Filling the Cooling System Version 3.0

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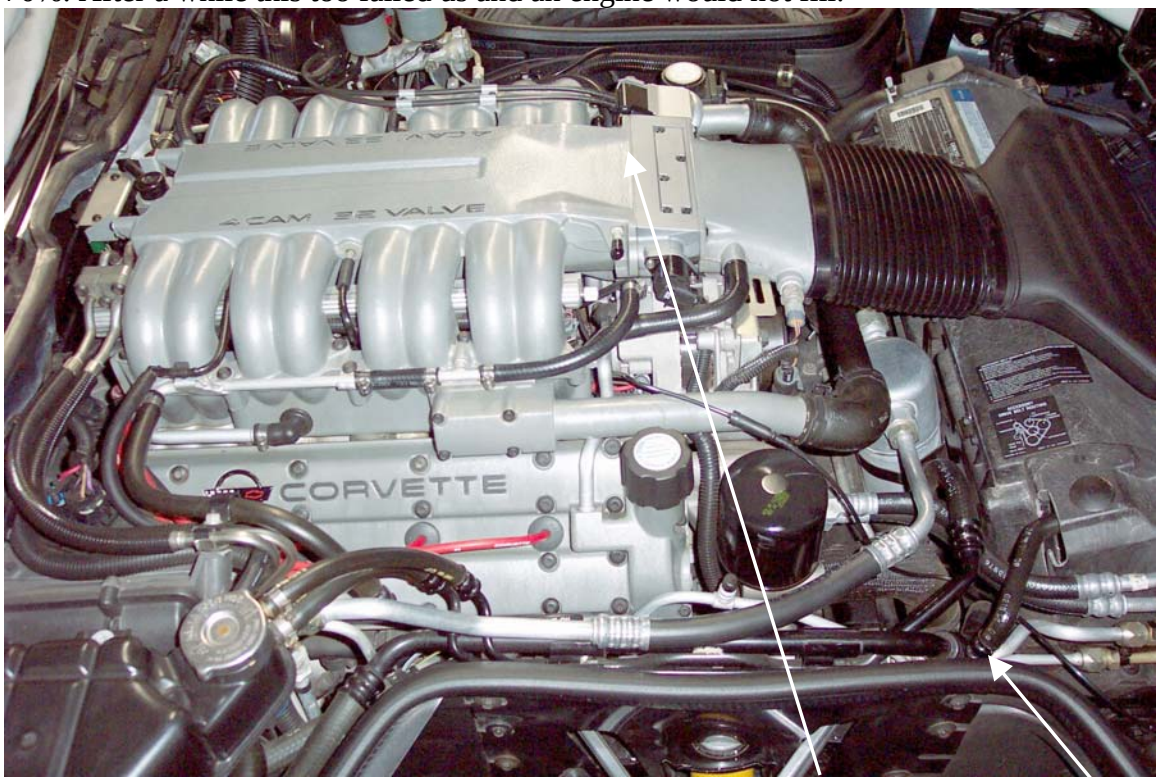
Filling the LT5 engine with coolant can be challenging. We have found that about 60% of the time the filling process is straightforward. A good sign of progress is when the air bleed tube in the black surge tank burps as the coolant is installed. The air bleed tube is the lower of the two tubes that are in the neck of the surge tank. When air is freely flowing out of the air bleed tube it usually leads to a nice flow of coolant from the tube after the engine is started. The coolant flow from the air bleed tube confirms that the pump is indeed pumping coolant. After topping the coolant in the surge tank, install the cap and you will be able to verify that the engine is cooling properly. Use your hand to feel the temperature of the left and right water manifold tubes. After just one minute of run time a temperature rise should be detected in both of the tubes. If one tube is much cooler than the other shut down the engine before it runs for over two minutes.

The other 40% percent of the time is where the Devil is in the details. In July of 2007, I published a method of burping the system when the cooling system is air locked. The article is titled, Filling the Engine with Coolant[i]. The procedure is to jack up the right side of the car. This helps the coolant rise to the surge tank. However, after a while this method failed us and an engine would not fill.

