

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

## Chapter 98 – Brake Hydraulic Systems

### Lesson Plan



#### **CHAPTER SUMMARY:**

1. Hydraulic principles, Pascal's law, and master cylinders
  2. Diagnosing master cylinders and master cylinder service
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#### **OBJECTIVES:**

1. Explain how the noncompressibility of liquids is used in brake systems.
  2. State Pascal's law. describe the function, purpose, operation, and types of master cylinders.
  3. Describe the process of diagnosing and troubleshooting master cylinders.
  4. This chapter will help prepare for the Brakes (A5) ASE certification test content area "A" (Hydraulic, Power Assist, and Parking Brake Systems Diagnosis and Repair).
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**RESOURCES:** (All resources may be found at <http://www.jameshalderman.com>)

1. Task Sheet ASE (A5-B-1) P-1: Hydraulic Pressure Analysis
  2. Task Sheet ASE (A5-B-2) P-1: Brake Pedal Height
  3. Task Sheet ASE (A5-B-3) P-1: (A5-B-4) P-1: Master Cylinder Service
  4. Task Sheet ASE (A5-B-5) P-1: Hydraulic System Fault Analysis
  5. Chapter PowerPoint
  6. Chapter Crossword Puzzle and Word Search
  7. Animations: Brake Hydraulic System
  8. Videos: See list at the end of the lesson plan.
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#### **ACTIVITIES:**

1. Task Sheet ASE (A5-B-1) P-1: Have students complete Hydraulic Pressure Analysis Task Sheet.
  2. Task Sheet ASE (A5-B-2) P-1: Have students complete Brake Pedal Height Task Sheet.
  3. Task Sheet ASE (A5-B-3) P-1: (A5-B-4) P-1: Have students complete Master Cylinder Service Task Sheet.
  4. Task Sheet ASE (A5-B-5) P-1: Have students complete Hydraulic System Fault Analysis 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>)

- Master cylinder bleeding (time 8:02)
- Master cylinder installation (time 4:50)
- Hydraulic brakes part 1 (time 24:44)
- Master cylinder replacement (time 9:57)
- Wheel cylinder (time 1:12)
- Master cylinder (time 3:15)
- Bench bleed a master cylinder (time 2:17)
- Brake Pressure Concerns (time 4:02)
- Combination valve (time 1:09)
- Brake pressure switch (time 2:10)
- Pascal's Law (time 4:46)
- Brake pedal play (time 1:47)
- Brake warning light components (time 3:12)
- Brake master cylinder pushrod lengths (time 9:36)