



## 1. Description

This procedure describes methods for the removal and installation of an engine-powered cooling fan. Inspection and evaluation requirements are also included.



## 2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of engine cooling systems. This procedure is intended for use by professionals who are qualified through training and experience.



## 3. Referenced Documents

The following documents are considered part of this procedure by reference.

### 3.1 Procedures

- CO01 Radiator Assembly
- HM01 Hazardous Materials
- PS01 Personnel Safety

### 3.2 Other Information

Vehicle-specific repair information



## 4. Equipment And Material Requirements

### 4.1 Coolant

Coolant used in this procedure must have these characteristics:

- correct type for the specific vehicle
- approved for aluminum if used with an aluminum engine block, cylinder head, radiator, or heater core
- new or properly recycled

Follow the vehicle maker's recommendations for the use of recycled coolant.



## 5. Damage Analysis

### 5.1 General Damage

Determine if the fan blades and clutch are separate parts and which part is damaged.

Inspect the mechanical cooling fan assembly for these conditions:

- damaged shroud or fan blades
- binding, or uneven blade rotation
- torn or frayed drive belt
- damaged or loose drive pulley
- excessive noise with the engine running
- leaks from the clutch assembly
- missing or damaged mounting fasteners

Damaged fan blades must be replaced.



## 6. Personnel Safety

### 6.1 General Safety

General safety information is in **PS01**.

### 6.2 Cooling System Safety

To prevent injury when repairing the cooling system:

- Do not open the cooling system when it is warm and under pressure.
- Protect eyes and skin from contact with coolant under pressure.
- Work in a well-ventilated area.
- Keep away from hot or moving engine parts.



## 7. Environmental Safety

### 7.1 Hazardous Materials

Hazardous material safety information is in **HM01**.

### 7.2 Coolant

Properly collect and recycle or dispose of coolant.



## 8. Vehicle Protection

### 8.1 Fan And Adjacent Areas

To protect a mechanical cooling fan and adjacent areas:

- Use care when removing or installing fasteners.
- Do not damage the shroud, fan blades, or clutch when handling or storing the fan assembly.
- Protect adjacent areas during removal and installation.

Do not operate a vehicle with a damaged fan. This can cause failure of the fan assembly and damage to adjacent parts.



## 9. Repair Procedure

### 9.1 Cooling Fan Test

To test the operation of the mechanical cooling fan clutch:

- 1. Check for fan clutch engagement with the engine off. The fan should freewheel, or turn easily by hand, when the engine is cold.
- 2. Check for fan clutch engagement with the engine running. With the engine cold, start the engine and monitor the fan while allowing the engine to warm to operating temperature. Listen for the cooling fan sound to change when the clutch engages. Watch for a change in fan rotation speed as the clutch engages.
- 3. Stop the engine. Allow the fan to come to a complete stop.
- 4. Check for fan clutch engagement with the engine off. The fan should not freewheel easily, and should have some resistance, when the engine is warm.

### 9.2 Fan Removal

To remove a mechanical cooling fan assembly:

- 1. Remove the fan shroud.
- 2. Loosen or remove the drive belt as needed.
- 3. Drain and remove the radiator, if necessary to provide clearance. Collect or recycle the coolant.
- 4. Mark the alignment of the fan and pulley.
- 5. Remove the cooling fan assembly mounting fasteners.
- 6. Remove the drive pulley and the cooling fan from the vehicle. Avoid damaging the radiator cooling fins.

### 9.3 Fan Installation

To install a mechanical cooling fan assembly:

- 1. Inspect the replacement parts for the correct type and size.
- 2. Position and align the fan and drive pulley. Be careful not to damage the radiator cooling fins.
- 3. Install the mounting fasteners. Torque the fasteners to the vehicle maker's recommendations.
- 4. Reinstall the radiator, if necessary, and refill with coolant.
- 5. Reinstall the drive belt.
- 6. Adjust the drive belt tension following the vehicle maker's recommendations.
- 7. Reinstall the fan shroud.
- 8. Test the operation of the mechanical cooling fan. See **9.1**.
- 9. Top off the coolant level, if necessary.
- 10. Road-test the vehicle and check for proper operating temperature.
- 11. Fill the coolant recovery bottle to the proper level.



## 10. Use Of Recycled (Salvage) Parts

### 10.1 Condition Of Salvage Parts

Do not install a salvage mechanical cooling fan having any of these defects:

- visible damage
- uneven rotation
- visible leaks from the clutch



## 11. Inspection And Testing

### 11.1 Inspection Of A Mechanical Cooling Fan Assembly

After installation of a mechanical cooling fan, inspect the vehicle for these conditions:

- proper fan position and alignment
- free and even rotation of the blades
- proper installation of all fasteners
- proper cycling during engine warm-up
- visible coolant and transmission fluid leaks
- proper tension of the drive belt
- proper installation of the fan shroud
- proper coolant level
- proper engine operating temperature
- proper automatic transmission fluid level
- proper operation of cooling fans

Correct any defects.