

Automotive Engines 10th

Chapter 10 Diesel Engine Operation

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1. What is the difference between direct injection and indirect injection?
2. What exhaust after-treatment is needed to achieve exhaust emission standards for vehicles 2007 and newer.
3. What are the three phases of diesel ignition?
4. What are the advantages and disadvantages of SCR?
5. Why are glow plugs kept working after the engine starts?

Answer Key

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1. In a direct injection-type diesel engine, the fuel is injected directly into the cylinder. In an indirect injection diesel, the fuel is injected into a small prechamber.
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2. Diesel exhaust particulate filter (DPF) is the aftertreatment device needed to meet the 2007+ emissions standards.
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3. The three phases of diesel ignition are:
 - a. Ignition delay
 - b. Rapid combustion
 - c. Controlled combustionPage Ref: 101
4. The advantages of SCR include:
 - a. The potential for higher power output
 - b. Reduced NOX emission up to 90%
 - c. Reduced HC and CO emissions up to 50%
 - d. Reduced particulate matter (PM) by 50%The disadvantages of SCR include:
 - a. On-board storage tank required for the urea (diesel exhaust fluid – DEF)
 - b. Difficult to find DEF at times
 - c. Increased cost to the vehicle owner due to the cost of refilling the DEF storage tankPage Ref: 112
5. The glow plugs are kept working to help reduce noise, white exhaust smoke (unburned fuel), and to improve idle quality
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