

SUPPLEMENTAL DIAGNOSTIC ANALYSIS

COMBUSTION LEAKS

(COMBUSTION GAS OBSERVED IN ENGINE COOLANT IN OVERFLOW TANK OR SURGE TANK)

PROBABLE CAUSES

The most probable cause of combustion gas leakage to the cooling system is past the lower nozzle sleeve in the cylinder head. **Figure 4.4.** A blown head gasket or porous cylinder wall is possible, but should not be suspected unless special circumstances exist such as evidence of engine overheating or a very high mileage engine that has not had proper coolant conditioning.

PROCEDURES

PROCEDURE #1

- Plug in block heater to warm coolant.
- Pressurize cooling system to 14 PSI.
- Remove valve covers and glow plugs.
- Observe glow plug holes while barring engine over by hand to see if coolant is flooding the top of the piston and escaping out of the glow plug hole. (If the leak is a slight leak pressure may have to left on overnight and the engine inspected the next morning.)
- When the suspected nozzle sleeve is isolated, drain coolant and remove and replace the nozzle sleeve as per the service manual.
- Re-test after repair to confirm repair.

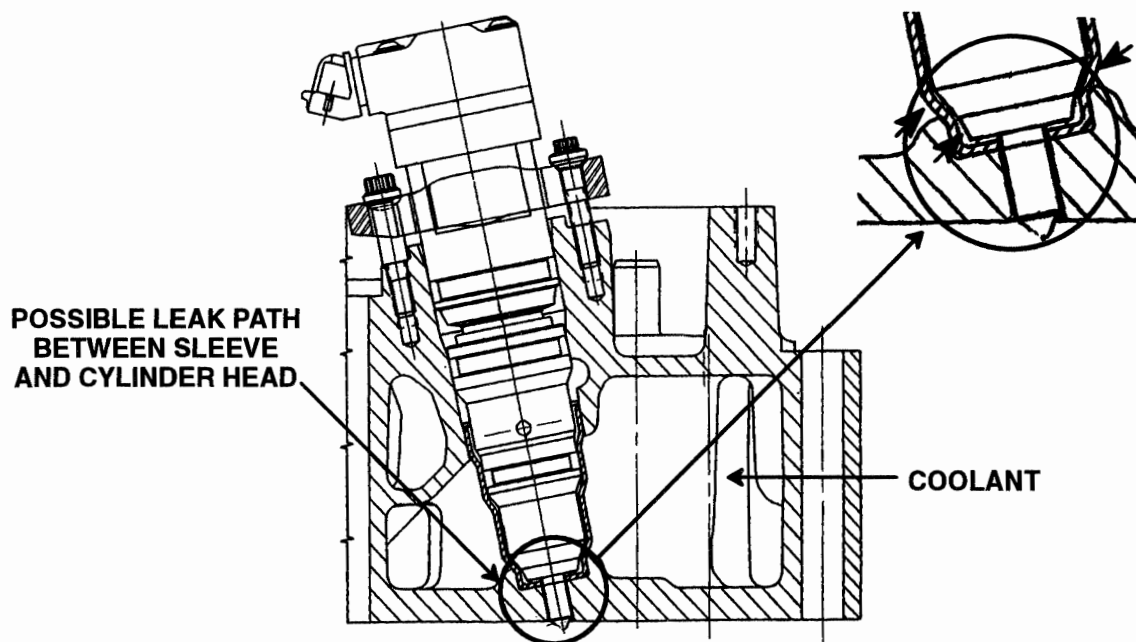


Figure 4.4. – Injector Sleeve – Combustion Gas Leak Path

COMBUSTION LEAKS (Continued)

PROCEDURES (Continued)

PROCEDURE #2

- Very slight leaks may require higher pressure to be isolated.
- Plug in block heater to warm coolant.
- Remove valve cover and glow plugs.
- Remove cap from the surge tank.
- Rotate the crankshaft on the cylinder to be tested so that the valves are shut. (Or remove rocker arm pedestals to close valves.)
- Install the compression adapter (ZTSE 4292) (Figure 4.5.) in the glow plug bore and adapt gauge end to accept shop air pressure (100 to 160 PSI).
- With shop air applied (Figure 4.5.) observe surge tank for escaping air. If the nozzle sleeve is leaking, air will escape into the cooling system when shop air pressure is applied and be seen as bubbles in the surge/overflow tank.
- When suspected nozzle sleeve is isolated, drain coolant and remove and replace nozzle sleeve as per the service manual.
- Re-test after repair to confirm repair.

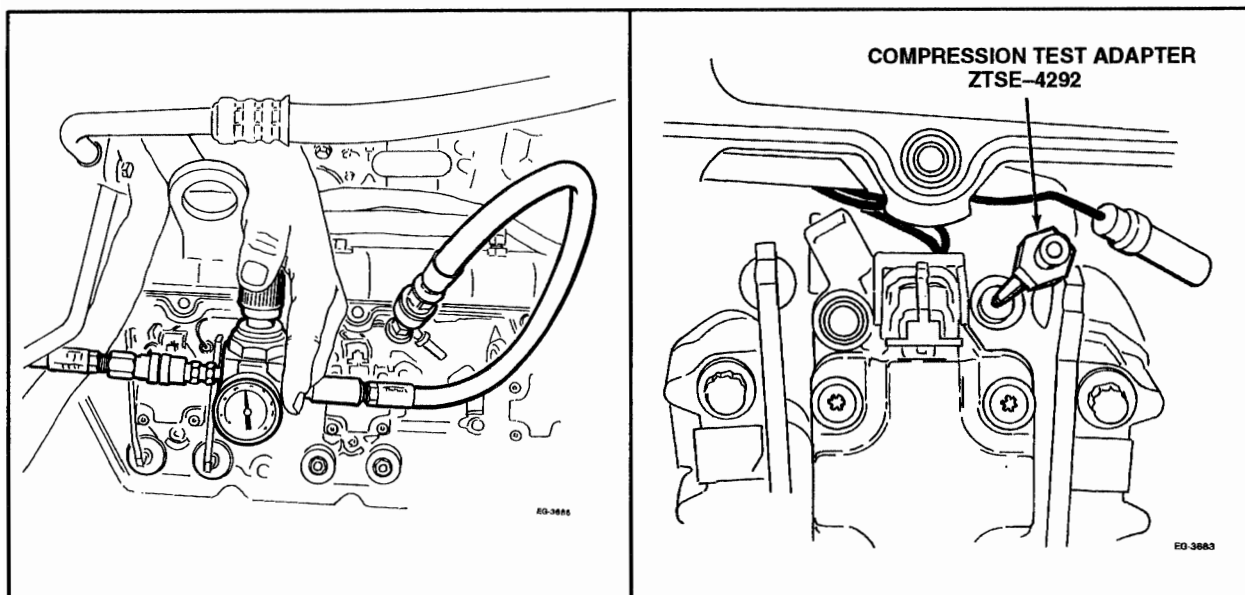


Figure 4.5. – Pressure Check for Combustion Leaks