

By Jerry Bisbee – ATC Tech Trainer

New EPA07 Coolant Surge Tank

■ Coolant Surge Tank Purpose

Coolant surge tanks serve several purposes:

- 1. A place to fill the cooling system.** There is a fill-line connected to the bottom of the surge tank that is typically connected to a low point on the engine. This allows the cooling system to fill from the bottom and push air out the top.
- 2. As an expansion tank for the coolant.** As the engine heats up and coolant expands, coolant that is pushed out of the engine is trapped in the surge tank.
- 3. A place for air to vent out of the engine as it is filling up and as it operates.**
- 4. A place to install the pressure cap that maintains a certain amount of pressure on the cooling system.**

■ Surge Tank Mounting

Earlier model trucks typically had the surge tank mounted above the engine on the frontwall of the cab in the engine compartment. They were one-chamber tanks that held liquid coolant in the bottom and air in the top. Beginning with trucks equipped with EPA07 engines, Freightliner began mounting the radiator assembly to the front of the engine instead of to the frame. The engine, radiator, charge-air-cooler, and AC condenser are one



assembly. Because of space constraints a new coolant surge tank was developed that mounts to the top of the radiator assembly instead of to the frontwall of the cab. Since the new surge tank is not mounted high above the engine, a new two-chamber tank is used.

■ New Surge Tank Design (see Figure 1)

The new surge tank consists of two separate chambers connected by an internal passageway. The upper chamber, located under the fill cap, contains coolant and air when the engine is started cold. It is connected to the engine by the fill-line and the vent line(s). The lower chamber is connected to the upper chamber by an internal passageway inside the seam on the left-hand side of the surge tank. This passageway connects an opening in the top of the upper chamber to an opening in the bottom of the lower chamber. The pressure cap is mounted in an opening on the left-hand end of the tank. This opening connects to the lower chamber.

■ New Surge Tank Operation

As the engine warms up and the coolant expands, the air and eventually some of the coolant in the upper chamber is pushed through the internal passageway in the seam, on the left-hand end of the tank, into the lower chamber. When the engine reaches operating temperature the upper chamber may contain only coolant. All the air may be located in the lower chamber.

When the engine is shut down and starts to cool down the coolant in the upper chamber starts to contract. Coolant and air are drawn back out of the lower chamber into the upper chamber. You can see coolant and air bubbles migrating through the passage in the seam on the left-hand end of the tank.

■ Service Procedures and Warnings

The surge tank must be filled from the upper opening in the upper chamber under the fill cap. **Never remove either the fill cap or the pressure cap when the engine is hot. Doing so will cause scalding hot coolant to be blown out of the surge tank. Allow the engine to cool before opening either cap.** Fill the upper chamber according to the "Cold Min" and "Cold Max" marks on the side of the surge tank with the proper coolant that is listed on the label located on the top of the surge tank (see Figure 2). When pressure-testing the cooling system the pressure tester should be connected to the pressure-cap port on the end of the surge tank. You may have to remove the radiator strut rod on some models to remove the pressure cap. Pressure-test the cooling system according to manufacturer's specifications.

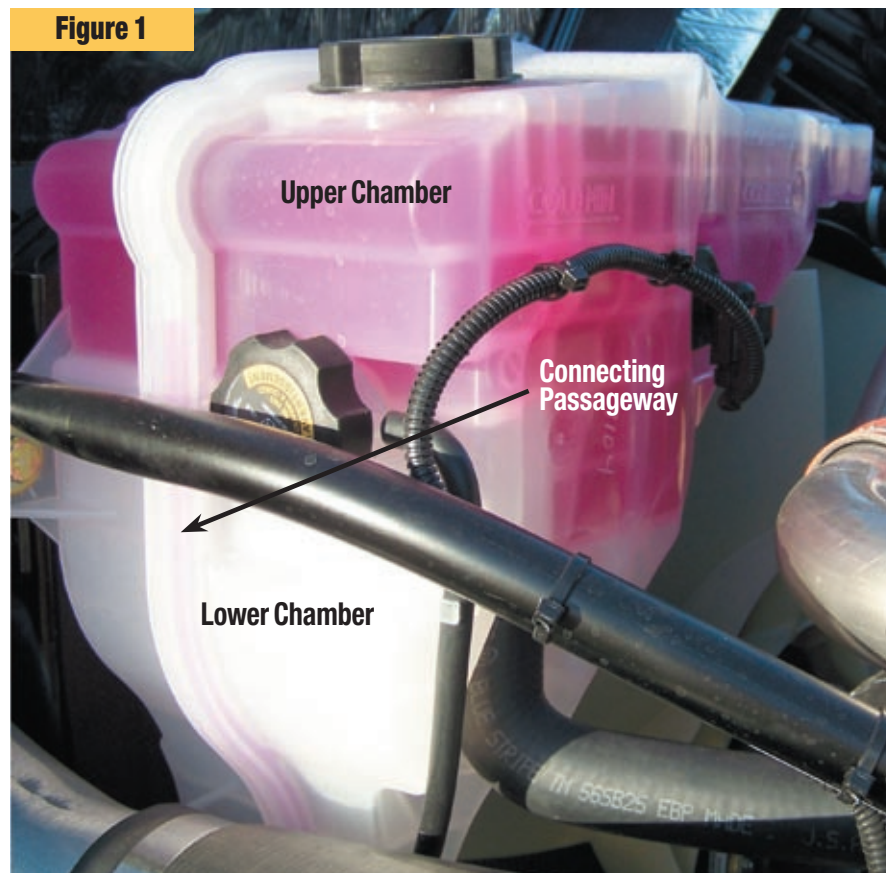


Figure 1

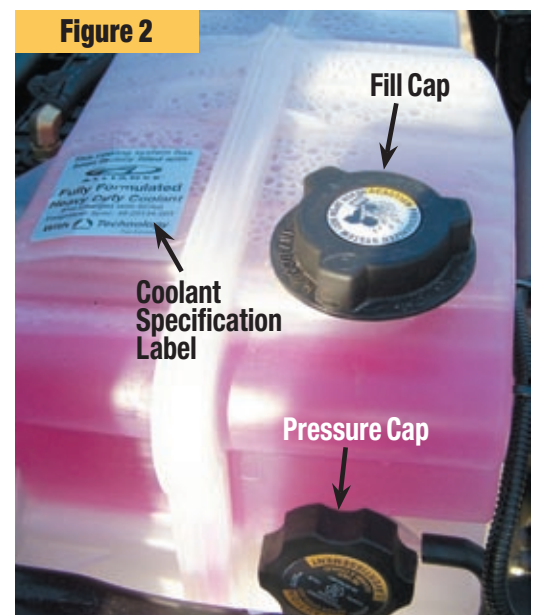


Figure 2

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Email Jerry Bisbee
techtalk@atcfreightliner.com

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