



## **Cylinder Head Pressure Testing Caution on 1997-2017 Cummins 15.0L ISX Diesel Engines**

The AERA Technical Committee offers the following information on pressure testing the cylinder head for 1997-2017 Cummins 15.0L, ISX diesel engines. This information should be considered anytime a fuel or coolant loss is being observed.

Technicians are reminded it is also important to pressure test the fuel passages within the cylinder head of these engines and is considered part of the head testing procedure.

It is also important to note that either the fuel injectors or injector cavity plugs must be installed to properly pressure test these cylinder heads.

### **Fuel Passages:**

The fuel system is split into two banks. The front bank is for cylinders No. 1 through 3, and the rear bank is for cylinders No. 4 through 6. The banks are tested independently of each other. Use Cummins test kit, Part #3164943.

- The left three male connectors on the plate are for the front bank and the right three male connectors are for the rear bank. The three male connectors on the plate are: • Metering • Timing • Return.
- Apply thread sealant to the male connectors and install them into the plate, if they are not installed. Install the gasket, plate, two short cap screws, and two long cap screws. Tighten the cap screws to 239 IN/LBS (27 Nm).
- Install the injector cavity plugs or injectors (3 of them) into the appropriate injector bores. Center the injector cavity plugs in the injector bores. Install the injector hold-down clamps and cap screws to 59 FT/LBS (80 Nm).
- Attach Leak Test Kit and pressure regulator, Cummins Part #3164231, or equivalent, to one of the male connectors on the plate. Apply 30 psi (207 kPa) of air pressure. Verify the test hardware is not leaking by spraying the test kit seals and fittings with soapy solution. Bubbles should not be present if system is sealed. Shut OFF the air pressure supply. The air pressure must not drop below 28 pdi (193 kPa) in 30 seconds.

If the fuel passages are leaking, the cylinder head must be replaced. Remove the test kit.

### **Coolant Passages:**

This procedure uses a pressure test plate that resembles the head gasket and the head bolts torqued to 50 FT/LBS (60 Nm).

Attach leak test kit and pressure regulator, Part #3164231, or equivalent, to the male connector.



Install one of the following, in order of preference:

- Standard fuel injectors (6)
- Injector sleeve retainer/cavity plugs (6) from Part #3164943, Fuel Leak Test Kit
- Injector sleeve retainer/cavity plugs (6) from Part #3164917, Coolant Pressure Test Kit.

Center the injector cavity plugs in the injector bores. Install the injector hold-down clamps and cap screws and torque to 59 FT/LBS (80 Nm).

**NOTE:** The cylinder head must be at room temperature before testing.

- Apply 50 psi (345 kPa) of air pressure to the cylinder head. Verify the test hardware is not leaking by spraying the test kit seals and fittings with soapy solution. Bubbles should not be present.
- Shut OFF the air pressure supply. Wait for 36 minutes.
- The air pressure must not drop more than 3 psi (20.7 kPa) in 36 minutes.
- If the pressure decay exceeds 3 psi (20.7 kPa) within 36 minutes, the cylinder head must be replaced. The pressure decay results must be recorded and location noted, if possible.

**NOTE:** Observation of bubbles does not necessarily indicate the leak requires replacement of the cylinder head, since air can sometimes flow through leaks that water and coolant, at operating temperature, will not, due to their larger molecular size. Also, coolant, at operating temperature, has a viscosity that is approximately 53 times greater than air. Therefore, at low pressure, the volume of coolant flow will be 53 times less than that of air. Pass/Fail should be determined solely by pressure decay results.