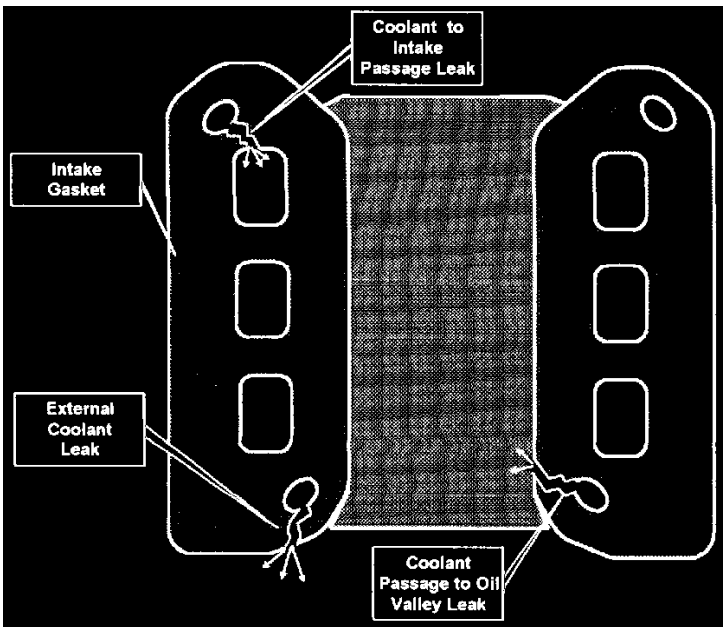
Cooling System: Testing and Inspection
Intake Manifold Coolant Leak



TYPES OF INTAKE MANIFOLD COOLANT LEAKS

Coolant to Intake Passage Leak - Coolant leaks through the gasket and into an intake passage, where it is drawn into the combustion chamber.

External Coolant Leak - Coolant leaks out through the gasket between the intake manifold and the cylinder head.

Coolant to Oil Valley Leak - Coolant leaks through the intake gasket and into the oil valley, where it then drains into the oil pan.

SYMPTOMS

Coolant to Intake Passage Leak

- Spark Plug may be coolant fouled.
- White smoke from the exhaust.
- Coolant loss with no signs of external leakage.
- Engine oil may show signs of coolant contamination (from cylinder blow by).

NOTE: Check the bottom side of the oil filler cap, this is where coolant contamination from cylinder blow by often accumulates first.

External Coolant Leak - Coolant leak is visible between the intake manifold and cylinder head.

Coolant to Oil Valley Leak

- Engine oil is contaminated heavily with coolant.

NOTE: Oil contaminated with coolant or water will have a creamy, light brown color.

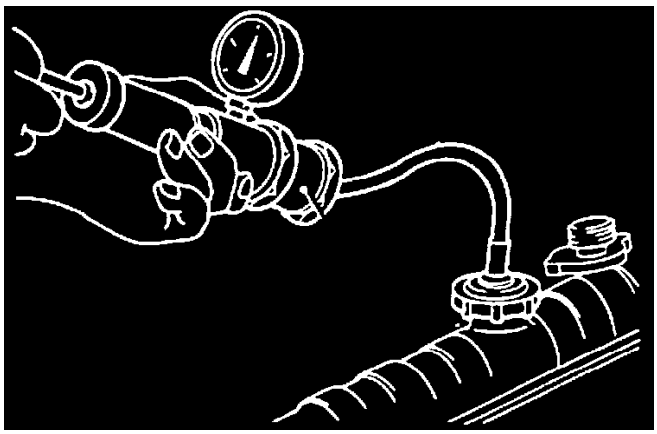
- Steady loss of coolant with no signs of external leakage (coolant level decreases while the oil level increases)
- Engine oil low pressure warning light may energize.

NOTE: Operating an engine with coolant contaminated oil is extremely damaging to the engine.

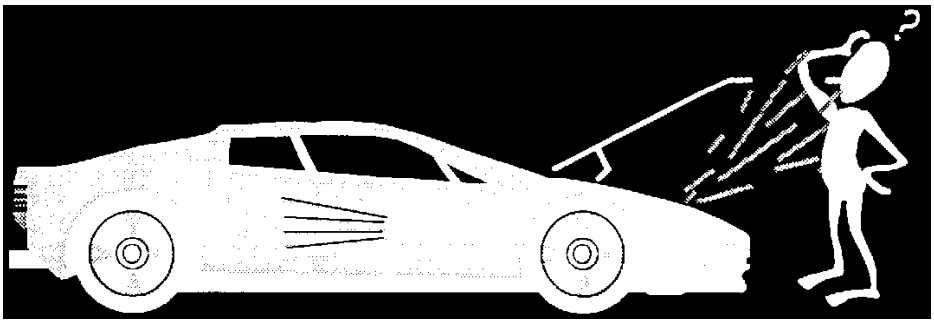
VERIFYING THE PROBLEM

Coolant to Intake Passage Leak

- Remove the spark plugs and inspect for coolant fouling.
- With the spark plugs removed:



- Pressurize the cooling system with a pressure tester (less than 8 PSI)
- Rotate the engine 1-2 revolutions with the starter. If a coolant to intake passage is present coolant may be expelled from the associated cylinder.

