FIGURE 4–1 Diesel combustion occurs when fuel is injected into the hot, highly compressed air in the cylinder.

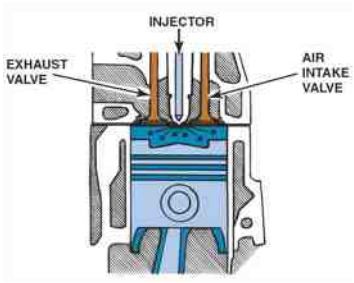

FIGURE 4–2 A typical injector-pump-type automotive diesel fuel injection system.

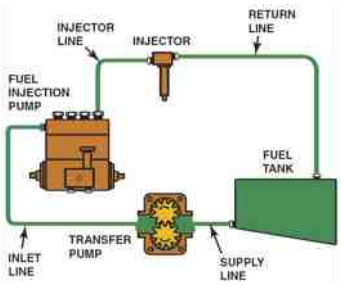

FIGURE 4–3 An indirect injection diesel engine uses a prechamber and a glow plug.

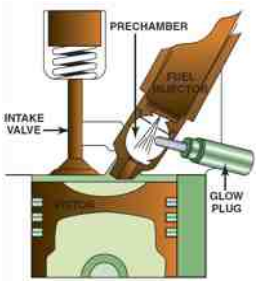

FIGURE 4–4 A direct injection diesel engine injects the fuel directly into the combustion chamber. Many designs do not use a glow plug.

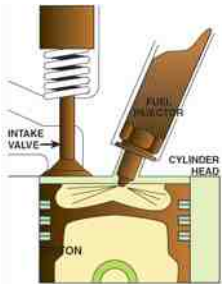

FIGURE 4–5 The common rail on a Cummins diesel engine. A high-pressure pump (up to 30,000 PSI) is used to supply diesel fuel to this common rail, which has cubes running to each injector. Note the thick cylinder walls and heavy-duty construction.

FIGURE 4–6 A rod/piston assembly from a 5.9-liter Cummins diesel engine used in a Dodge pickup truck.

FIGURE 4–7 Using an ice bath to test the fuel temperature sensor.

FIGURE 4–8 A typical distributor-type diesel injection pump showing the pump, lines, and fuel filter.

FIGURE 4–9 A schematic of a Stanadyne diesel fuel injection pump assembly showing all of the related components.

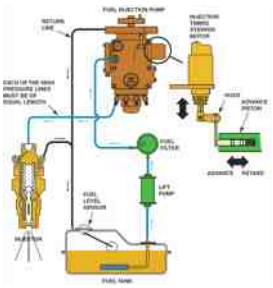

FIGURE 4–10 Overview of a computer-controlled high-pressure common rail V-8 diesel engine.

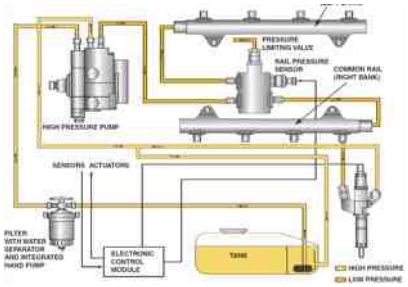

FIGURE 4–11 A HEUI injector from a Ford PowerStroke diesel engine. The grooves indicate the location of the O-rings.

FIGURE 4–12 Typical computer-controlled diesel engine fuel injectors.

FIGURE 4–13 A schematic of a typical glow plug circuit. Notice that the relay for the glow plug and intake air heater are both computer controlled.

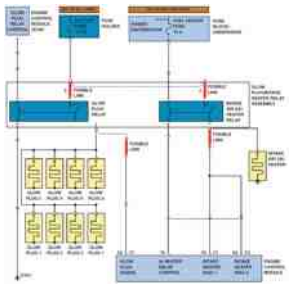

FIGURE 4–14 Roller lifter from a GM Duramax 6.6-liter V-8 diesel engine. Notice the size of this lifter compared to a roller lifter used in a gasoline engine.

FIGURE 4–15 A hydrometer is used to measure the API specific gravity of diesel fuel. The unit of measure is usually the American Petroleum Institute (API) scale.

FIGURE 4–16 A wire wound electrical heater is used to warm the intake air on some diesel engines.

FIGURE 4–17 A typical accelerator pedal position (APP) sensor uses three different sensors in one package with each creating a different voltage as the accelerator is moved.

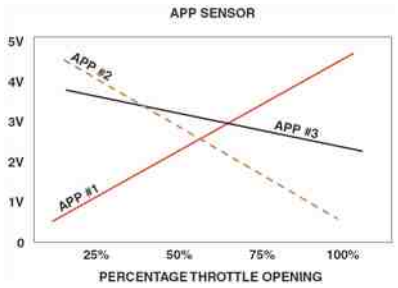

FIGURE 4–18 A diesel exhaust particulate filter on a Cummins 6.7-liter diesel engine.

FIGURE 4–19 A differential pressure sensor showing the two hoses from the diesel exhaust particulate filter.

FIGURE 4–20 A scan tool is used to retrieve diagnostic trouble codes and to perform injector balance tests.

FIGURE 4–21 A compression gauge designed for the higher compression rate of a diesel engine should be used when checking the compression.

FIGURE 4–22 A typical pop tester used to check the spray pattern of a diesel engine injector.

FIGURE 4–23 The letters on the side of this injector on a Cummins 6.7-liter diesel indicate the calibration number for the injector.