

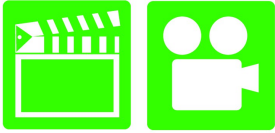
# Automotive Maintenance and Light Repair, 1<sup>ST</sup> Edition

## Chapter 56 BRAKE BLEEDING METHODS & PROCEDURES

### Opening Your Class

KEY ELEMENT	EXAMPLES
<b>Introduce Content</b>	This course or class covers <b>Automotive Maintenance and Light Repair</b> . It correlates material to task lists specified by ASE and NATEF.
<b>Motivate Learners</b>	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
<b>State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.</b>	Explain the chapter learning objectives to the students. <ul style="list-style-type: none"><li>— Prepare to take the Brakes (A5) ASE certification test content area “A” (Hydraulic System Diagnosis and Repair).</li><li>— Explain how to bench bleed a master cylinder.</li><li>— Describe the proper brake bleeding sequence.</li><li>— Describe the single stroke manual brake bleeding procedure.</li><li>— Discuss how to gravity bleed the hydraulic brake system.</li><li>— List the steps needed to perform a pressure bleed procedure.</li></ul>
<b>Establish the Mood or Climate</b>	Provide a <i>WELCOME</i> , Avoid put downs and bad jokes.
<b>Complete Essentials</b>	Restrooms, breaks, registration, tests, etc.
<b>Clarify and Establish Knowledge Base</b>	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

## ICONS



## Ch56 Brake Bleeding Methods & Procedures

### 1. SLIDE 1 CH56 BRAKE BLEEDING METHODS & PROCEDURES

### 2. SLIDES 2-4 EXPLAIN OBJECTIVES

Check for **ADDITIONAL VIDEOS & ANIMATIONS** @ <http://www.jameshalderman.com/>  
**WEB SITE REGULARLY UPDATED**

### 4. SLIDES 4-7 EXPLAIN Brake Bleeding

8. SLIDE 8 EXPLAIN Figure 56-1 Bench bleeding a master cylinder. Always clamp a master cylinder in a vise by the mounting flange to prevent distortion of the cylinder bore. Bench bleeding tubes can also be used that route the fluid back into the reservoir.

**DEMONSTRATION: SHOW HOW TO BENCH BLEED A MASTER CYLINDER USING THE PROPER TUBING AND FITTINGS. SHOW STUDENTS THE BLEEDER LOCATIONS ON THE MASTER CYLINDER, VALVES, WHEEL CYLINDERS, AND BRAKE CALIPERS**







**DISCUSSION: DISCUSS THE PROCESS OF BRAKE BLEEDING. WHAT PROBLEMS ARE CAUSED BY AIR TRAPPED IN THE HYDRAULIC BRAKE SYSTEM?**

**HANDS-ON TASK: HAVE STUDENTS BENCH BLEED A MASTER CYLINDER USING THE PROPER PROCEDURE. ALSO USING PROPER CAUTION WHEN WORKING WITH BRAKE FLUID**

9. SLIDE 9 EXPLAIN Brake Bleeder Valve Loosening Methods

10. SLIDE 10 EXPLAIN Figure 56-2 Typical bleeder valve from a disc brake caliper. Arrows point to taper section that does actual sealing. It is this taper that requires a shock to loosen. If the bleeder is simply turned with a wrench, bleeder usually breaks off because tapered part at bottom remains adhered to the caliper or wheel cylinder. Once loosened, brake fluid flows around taper and out through hole in side of bleeder valve. Hole is clogged in this example and needs to be cleaned out.

11. SLIDE 11 EXPLAIN Figure 56-3 Typical bleeder locations. Note that combination valve & master cylinder shown do not have bleeder valves; therefore, bleeding is accomplished by loosening the brake line at outlet ports.

