AUTO COOLING-SYSTEM REPAIR -- VISUAL INSPECTION AND PRESSURE TEST

In this article I will try to show you how to diagnose problems with your car's cooling system, spot a faulty water pump or radiator, and perform a general visual overview looking for worn belts, hoses, etc.

My project vehicle, is my own 1976 2500S it is not exhibiting any signs of any coolant loss. Signs of coolant leaks are coolant is found to be slowly leaking out onto garage floor, high water temperatures caused by an overheating engine.

Note: If an engine is allowed to run without coolant, it will overheat severely and can cause permanent or irreparable damage. Metal parts can actually fuse together, and ultimately ruin the engine. If your vehicle begins to overheat, pull over and allow the engine to cool down. Once the engine has cooled, check to be sure you have water and coolant in your system.

DIY Difficulty Rating for Repair: A thorough check and straightforward repair to the cooling system should take no more than an hour. I give it a difficulty rating of 3 on a 10 point scale. In my demonstration, the visual check and test took about 30 minutes. Repair times may vary depending on make, model and specific parts needing repaired/replaced.

Important: Included on the next two pages are the steps in this automotive procedure. These steps are general guidelines only that are applicable to most vehicles. With any particular vehicle, there may be procedures, specifications, settings, tolerances, components, etc. that are specific to that vehicle. Always consult your vehicle's service manual when undertaking significant automotive repairs.

In addition to standard auto-mechanic's tools, one of the specialty tools that will be needed for this project is a **cooling-system pressure tester,** you may also need a bucket to drain your system into and some replacement coolant.

Visual Inspection of Cooling System

The initial phase of this project is a visual inspection under the hood. Look for any obvious leaks and check the condition of the drive belt and hoses. In my inspection, no leaks were identified (by coolant pooling on the garage floor). Also, hoses and belts found to be in worn condition need to be replaced (**figure A**).

- Visually inspect the **radiator** -- the heart of the cooling system that serves to dissipate the heat generated by the engine. Making certain that the engine is completely cool, remove the cap (**figure B**) and check inside the neck of the radiator for the presence of rust, sludge and debris.
- In this demonstration, the radiator was found to be in good condition, no rust was visible inside.
- Check the coolant expansion/recovery tank (**figure C**) for leaks and for the condition of the coolant. Again, coolant that is brown or rusty looking indicates a cooling system in need of service.
- Previous visual inspections I have done recently revealed a visible leak on the **weep hole** on the **water pump**. Weep holes are purposely built into the water pump as an alert to internal failure. This indicates that the water pump should be replaced, there is normally water staining below the weep hole.
- The **drive belt** that runs the water pump was also inspected for tightness and condition (**figure D**).
- The visual inspection may indicate the repair of the cooling system, which should include repair/replacement of the radiator, water pump, hoses, radiator cap, belt and coolant.

  NOTE: *Rather than attempt a radiator repair, it may be more practical to simply replace the radiator with a new one. The radiator cap should be replaced at the same time.*

Pressure Test

Before beginning the repairs, conduct a **pressure test** to ensure that there are no additional leaks that were overlooked in the visual inspection.

- A pressure-tester can be purchased from an auto center for around $150 - 250, Top quality testers can be as much as $600.00.

- The pressure tester has an adapter on the end of the hose that connects to the radiator in the same place as the radiator cap (**figure E**). Install the tester and tighten it down securely.

  NOTE: Pressure test can be carried out with the engine cold, warming up, hot or cooling down. ***Do not over pressurise your system. this can result in damage to your radiator, hoses or engine.***

- The pressure tester has a gauge (**figure F**) with color bands indicating the pressure levels that are appropriate for specific vehicles and cooling systems. Your radiator cap should indicate the appropriate pressure for your system. You can also get this information from your vehicle's owners or service manual.

- My vehicle has a 13-pound system, indicated by the blue bar on the gauge, check yours.

- With the tester connected, increase the pressure to the cooling system -- using the hand pump -- until the needle on the gauge reaches the appropriate bar.

- Leave the tester on the system, and check it in about 5 minutes. If the system is sealed properly, it should hold pressure, and the needle will not drop significantly. If the system has a leak the needle will drop out of the acceptable range (**figure G**) the faster the pressure drop the bigger the leak.

- With pressure applied using the pressure tester, a leak can be identified in all areas of the cooling system including the pump (shown in **figure H**) and the interior heater and hoses.

- To release the pressure use the lever on top of the radiator fitting, when system hot take precautions not to scald yourself with hot water, use of a glove or a rag around the cap is recommended.