

Cooling System Overview

1) Radiator. The radiator is responsible for transferal of heat from the circulating coolant to the air passing through it. Heated coolant flows into the top of the radiator from the engine. The coolant is passed through a series of tubes and fins that effectively dissipate the heat in the coolant.

2) Radiator Cap. Modern radiator caps are actually pressure valves that are responsible for increasing and regulating pressure in the cooling system. Increasing the cooling system pressure raises the boiling point of the coolant. For every additional pound of atmospheric pressure the coolant boiling point increases 3°F.

3) Coolant. As the coolant flows through the hot engine, it transfers the heat to itself for dissipation in the radiator. In addition to providing improved performance over plain tap water, most leading antifreeze products contain anti-rust and anti-corrosion additives that prevent sediment buildup and premature cooling system component failure.

4) Coolant Recovery Tank. The coolant recovery tank serves as a reservoir. It receives coolant expelled from the cooling system through the pressure valve in the radiator cap. It holds the expelled coolant for reintroduction into the cooling system when needed. When additional coolant is needed in the system, it should be added to the recovery tank, not directly to the radiator.

5) Fan. The fan pulls cool air through the radiator to aid heat-transfer from the coolant.

6) Fan Clutch. The fan clutch is designed to keep the optimum amount of air flowing through the radiator. At slow vehicle speeds, the fan is required to move enough air through the radiator to ensure proper cooling. At highway speeds, the air flow through the radiator is sufficient to provide proper cooling without the aid of the fan. The clutch lets the fan free-wheel at highway speeds, reducing horsepower loss.

7) Belts. The belts are responsible for driving the water pump, as well as other accessories. Be sure they're in good shape and adjustment, not worn, cracked, or slipping. Never over-tighten belts. Over-tightened belts put unnecessary side-load pressures on the water pump impeller shaft and bearings. Premature water pump failure is inevitable.

8) Hoses. Radiator hoses are responsible for carrying coolant to and from the engine from the radiator. They should be regularly checked for signs of advanced deterioration, such as bulging and cracking. Healthy hoses should be pliable, not soft and spongy, or hard and brittle. Any sign of leakage could mean that it's time for a replacement.

9) Thermostat. The thermostat is responsible for regulating the flow of coolant into the engine block. It keeps the engine block at its optimum operating temperature. When the engine is cold, the thermostat closes to restrict coolant flow and allow the engine to quickly reach a satisfactory operating temperature. As the engine heats up, the thermostat opens and allows more coolant to circulate. A sticky thermostat can stop or restrict coolant flow to the engine.

10) Water Pump. The water pump delivers a continuous flow of coolant through the radiator and through the engine. A paddle-style impeller mounted inside the water pump housing, rotating on a bearing-supported shaft, is responsible for moving the coolant. The impeller shaft is driven externally by a pulley/belt combination that's connected to the crank shaft pulley. Keeping the coolant clean and fresh and the belts properly tensioned is about all the maintenance the water pump requires.

