


15 DIESEL ENGINE OPERATION

FIGURE 15.3 A Cummins diesel engine as found in a Dodge pickup truck. A high-pressure pump (up to 30,000 PSI) is used to supply diesel fuel to this common rail, which has tubes running to each injector. Note the thick cylinder walls and heavy duty construction.




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FIGURE 15.4 A rod/piston assembly from a 5.9 liter Cummins diesel engine used in a Dodge pickup truck.

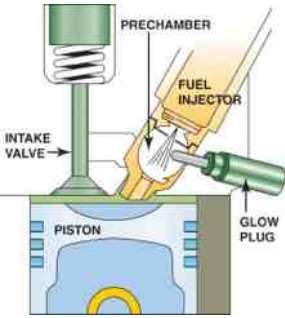


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FIGURE 15.5 An indirect injection diesel engine uses a pre-chamber and a glow plug.

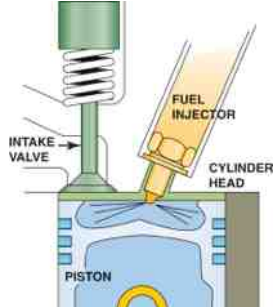


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FIGURE 15.6 A direct injection diesel engine injects the fuel directly into the combustion chamber. Many designs do not use a glow plug.




The diagram shows a cross-section of a diesel engine's combustion chamber. An intake valve is on the left. A fuel injector is positioned above the cylinder head, spraying fuel into the chamber. A piston is at the bottom of the cylinder. Labels include: INTAKE VALVE, FUEL INJECTOR, CYLINDER HEAD, and PISTON.

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15 DIESEL ENGINE OPERATION

FIGURE 15.7 A fuel filter attached to the frame rail on a Ford pickup truck equipped with a diesel engine. When the "water in fuel" warning lamp comes on, the water that is trapped in the filter-water separator assembly can be drained from the unit.



The photograph shows a fuel filter-water separator assembly mounted on a truck's frame rail. A fuel filter cap is visible on top, and a water drain hose is connected to the bottom. Labels include: FUEL FILTER CAP and WATER DRAIN.

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15 DIESEL ENGINE OPERATION

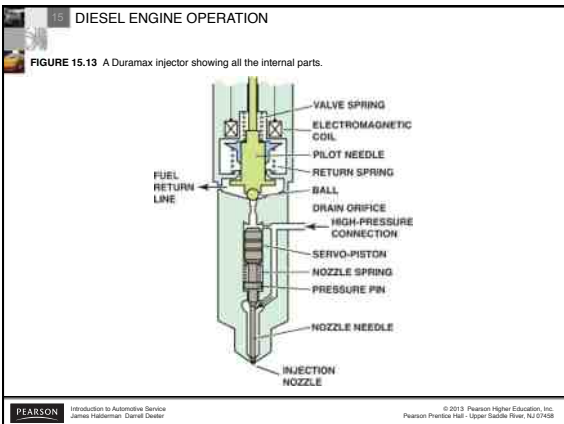
FIGURE 15.8 A typical distributor-type diesel injection pump showing the pump, lines, and fuel filter.



The photograph shows a distributor-type diesel injection pump assembly. It includes the pump, fuel injector lines, and a fuel filter. Labels include: FUEL INJECTOR LINES and FUEL FILTER.

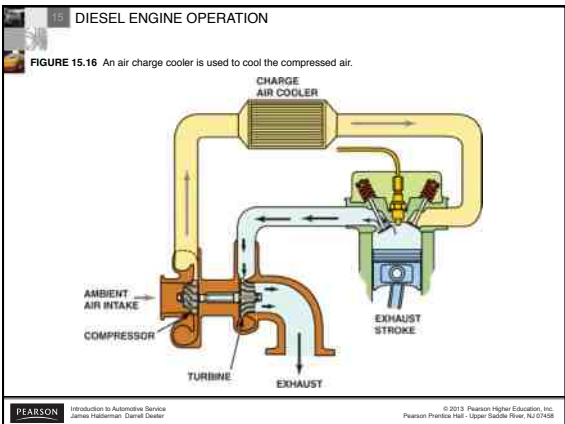
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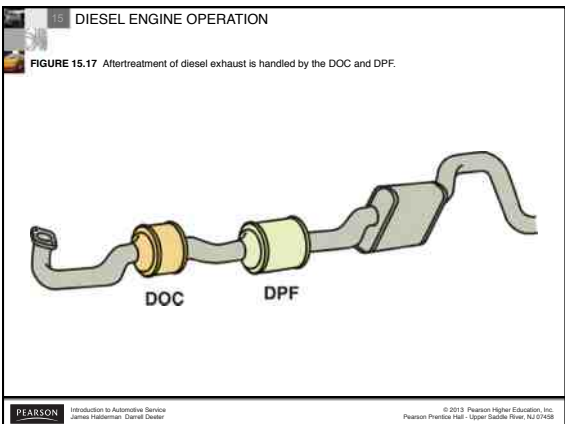












15 DIESEL ENGINE OPERATION

FIGURE 15.18 The soot is trapped in the passages of the DPF. The exhaust has to flow through the sides of the trap and exit.

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15 DIESEL ENGINE OPERATION

FIGURE 15.19 Diesel exhaust fluid costs \$3 to \$4 a gallon and is housed in a separate container that holds from 5 to 10 gallons, or enough to last until the next scheduled oil change in most diesel vehicles that use SCR.

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FIGURE 15.20 Urea (diesel exhaust fluid) injection is used to reduce NOx exhaust emissions. It is injected after the diesel oxidation catalyst (DOC) and before the diesel particulate filter (DPF) on this 6.7 liter Ford diesel engine.

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