Eventually we learned about clogged air bleed flow restrictors. They are not described in the service manual. In June of 2013, I published an article titled, Clogged Air Bleed Restrictors[ii]. The article describes the locations of the two flow restrictors that can clog. If the throttle body air bleed flow restrictor is clogged the left cylinder head won't fill. If

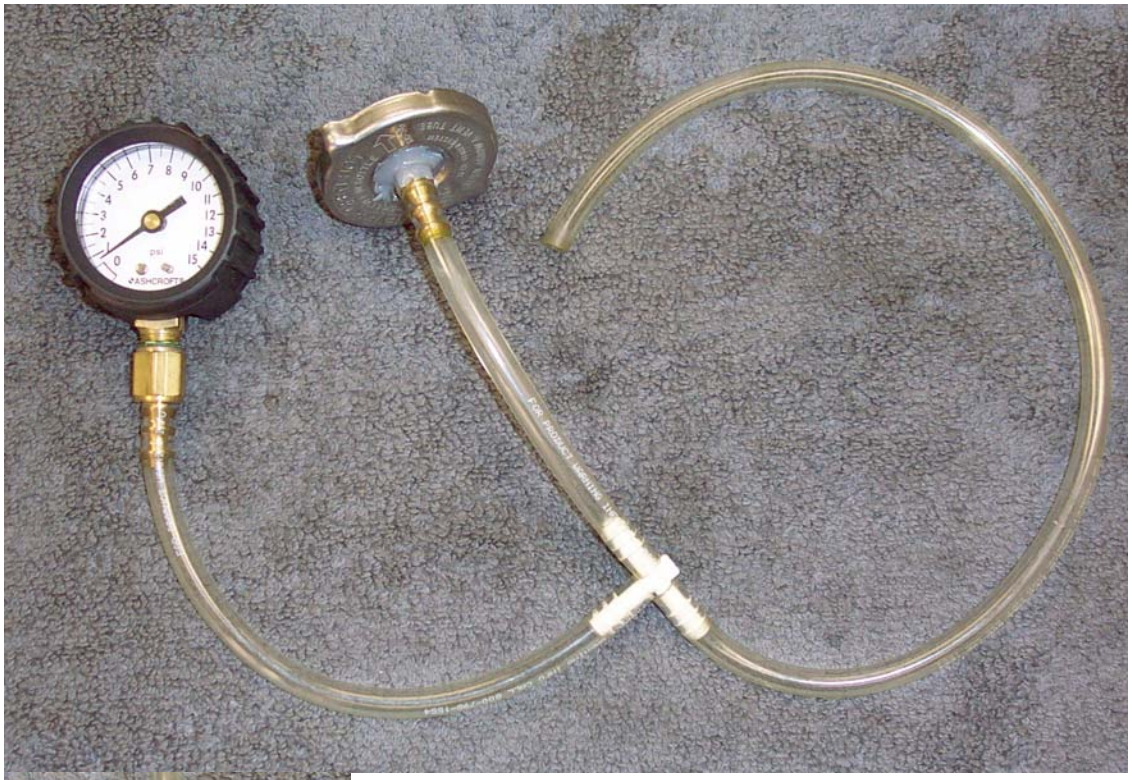
the radiator air bleed flow restrictor is clogged the radiator won't fill more than about 70%. After a while this too failed us and an engine would not fill.



