
















A5 BRAKES 6th 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 Automotive Brakes . 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">1. Discuss the need for brake bleeding.2. Describe the manual bleeding procedure.3. Discuss how to gravity bleed the hydraulic brake system.4. Discuss how to pressure bleed the hydraulic brake system.5. Describe how to flush the hydraulic system.
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.

ICONS	Ch08 Brake Bleeding Methods & Procedures
      	<p>1. SLIDE 1 BRAKE BLEEDING METHODS & PROCEDURES</p> <p>2. SLIDES 2-3 EXPLAIN OBJECTIVES Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <p>4. SLIDES 4-7 EXPLAIN Brake Bleeding</p> <p>8. SLIDE 8 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.</p> <p><u>DEMONSTRATION:</u> 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</p> <p><u>DISCUSSION:</u> ASK STUDENTS TO DISCUSS THE PROCESS OF BRAKE BLEEDING. WHAT PROBLEMS ARE CAUSED BY AIR TRAPPED IN THE HYDRAULIC BRAKE SYSTEM?</p> <p><u>HANDS-ON TASK:</u> HAVE STUDENTS BENCH BLEED A MASTER CYLINDER USING THE PROPER PROCEDURE. ALSO USING PROPER CAUTION WHEN WORKING WITH BRAKE FLUID</p> <p>9. SLIDE 9 EXPLAIN Brake Bleeder Valve Loosening Methods</p> <p>10. SLIDE 10 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.</p>

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	<p>11. SLIDE 11 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.</p>
	<p>12. SLIDES 12-13 EXPLAIN Hit and Tap Method</p> <p>14. SLIDE 14 EXPLAIN Figure 8-4 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><u>DEMONSTRATION: SHOW STUDENTS AN EXAMPLE OF A BRAKE BLEEDER VALVE AND DESCRIBE THE VARIOUS METHODS RECOMMENDED TO LOOSEN IT.</u></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 8-5 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 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.</p>
	<p><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></p>
	<p>29. SLIDE 29 EXPLAIN Figure 8-7 Using a compressed air-powered vacuum bleeder.</p> <p>30. SLIDE 30 EXPLAIN Figure 8-8 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 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</p>

ICONS**Ch08 Brake Bleeding Methods & Procedures**

brake fluid runs out.

34. SLIDES 34-39 EXPLAIN Gravity Bleeding

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

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLIBS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=BRAKE%20BLEEDING%201&CLIP=PANDC/CHET/2012/AUTOMOTIVE/A18.MOV&CAPTION=CHET/CHET_MYLIBS/AKAMAI/2012/AUTOMOTIVE/XML/A18.ADB.XML](http://media.pearsoncmg.com/ph/chet/chet_mylibs/akamai/template/video640x480.php?title=brake%20bleeding%201&clip=pandc/chet/2012/automotive/a18.mov&caption=chet/chet_mylibs/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 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.

43. SLIDE 43 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.

44. SLIDES 44-46 EXPLAIN Pressure Bleeding

47. SLIDE 47 EXPLAIN **Figure 8-12** Metering valve override tool on a GM vehicle.

48. SLIDES 48-55 EXPLAIN Pressure Bleeding

56. SLIDE 56 EXPLAIN **Figure 8-13** Pull-out-type metering valves being held out W/special override tool

57. SLIDE 57 EXPLAIN **FIGURE 8-14** A turkey baster can be used to remove the old brake fluid from the master cylinder reservoir.

58. SLIDES 58-59 EXPLAIN SUMMARY

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