

# Automotive Chassis Systems 7<sup>th</sup> Edition

## Chapter 8 Brake Bleeding Methods and Procedures

### Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of <b>Automotive Chassis Systems</b> . It correlates material to task lists specified by ASE and NATEF.
Motivate Learners	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.
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.	Explain the chapter learning objectives to the students. <ol style="list-style-type: none"><li>1. Discuss the need for brake bleeding.</li><li>2. Describe the manual bleeding procedure.</li><li>3. Discuss how to gravity bleed the hydraulic brake system.</li><li>4. Discuss how to pressure bleed the hydraulic brake system.</li><li>5. Describe how to flush the hydraulic system.</li></ol> <b>This chapter will help prepare for ASE Brakes (A5) certification test Sub-Repair Area "A" Hydraulics</b>
Establish the Mood or Climate	Provide a <i>WELCOME</i> , Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	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.

**NOTE: This lesson plan is based on Automotive Chassis Systems 7<sup>th</sup> Edition Chapter Images found on Jim's web site @ [www.jameshalderman.com](http://www.jameshalderman.com)**

**LINK CHP 8: [Chapter Images](#)**

## ICONS



## Ch08 Brake Bleeding Methods & Procedures

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

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

#### Videos

At the beginning of this class, you can download the crossword puzzle & Word Search from the links below to familiarize your class with the terms in this chapter & then discuss them

**[Crossword Puzzle \(Microsoft Word\) \(PDF\)](#)**

**[Word Search Puzzle \(Microsoft Word\) \(PDF\)](#)**

2. **SLIDE 2 EXPLAIN** Figure 8-1 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 STUDENTS 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: ASK STUDENTS TO 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**

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3. **SLIDE 3 EXPLAIN Figure 8-2** 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.

4. **SLIDE 4 EXPLAIN Figure 8-3** Typical bleeder locations. Note that the combination valve and master cylinder shown do not have bleeder valves; therefore, bleeding is accomplished by loosening the brake line at the outlet ports.

5. **SLIDE 5 EXPLAIN Figure 8-4** Using an air punch next to bleeder valve to help “break the taper” on the bleeder valve.

**DEMONSTRATION: SHOW STUDENTS AN EXAMPLE OF A BRAKE BLEEDER VALVE AND DESCRIBE THE VARIOUS METHODS RECOMMENDED TO LOOSEN IT.**

6. **SLIDE 6 EXPLAIN Figure 8-5** Most vehicle manufacturers recommend starting brake bleeding process at the rear wheel farthest from master cylinder

7. **SLIDE 7 EXPLAIN Figure 8-6** 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.

**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?**

8. **SLIDE 8 EXPLAIN Figure 8-7** Using a compressed air-powered vacuum bleeder.

9. **SLIDE 9 EXPLAIN Figure 8-8** Vacuum bleeding uses atmospheric pressure to force brake fluid through the hydraulic system.

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10. **SLIDE 10 EXPLAIN Figure 8-9** 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.

### Bleeding Brakes & Air

#### Bleeding Brakes, Gravity

#### Bleeding Brakes, Pressure Bleeder

#### Bleeding Brakes, Reverse Injection

#### Bleeding Brakes, Vacuum

11. **SLIDE 11 EXPLAIN Figure 8-10** 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.
12. **SLIDE 12 EXPLAIN Figure 8-11** Brake fluid under pressure from power bleeder is applied to top of master cylinder. It is very important that the proper adapter be used for the master cylinder. Failure to use the correct adapter or failure to release the pressure on the brake fluid before removing the adapter can cause fluid to escape under pressure.
13. **SLIDE 13 EXPLAIN Figure 8-12** Metering valve override tool on a GM vehicle.
14. **SLIDE 14 EXPLAIN Figure 8-13** Pull-out-type metering valves being held out W/special override tool
15. **SLIDE 15 EXPLAIN FIGURE 8-14** A turkey baster can be used to remove the old brake fluid from the master cylinder reservoir.

**DEMO**



**DEMO**



**DEMONSTRATION: SHOW STUDENTS HOW TO DO A PRESSURE, OR POWER, BLEEDING OF BRAKE HYDRAULIC SYSTEM, AND DISCUSS ADVANTAGES OF THIS METHOD.**

**ON-VEHICLE NATEF TASK BLEED AND/OR FLUSH BRAKE SYSTEM**

**DEMONSTRATION: SHOW METERING VALVE OVERRIDE TOOL, AND DISCUSS HOW TO USE IT IN PRESSURE-BLEEDING FRONT BRAKES.**

**HANDS-ON TASK: HAVE STUDENTS PRESSURE BLEED A BRAKE SYSTEM WITHOUT USING THE METERING VALVE OVERRIDE TOOL. THEN HAVE THEM REDO THE PROCESS USING THE METERING VALVE OVERRIDE TOOL**