

Wheels: Elmer states that his 1989 Ford F150 pickup truck equipped with a 300 cu. in. straight six-cylinder engine has started to overheat. He has already replaced the thermostat, flushed the radiator, and checked the pressure cap. Elmer also states that the fan clutch appears to be working. Do you have any suggestions?

Halderman: If the truck overheats on the highway, the most common cause is lack of coolant flow due to items such as a partially clogged radiator or slipping or worn water pump impeller requiring a replacement pump. If the overheating occurs in city driving and is OK at highway speeds, then the most common problem is a lack of air through the radiator. Dirt, debris, or the clutch fan can be the cause.

Wheels: What steps could be followed to determine the root cause of the problem?

Halderman: The first step as in any vehicle problem diagnosis is to verify the concern. For example, the problem may be due to a fault in the temperature gauge instead of the engine itself. An infrared pyrometer is often used by professional service technicians to determine the temperature of the engine, radiator and thermostat housing. Special heat sensitive crayons are also used to determine the temperature of the engine coolant. The crayons are designed to melt at a particular temperature and are color-coded. The technician applies marks of different crayons on the thermostat housing and then drives the vehicle. After the test drive, a visual inspection is made of the crayons. The one that is melted with the highest rating is an indicator of the actual temperature. The temperature could be checked using a scan tool. The temperature displayed on the scan tool represents the temperature of the coolant as determined by the engine coolant temperature sensor, which is often a different sensor than the one for the dash gauge. A service technician can use the infrared pyrometer to check for cool areas in the surface of the radiator, which can indicate a partial clog. A radiator repair shop can also perform a flow test to determine if it is partially blocked. A cleaning or replacement radiator may be needed.

The clutch fan can be checked for leakage of the silicone fluid. If it is leaking, it should be replaced.

If the radiator is out for service, it is wise to replace all the hoses, radiator and heater, and refill the system with new coolant.

Wheels: Is there another cause of overheating that is not caused by a fault with the cooling system?

Halderman: Yes. Overheating can also be caused by a defective (leaking) head gasket. Combustion gases can be forced into the cooling system reducing the effect of the coolant. I would suspect a defective head gasket if the coolant level is low and white steam is coming from the exhaust. If either of these conditions exist, a series of tests such as a compression test and cylinder leakage test may be performed to confirm the fault before the cylinder head is removed. When a head gasket fails, the cylinder head itself may be warped requiring that the cylinder head be machined before being reassembled using a new head gasket.