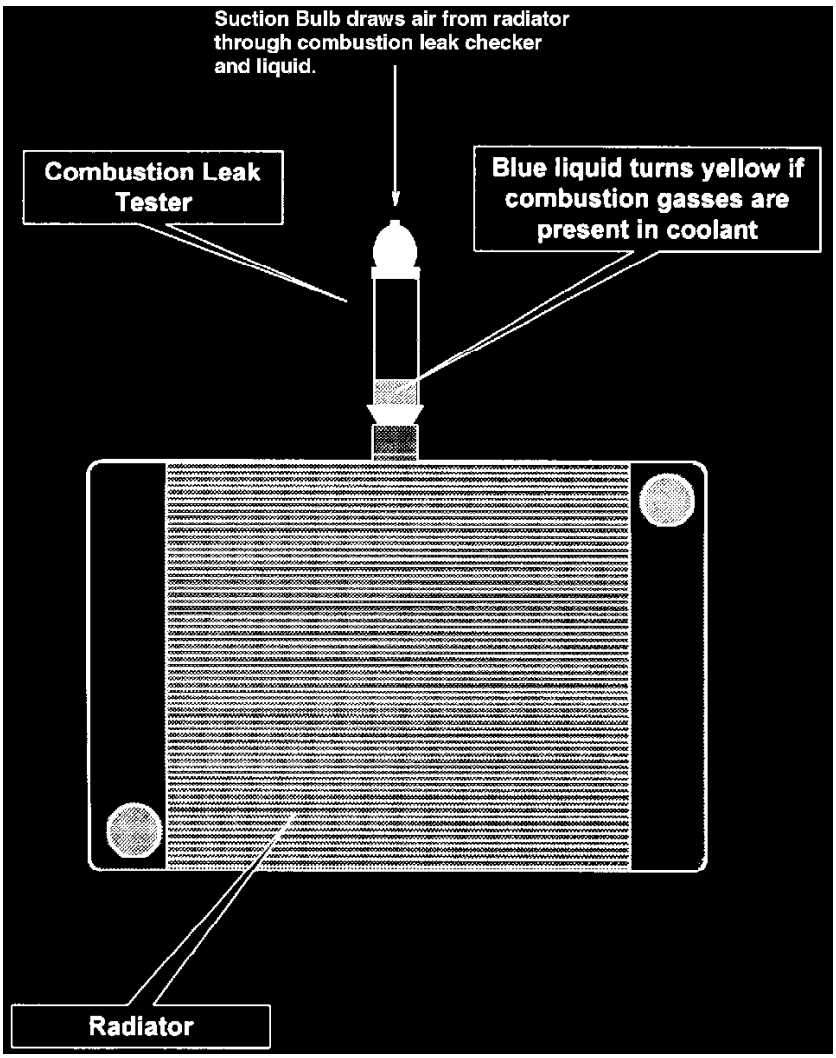


WARNING: Keep clear of the engine compartment while performing this test. Coolant may be expelled from the spark plug holes with great force. Perform this test only with the engine cold.

Coolant to Intake Passage leaks have several symptoms in common with head gasket failures. To identify an intake leak from a head gasket leak compare the following:

Both Head Gasket and Intake Gasket Leaks:
- White smoke from the exhaust
- Possible coolant contamination of the engine oil
- Spark plugs may be coolant fouled

Head Gasket Leak **ONLY**:
- Coolant contaminated with combustion gases.
- Engine may overheat rapidly (from combustion gasses being injected into the coolant.
- Associated cylinder may loose compression.



Checking the coolant for the presence of combustion gasses is the primary method for determining if a leak is from the head gasket or intake gasket.

External Coolant Leak - Pressurize the cooling system with a pressure tester and check for leaks around the intake manifold sealing surface.

Coolant to Oil Valley Leak

- Inspect the engine oil for coolant contamination.
- Pressurize the radiator with a pressure tester and:
  - Drain the engine oil.
  - Leave the oil pan drain plug off and check for coolant leakage from the intake, through the oil valley, and into the oil pan.