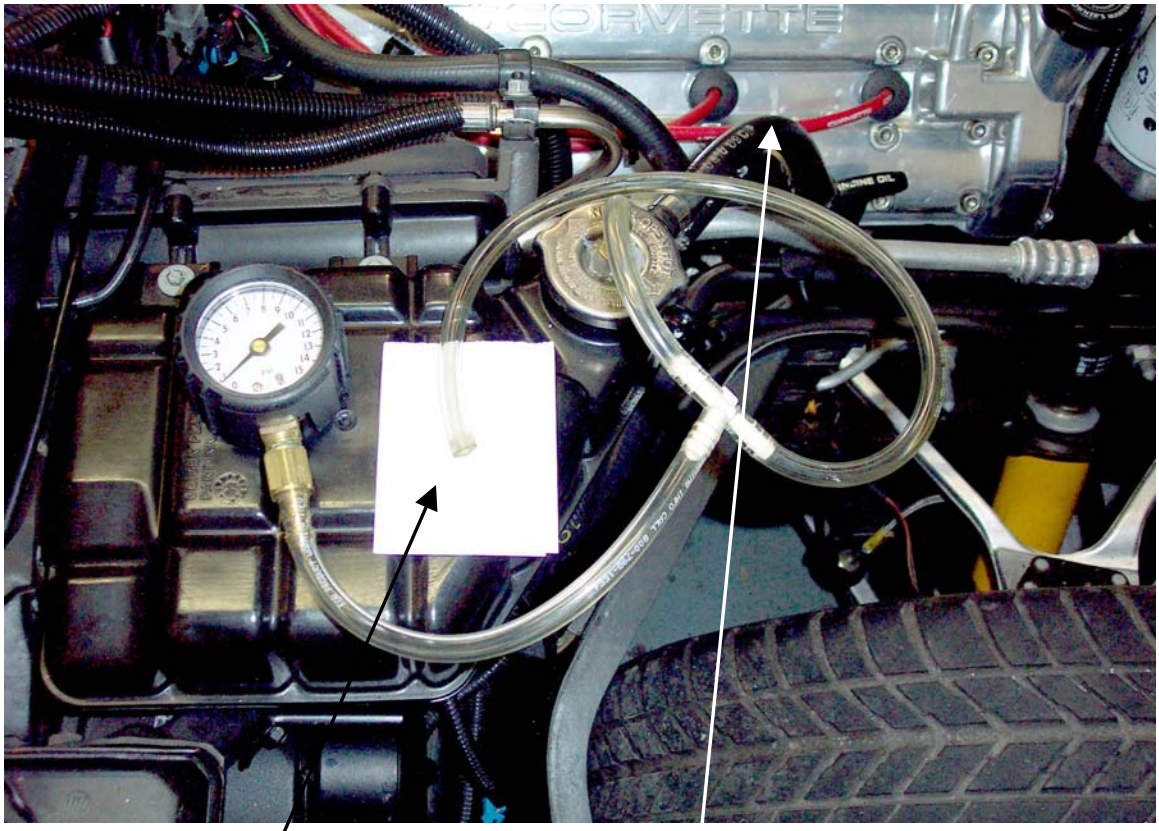
Air bleed flow restrictions are located at:

- The plenum feed to the throttle body.
- Where the radiator vent hose connects to the aluminum tube.

We discovered that pressurizing an air locked system will force out the trapped air. This method has never failed us. Of course the air bleed flow restrictors must be open. We always test for flow through the air bleed flow restrictors before we proceed to fill the engine. We fabricated this simple tool.



Pinch off the upper 3/8” ID hose on the surge tank. This is the overflow hose that goes to the white reservoir tank. Attach the pressurization tool to the surge tank and use shop air to pressurize the system to 15 psi. After a two second blast of air you will find the surge tank empty, a gratifying sign of progress. The system will fill normally to the top after that. Start the engine and observe the glory of the coolant flow out of the surge tank air bleed tube.



Apply shop air here. Pinch off the overflow hose here.

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[i] Filling the Engine With Coolant. Heart Of The Beast. July 2007. Publication #11.
http://www.zr1specialist.com/HAT%20Web/articles/filling%20coolant.htm

[ii] Clogged Air Bleed Restrictors. Heart Of The Beast. June 2013. Publication #31.
http://www.zr1specialist.com/HAT%20Web/articles/Clogged%20Engine%20Coolant%20Air%20Bleed%20Restrictors.htm