

HEUI Injector Plunger and Barrel Assembly and Nozzle Damage

HEUI injector plunger and barrel assemblies and nozzles can be damaged during operation either on a test stand or on the engine if air is present in the fuel system. Excessive air in a HEUI injector causes scoring of the plunger from lack of lubrication. The nozzle body can crack in the spray orifice area from an overload condition due to a lack of fuel to cushion the nozzle needle as it lifts and seats. By purging air from the fuel system and from the oil passages in the cylinder heads the engine will also start quicker, preventing starter motor damage from excessive cranking and wear. The following procedures explain how to purge air from the systems.

Removing air from the fuel system.

Begin by disconnecting the cam position sensor connector so the engine will not start.

Ford Power Stroke Model Year 1995-1997: Open the fuel return line from the cylinder heads at the fuel pressure regulator block on the fuel filter and crank the engine over for 15 seconds at a time until the air is removed then tighten the line.

Ford Power Stroke Model Year 1999 and up: Open the fuel passage access ports on each head and activate the electric supply pump until the air is purged, crank the engine three times for 15 seconds each then tighten the plugs.

Navistar T444E, DT466E and I530E engines: Pump the hand primer until it is hard to depress. For T444E engines open appropriate fuel lines or plugs to bleed the air. Crank the engine for 15 seconds then pump the hand primer on DT466E and I530E engines after each crank cycle. Repeat the engine cranking and hand primer pumping two more times. Tighten the hand primer or fuel lines or plugs.

Reconnect the cam position sensor. It is also recommended to add a fuel conditioner to the tank.

Removing air from the high-pressure oil rail.

There are two ways the air can be removed from the high-pressure oil rail in the cylinder heads.

In the first method the oil rails are filled with oil through the oil rail drain plugs and after reinstallation of the plugs crank the engine with the cam position sensor connector removed.

The preferred method is to use a nozzle tester such as DPE99050 along with emergency test line DPE96020 connected to an oil rail drain port. Then open another drain port, use the nozzle tester to fill the rail with oil, reinstall the drain plug, and then raise the pressure to 2000 PSI. The nozzle tester gauge should show the pressure holding steady indicating the injector seals were not damaged in the installation. Repeat the process for the other cylinder head.

Test stand operation.

To prevent damage to the injector plunger and barrel assembly or nozzle when testing injectors on a test bench, actuate the injectors at low RPM until the injectors begin to deliver fuel.