

# Automotive Technology 6<sup>th</sup> Edition

## Chapter 19 – Diesel Engine Operation and Diagnosis

### Lesson Plan



#### **CHAPTER SUMMARY:**

1. Diesel engines and the three phases of combustion
  2. Fuel tank and lift pump, injection pump, and engine driven vacuum pump
  3. HEUI system, diesel nozzles, glow plugs, diesel fuel heaters, and accelerator pedal position sensor
  4. Diesel engine turbochargers, exhaust gas recirculation, and diesel particulate matter
  5. Diesel oxidation catalyst, diesel exhaust particulate filter, and selective catalytic reduction
  6. Diesel exhaust smoke diagnosis, diesel performance diagnosis, and compression testing
  7. Glow plug resistance balance test, injector pop test, and emission testing
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#### **OBJECTIVES:**

1. State the characteristics of diesel engines.
  2. Describe the fuel tank, lift pump, injection pump, and engine- driven vacuum pump.
  3. Explain the HEUI system.
  4. Discuss the purpose of glow plugs, diesel fuel heaters, diesel injector nozzles, and accelerator pedal position sensors.
  5. Explain the purpose of diesel engine turbochargers.
  6. Discuss the purpose of the exhaust gas recirculation system, selective catalytic reduction, and diesel oxidation catalysts.
  7. Explain diesel particulate matter, and discuss the function of diesel exhaust particulate filters and selective catalytic reduction.
  8. Discuss diesel exhaust smoke diagnosis and performance diagnosis.
  9. Discuss compression testing, glow plug resistance balance test, injector pop testing, and diesel emission testing.
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#### **RESOURCES:** (All resources may be found at <http://www.jameshalderman.com>)

1. **Task Sheet ASE (A1-A-2) P-1:** Diesel Engine Identification
  2. Chapter PowerPoint
  3. Chapter Crossword Puzzle and Word Search
  4. Animations: Diesel 4-Stroke Cycle
  5. Videos: How Diesel Engines Work Part 1 (time 4:13) and How Diesel Engines Work Part 2 (time 2:02)
  6. Videos: How Diesel Engines Work Part 3 (time 2:32) and How Diesel Engines Work! (time 2:23)
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#### **ACTIVITIES:**

1. **Task Sheet ASE (A1-A-2) P-1:** Have students complete Diesel Engine Identification Task Sheet.
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#### **ASSIGNMENTS:**

1. Chapter crossword and word search puzzles.
  2. Complete end of chapter 10 question quiz.
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**CLASS DISCUSSION:**

1. Review and group discussion chapter Frequently Asked Questions and Tech Tips sections.
  2. Review and group discussion of the five (5) chapter Review Questions.
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**NOTES AND EVALUATION:**

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