ICONS	Ch56 Brake Bleeding Methods & Procedures
      	<p>12. SLIDES 12-13 EXPLAIN Hit and Tap Method</p> <p>14. SLIDE 14 EXPLAIN Figure 56-4 Using an air punch next to the bleeder valve to help “break the taper” on the bleeder valve.</p> <p>15. SLIDE 15 EXPLAIN Hit and Tap Method</p> <p><b><u>DEMONSTRATION: SHOW EXAMPLE OF A BRAKE BLEEDER VALVE AND DESCRIBE THE VARIOUS METHODS RECOMMENDED TO LOOSEN IT.</u></b></p> <p>16. SLIDES 16-17 EXPLAIN Wax Method</p> <p>18. SLIDES 18-20 EXPLAIN Bleeding Sequence</p> <p>21. SLIDE 21 EXPLAIN Figure 56-5 Most vehicle manufacturers recommend starting brake bleeding process at the rear wheel farthest from master cylinder.</p> <p>22. SLIDES 22-27 EXPLAIN Manual Bleeding</p> <p>28. SLIDE 28 EXPLAIN Figure 56-6 Bleeding brakes using clear plastic tubing makes it easy to see air bubbles. Submerging hose in a container of clean brake fluid helps ensure that all of air will be purged by system.</p> <p><b><u>DISCUSSION: TALK ABOUT THE 4 TYPES OF BRAKE BLEEDING. ASK STUDENTS TO DISCUSS BENEFITS OF PERFORMING A GRAVITY BLEED DURING AN OIL CHANGE. WHY IS THIS A GOOD TIME TO BLEED THE BRAKE SYSTEM?</u></b></p> <p>29. SLIDE 29 EXPLAIN Figure 56-7 Using a compressed air-powered vacuum bleeder.</p> <p>30. SLIDE 30 EXPLAIN Figure 56-8 Vacuum bleeding uses atmospheric pressure to force brake fluid through the hydraulic system.</p> <p>31. SLIDES 31-32 EXPLAIN Gravity Bleeding</p> <p>33. SLIDE 33 EXPLAIN Figure 56-9 Gravity bleeding is simply opening the bleeder valve and allowing gravity to force the brake fluid out of the bleeder valve. Because air is lighter than brake fluid all of the air escapes before the brake fluid runs out.</p> <p>34. SLIDES 34-39 EXPLAIN Gravity Bleeding</p>

## ICONS



## Ch56 Brake Bleeding Methods & Procedures

### **VIDEO: 2.0 MINUTES: PRESSURE BLEEDING WWW.MYAUTOMOTIVELAB.COM**

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET\\_MYLABS/AKAMAI/TEMPLATE/VIDEO0640X480.PHP?TITLE=BRAKE%20BLEEDING%201&CLIP=PANDC/CHET/2012/AUTOMOTIVE/A18.MOV&CAPTION=CHET/CHET\\_MYLABS/AKAMAI/2012/AUTOMOTIVE/XML/A18.ADB.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video0640x480.php?title=brake%20bleeding%201&clip=pandc/chet/2012/automotive/a18.mov&caption=chet/chet_myLABS/akamai/2012/automotive/xml/a18.adb.xml)

### **Bleeding Brakes & Air**

### **Bleeding Brakes, Gravity**

### **Bleeding Brakes, Pressure Bleeder**

### **Bleeding Brakes, Reverse Injection**

### **Bleeding Brakes, Vacuum**

**40. SLIDES 40-41 EXPLAIN** Pressure Bleeding

**42. SLIDE 42 EXPLAIN Figure 56-10** typical pressure bleeder. The brake fluid inside is pressurized with air pressure in the air chamber. This air pressure is applied to the brake fluid in the upper section. A rubber diaphragm separates the air from the brake fluid.

**43. SLIDE 43 EXPLAIN Figure 56-11** Brake fluid under pressure from power bleeder is applied to top of master cylinder. It is very important that proper adapter be used for master cylinder. Failure to use correct adapter or failure to release pressure on brake fluid before removing the adapter can cause fluid to escape under pressure.

**44. SLIDES 44-46 EXPLAIN** Pressure Bleeding

**47. SLIDE 47 EXPLAIN Figure 56-12** Metering valve override tool on a GM vehicle.

**48. SLIDES 48-55 EXPLAIN** Pressure Bleeding

**56. SLIDE 56 EXPLAIN Figure 56-13** Pull-out-type metering valves being held out W/special override tool

**57. SLIDE 57 EXPLAIN FIGURE 56-14** A turkey baster can be used to remove the old brake fluid from the master cylinder reservoir.

### **NATEF MLR TASK A5B6 BLEED AND/OR FLUSH BRAKE SYSTEM.**