

### WARNING

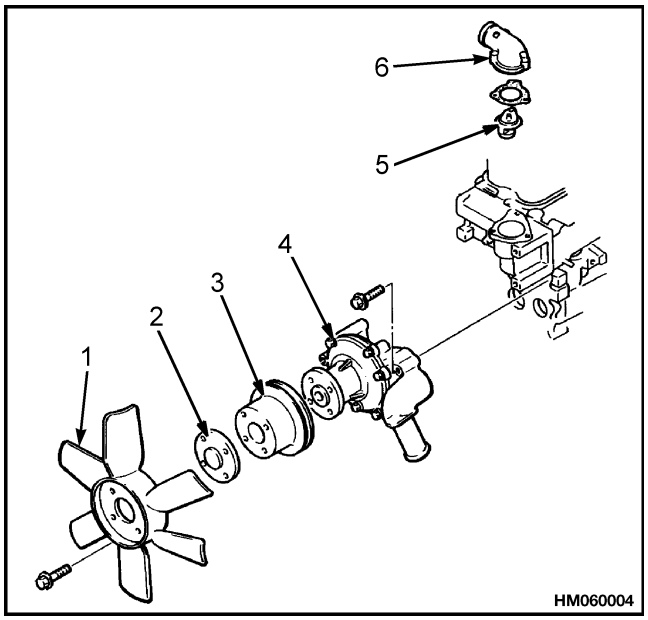
**During engine operation, be careful not to touch the fan, pulleys, or drive belts. Contact with these parts can cause serious injury.**

### CAUTION

**DO NOT operate the engine without a thermostat. The engine and cooling system can be damaged.**

**NOTE:** Repair procedures for the thermostat are in the **Engine** section of the **Service Manual**.

1. Remove thermostat from cooling system. See Figure 3.
2. Mix solution of water with 33% antifreeze. Heat solution to 14°C (57°F) above temperature on thermostat.
3. Hold thermostat with wire and put it in solution. Stir solution. If operating correctly, thermostat will open.
4. Remove thermostat and put in same solution at −12°C (10°F) below temperature on thermostat. Valve must close completely.




1. FAN
2. SPACER
3. HUB/PULLEY
4. WATER PUMP
5. THERMOSTAT
6. THERMOSTAT HOUSING

***Figure 3. Cooling System Components Typical Arrangement***

### WATER PUMP

**WARNING**

**During engine operation, be careful not to touch the fan, pulleys, or drive belts. Contact with these parts can cause serious injury.**

**NOTE:** Repair procedures for the water pump are in the **Engine** section of the **Service Manual**.

Run the engine until it is warm. Check the operation of the water pump by holding the top radiator hose. If the pump is operating, there will be pressure surges in the hose. See Figure 3.

### EXHAUST LEAKS

**WARNING**

**During engine operation, be careful not to touch the fan, pulleys, or drive belts. Contact with these parts can cause serious injury.**

To check for exhaust leaks into the cooling system, use a kit for this purpose. Follow the manufacturer's instructions when doing the test.

### FAN AND FAN SHROUD

**WARNING**

**During engine operation, be careful not to touch the fan, pulleys, or drive belts. Contact with these parts can cause serious injury.**

**WARNING**

**DO NOT try to repair a damaged fan. If a fan has a bent blade or is cracked, install a new fan. A damaged fan can break during use and cause damage or serious injury.**

**NOTE:** Repair procedures for the fan and shroud are in the **Frame** section of the **Service Manual**.

1. When installing fan, make sure correct spacers are installed and mounting capscrews are tight. See Figure 1 and Figure 3.
2. When installing fan shroud, make sure correct seals are on shroud. Before tightening capscrews, make sure clearance around circumference of fan is even with shroud. Also make sure 1/3 to 1/2 of cross-section of fan blade extends into fan shroud.
3. Make sure WARNING labels are installed on shroud.

## Radiator Cleaning

### DRAIN

**WARNING**

**DO NOT remove the radiator cap from the radiator when the engine is hot. When the radiator cap is removed, the pressure is released from the system. If the system is hot, the steam and boiling coolant can cause burns.**

**CAUTION**

**Disposal of lubricants and fluids must meet local environmental regulations.**

1. Let coolant cool to room temperature. Put drain pan under radiator. Remove radiator cap. See Figure 1.
2. Open drain valve or remove bottom radiator hose. Remove drain plug from engine block to drain engine.

### CLEAN

**CAUTION**

**Disposal of lubricants and fluids must meet local environmental regulations.**

1. Drain cooling system. Fill cooling system with clean water.
2. Install radiator cap. Run engine until top radiator hose is hot. Stop engine and let engine cool.