



TECHNICAL NOTE

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Bureau of Land Management U.S. DEPARTMENT OF THE INTERIOR

VEHICLE COOLING SYSTEMS

Now is the time to check your vehicle's cooling systems. Fall is a crucial time for the cooling systems of your vehicles--a time to make sure your radiator and radiator pressure caps are operating perfectly. Effective, preventive maintenance can mean more fleet profits for us.

Driving conditions sometime impose a heavy load on the cooling system of a vehicle. Traffic jams may require a driver to creep along at a little more than idle speed for a mile or more and at times, come to a complete stop. Or, if a motor is suddenly shut off after a high-speed run, there is a great amount of residual heat in the manifold system and motor block. This finds its way into the coolant. Pump circulation will stop and underhood temperatures may rise as high as 250° F.

Also, over a period of time, rust and scale accumulate in the radiator and engine water jackets. This restricts the circulation of water, and the engine tends to overheat. In addition, the hose and connection between the radiator and engine may deteriorate, causing leakage or inadequate passage of water.

In spite of these adverse conditions, a properly maintained coolant system will prevent coolant boiling and coolant loss.

Here are some suggestions to vehicle owners to keep their cooling systems in top-notch condition.

The appearance of the coolant indicates whether rust and scale have accumulated in the cooling system. If the coolant looks rusty or muddy, then scale is present. It should be drained, flushed and fresh coolant added.

The radiator should also be tested for any restrictions. Remove the radiator hose connections. Drain the radiator. Then add a stream of water from a hose into the top of the radiator. The water should run through the radiator and out. The radiator should not fill up. If the water runs out slowly, the radiator is clogged.

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Hose and hose connections should be examined. If a hose is soft and collapses easily when squeezed, it should be replaced. Even if the hose does not feel soft, but has been in use for a long period of time, the core could be cracked or collapsed. This can be determined by moving one end of the hose and examining it visually.

The water pump should be checked, too. You can get some idea of its operating condition by squeezing the upper hose connection in your hand, with the engine warm and running.

A leak any place in the cooling system is dangerous. To determine if there are any leaks use a Pressure Cap and Cooling System Tester. The thermostat should, of course, be tested for accuracy.

A fan belt should be examined every few thousand miles to be sure that it is still in good condition. Low belt tension causes slippage, so the fan and generator pulleys can not turn fast enough. The result will be a worn out belt, a run down battery and engine overheating. Excessive belt tension will overload the water pump and generator bearings and cause them to wear out.

Since winter weather, which could freeze a cooling system, is not far off, anti-freeze solutions should be checked for effectiveness.

Remember, the cooling system should be checked when the system is cool. Removal of the cap, when the system is at normal operating temperatures reduces the pressure in the system and causes the coolant to boil and blow out scalding coolant. A large amount of coolant can be lost.

The cooling system should be maintained with the coolant solution specified in the vehicle's manual.

Probably the most important aspect of a properly operated cooling system is the radiator pressure cap. The pressure cap makes it possible to increase the pressure over the coolant. This in turn permits a higher coolant temperature before boiling is attained. With a greater temperature differential between air and coolant temperature, the necessary heat removal can be attained.

Most radiator caps are designed to obtain maximum performance from the vehicle's cooling system. The use of a cap with either

a higher or a lower relief pressure than intended for the engine will result in unsatisfactory performance. Also, a cap having a relief pressure operating range below that of the cap supplied by the engine manufacturer, will result in radiator coolant loss when the design temperature limits of the engine are realized.

A pressure cap should be examined for signs of deterioration every 12 months or 12,000 miles. Radiator cap testers are effective in determining whether the radiator cap has reached the point where it no longer maintains an effective seal. Sand and other dirt can prevent the valve from sealing. The cap should be cleaned off before testing.

Keeping these cooling system tips in mind can mean fewer maintenance problems for you. Preventive maintenance also means lower operating cost.