6.10.1 Repair or Replacement of Charge Air Cooler

Refer to the OEM guidelines for CAC repair and replacement procedures.

6.10.2 Removal and Cleaning of Charge Air Cooler

Refer to the OEM guidelines for CAC service procedures.

6.10.2.1 Inspection of Charge Air Cooler System

The CAC system must be routinely inspected for broken hoses, loose clamps and dirty/obstructed coolers. Damage to any of these components or obstructions require immediate repairs.

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**WARNING:**

**PERSONAL INJURY**

To avoid injury while performing the test or procedure, wear adequate eye, face protection, and heat-resistant gloves.

Inspect the CAC system as follows:

1. Visually inspect the core, tanks, and welds for cracks and holes. If cooler fails visual inspection replace the charge air cooler. Refer to section 6.10.1.
2. If the intake manifold shows signs of leaks it should be removed. Refer to section 6.4.2.
3. Both the intake manifold mating surface and the head port area should be cleaned. Refer to section 6.4.3.
4. After the intake manifold has been cleaned the mating ports should be checked for warpage. Refer to section 6.4.3.1.
5. Reinstall the intake manifold refer to section 6.4.4.

6.10.2.2 Charge Air Cooler Pressure Check

Perform the following to pressure test the charge air cooler:
1. Use the charge air cooler tester, J-41473 to test cooler for leaks. See Figure 6-81 for component parts.

2. Disconnect the air inlet and outlet piping connecting the charge air cooler to the engine.
3. Install the charge air cooler test gauge coupler into the inlet hose (hot side) of the charge air cooler coming from the turbocharger compressor. Secure hose and coupler with clamp and torque the clamp to 5.6 - 6.78 N·m (50 - 60 lb·in). See Figure 6-81a.

4. Attach the gauge/regulator assembly to the quick disconnect fitting on the gauge coupler.

5. Install clamp and attach the bleed-off coupler to the outlet hose (cold side) of the charge air cooler. Torque the clamp to 5.6 - 6.78 N·m (50 - 60 lb·in).
6. Connect the safety straps on the couplers to any convenient screw on the radiator mounting bracket.

**WARNING:**

PRESSURIZED AIR AND FLYING PARTICLES

To avoid injury to eye or face, wear a face shield or goggles when conducting a pressure test.

7. Attach an air pressure line, with filtered air, to the air shutoff valve and gradually pressurize the charge air cooler to a pressure of 205 kPa (30 psi). If necessary, perform the following steps to adjust the air regulator until the gauge reads 205 kPa (30 psi):

[a] Pull regulator knob outward to unlock.
[b] Turn knob to adjust pressure to 205 kPa (30 psi).
[c] Push the regulator knob back into locked position.

8. Close the air shutoff valve and monitor the gauge with a stop watch for 15 seconds. Note any decrease in air pressure.

9. Repeat test at least three times to verify results.

[a] If the pressure drop is 34 kPa (5 psi) or less in 15 seconds the cooler is good.
[b] If the pressure drop is greater than 34 kPa (5 psi) in 15 seconds, replace the charge air cooler. Refer to 6.10.1

10. Slowly release pressure with the charge air cooler by opening the valve in the bleed-off coupler.

11. Remove all charge air cooler tester pieces and reconnect charge air cooler piping to the engine.

12. Reconnect air inlet and outlet piping to engine. Torque hose clamps to 5.6 - 6.78 N·m (50 - 60 lb·in).

### 6.10.2.3 Turbocharger Failure Clean-up Procedure

When a turbocharger failure occurs, debris and oil are deposited into truck components. It is necessary to properly clean the engine and related components to ensure additional damage does not occur.
To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

**NOTICE:**

Failure to remove residual lubricating oil from air intake passages may allow the oil to act as an external fuel source at engine startup. This can cause a sudden engine overspeed condition, which may result in severe engine damage.

**CAUTION:**

To avoid injury, always wear adequate safety equipment.

To clean engine and related components perform the following procedure:

1. Inspect inlet and outlet ducting to the CAC and clean as necessary.
2. Remove the CAC; refer to Section 6.10.2.
3. Remove compressor wheel debris by gently tapping the inlet side first and the outlet second.
4. Remove oil residue from inside the CAC by cleaning it with a mild solution of hot water and detergent. Backflush the CAC with hot water to rinse and remove any remaining fine debris particles.
5. Blow out the CAC with compressed air to remove all moisture.
6. Pressure test the CAC, refer to Section 6.10.2.2. If the CAC does not meet pressure test requirements, it must be replaced.

**WARNING:**

**EYE INJURY**

To avoid injury from flying debris when using compressed air, wear adequate eye protection (face shield or safety goggles) and do not exceed 40 psi (276 kPa) air pressure.
6.10 CHARGE AIR COOLER

**WARNING:**

**PERSONAL INJURY**

To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

**NOTICE:**

Failure to remove residual lubricating oil from air intake passages may allow the oil to act as an external fuel source at engine startup. This can cause a sudden engine overspeed condition, which may result in severe engine damage.

7. Inspect the air cleaner and replace if contaminated with debris.
8. Inspect and clean air ducting from air cleaner as necessary.
9. Drain oil from the muffler and exhaust pipe.

6.10.3 Installation of Charge Air Cooler

Refer to the OEM guidelines for CAC installation procedures.

When installation is completed, refer to section 11.8 for engine test.
6.11 THROTTLE ACTUATOR FOR THE SERIES 60G ENGINE

The throttle actuator is used to control the amount of air and fuel mixture to the engine. A butterfly valve within the body is positioned by an electric actuator that is controlled by DDEC III/IV. See Figure 6-82.

Figure 6-82  Throttle Actuator for the Series 60G Engine