

Automotive Technology 6th Edition

Chapter 26 – Engine Condition Diagnosis

Lesson Plan



CHAPTER SUMMARY:

1. Typical engine related complaints, engine smoke diagnosis, and test drive
 2. Visual checks, noise diagnosis, oil pressure testing, and oil pressure warning lamp
 3. Cylinder contribution test, compression test, and wet compression test
 4. Relative compression test, running dynamic compression test, and cylinder leakage test
 5. Cylinder balance test, power balance test procedure, vacuum tests, and exhaust restriction test
 6. Testing back pressure with a vacuum gauge and pressure gauge
 7. Diagnosing head gasket failure and dash warning lights
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OBJECTIVES:

1. Discuss typical engine-related complaints and engine smoke diagnosis.
 2. Discuss the importance of the driver's description and visual checks.
 3. Discuss engine noise diagnosis.
 4. Explain oil pressure testing and the purpose of oil pressure warning lamps.
 5. Explain compression testing, and compare wet and running compression tests.
 6. Describe cylinder leakage test and cylinder power balance test.
 7. Explain the vacuum test and exhaust restriction test.
 8. Explain how to test back pressure with a vacuum gauge and a pressure gauge, and how to diagnose head gasket failure.
 9. Discuss the operation of dash warning lights.
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RESOURCES: (All resources may be found at <http://www.jameshalderman.com>)

1. **Task Sheet ASE (A1-A-1) P-1:** Engine Problem Analysis
 2. **Task Sheet ASE (A1-A-4) P-1:** Fluid Leakage Detection
 3. **Task Sheet ASE (A8-A-3) P-3:** Engine Noise and Vibration Diagnosis
 4. **Task Sheet ASE (A8-A-4) P-2:** Exhaust System Smoke Test
 5. **Task Sheet ASE (A8-A-5) P-1:** Vacuum Testing
 6. **Task Sheet ASE (A8-A-6) P-1:** Cylinder Power Balance Tests
 7. **Task Sheet ASE (A8-A-7) P-1:** Compression Testing
 8. **Task Sheet ASE (A8-A-8) P-1:** Cylinder Leakage Test
 9. **Task Sheet ASE (A1-D-9) P-1:** Oil Pressure Measurement
 10. Chapter PowerPoint
 11. Chapter Crossword Puzzle and Word Search
 12. Animations: Oil Pressure Test
 13. Videos: See list at the end of the lesson plan
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DEMO

ACTIVITIES:

1. **Task Sheet ASE (A1-A-1) P-1:** Have students complete Engine Problem Analysis Task Sheet.
 2. **Task Sheet ASE (A1-A-4) P-1:** Have students complete Fluid Leakage Detection Task Sheet.
 3. **Task Sheet ASE (A8-A-3) P-3:** Have students complete Engine Noise and Vibration Diagnosis Task Sheet.
 4. **Task Sheet ASE (A8-A-4) P-2:** Have students complete Exhaust System Smoke Test Task Sheet.
 5. **Task Sheet ASE (A8-A-5) P-1:** Have students complete Vacuum Testing Task Sheet.
 6. **Task Sheet ASE (A8-A-6) P-1:** Have students complete Cylinder Power Balance Tests Task Sheet.
 7. **Task Sheet ASE (A8-A-7) P-1:** Have students complete Compression Testing Task Sheet.
 8. **Task Sheet ASE (A8-A-8) P-1:** Have students complete Cylinder Leakage Test task Sheet.
 9. **Task Sheet ASE (A1-D-9) P-1:** Have students complete Oil Pressure Measurement 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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Videos: (at <http://www.jameshalderman.com>)

Cylinder leak check (time 9:19)	Compression testing (time 10:00)
Leak down test (time 2:12)	Vacuum testing (time 2:21)
Belt noise (time 3:19)	Vacuum testing (time 10:24)
Engine noise location (time 3:59)	Fuel system diagnosis (time 9:36)
Leak down tester (time 6:36)	Drivability diagnosis (time 12:05)
Power balance test (time 7:47)	Finding engine leaks (time 12:49)
Leak down test (time 27:34)	Engine cluster test (time 1:38)
How to find a vacuum leak (time 5:56)	Back pressure test (time 5:35)
Head gasket check (time 2:25)	Van engine repair (time 4:18)
Engine noise diagnosis (time 22:42)	Using a bore scope (time 1:36)
Engine noise diagnosis (time 3:16)	Head gasket leak test (time 1:06)
Check for head gasket leak (time 1:45)	Labscope Relative Compression Testing (time 7:29)
Compression testing (time 3:33)	Low oil pressure (time 3:26)
Relative compression test (time 12:58)	Oil pressure (time 9:00)
Power balance test (time 1:37)	Exhaust manifold (time 9:06)
Cranking vacuum test (time 0:49)	Vacuum testing (time 4:17)
Engine vacuum test (time 1:50)	Vacuum leak (time 2:12)
Cylinder leak down test (time 1:12)	Bad catalytic converter (time 0:50)