Testing cooling system pressure

Objective:

Test a cooling system to confirm that it is without leaks and has the ability to hold the pressure specified by the manufacturer.

This activity sheet contains:

- Step-by-step instructions for completing the workshop procedure

Safety check:

- When working around the cooling system, care must be taken particularly if the engine is at operating temperature, as the coolant may be hot enough to scald.
- Always allow the system to cool before removing the radiator cap.
- Do not remove a radiator cap from a hot cooling system.
- Always use extreme caution when removing the radiator cap. Releasing the pressure cap, on an engine at operating temperature, may cause the hot coolant to superheat.
- If you must remove the radiator cap from a hot system, wear protective gloves and eyewear and remove it slowly, to the first (safety) point, to prevent the pressure inside from erupting. If you don't this could cause the scalding hot coolant to spill hot fluid over you or someone standing nearby.
- Make sure the engine is off when carrying out any visual inspection of the system or when you connect the tester. You may be required to run the engine after the tester has been installed and pressurized.
- When the engine is running, make sure that you keep any loose clothing away from rotating parts.
- When pressure testing a system, make sure you do not exceed the manufacturer's maximum pressure.
- Have a qualified instructor show you the correct operation of the tester.
- Make sure that you understand and comply with all environmental and occupational health and safety standards for your workplace at all times. If you are unsure of what these are, ask your supervisor.

Points to note:

- To test the cooling system for both internal and external leaks, a pressure tester is normally used. These are often referred to as cooling system testers or analyzers. There are a number of different analyzers used today. Make sure you are familiar with the system used in your workshop.
- If you need to replace a pressure cap, use only a cap with the correct recommended pressure. If a cap with a lower pressure rating is fitted, it will lower the boiling point of the coolant. Alternatively, a higher rated cap will increase the boiling point.
- Each 10 kPa (1.45 PSI) of cap-rated pressure changes the boiling point by 2°C (3.6°F). For example: A 90 kPa (13 PSI) radiator cap will increase the boiling point from 100°C (212°F) to 118°C (244°F). Similarly, a 100 kPa (14.5 PSI) radiator cap will raise the boiling point from 100°C (212°F) to 120°C (248°F).
- Pressure testing kits come with a number of adapters for various cooling systems. These adapters can be used to connect the tester to the radiator or to the radiator cap.

1. Inspect cooling system visually

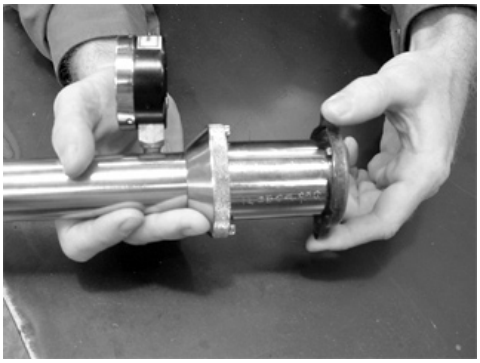
Before pressure testing the system, you must visually inspect the system for any obvious signs of leaks or wear in the following locations:

- Radiator core, including the internal coolant tubes and the external airflow passages
- Radiator tanks, both the coolant inlet and exit tanks
- Coolant hoses, including the heater hoses
- Water pump housing and associated areas
- All accessible engine core plugs (The inaccessible core plugs will be tested when you fit the tester unit.)
- The cooling fan and drive belt
- Radiator cap and seals

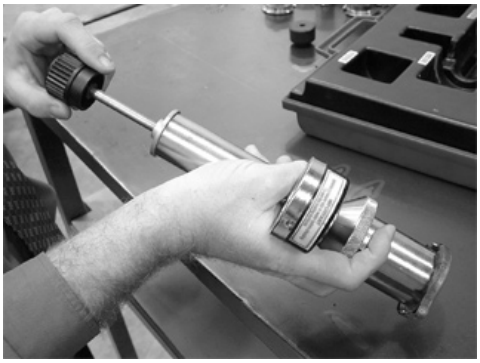
2. Check the operating instructions of the tester

Refer to the manual for the tester to thoroughly familiarize yourself with its operation. If possible, have your supervisor show you the correct operation of the particular tester.

3. Test the radiator cap



The outside of the radiator cap should be marked with its operating pressure: e.g. 13lbs, 17lbs, 90kPa, 120kPa etc. When this pressure is reached, the pressure relief valve in the cap will allow a discharge into the overflow system.



Refer to the workshop manual, or the vehicle owner's manual, to check that the pressure cap fitted has the correct pressure rating for that cooling system.

Attach the radiator cap to the tester with an adapter and pump up the pressure on the radiator cap spring. The pressure should hold just below the relief pressure setting. If the pressure will not hold, or it cannot reach this pressure, then replace it with a new cap of the correct type and recommended pressure.

4. Test the cooling system

Before testing the integrity of the cooling system, top up the coolant level.

Attach the cooling system tester to the radiator cap locator. Pump up the system pressure to slightly above the pressure recommended by the rating specified on the pressure relief cap.

Observe the pressure reading. If it remains steady and does not drop, then the system is not leaking. However, if the pressure drops, look for the leak. If there is no visible external leak, then the leak is most probably internal. That could include a blown head gasket or internal corrosion, and may indicate a serious problem.

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4. Test the cooling system (continued)

If there are any visible leaks, or the pressure drops, refer your test results to your supervisor.

Remove the pressure from the system before undertaking any repairs.