













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

## Chapter 58 DRUM BRAKES

### 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 for the Brakes (A5) ASE certification test content area “B” (Drum Brake Diagnosis and Repair).</li><li>— Discuss the procedure recommended for brake drum removal.</li><li>— Discuss the inspection and lubrication points of the backing plate.</li><li>— Explain the importance of the proper drum brake hardware.</li><li>— Disassemble and reassemble a drum brake assembly.</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	Ch58 DRUM BRAKES
	<p><b>1. SLIDE 1 CH58 DRUM BRAKES</b>  <b>2. SLIDES 2-3 EXPLAIN OBJECTIVES</b></p>
 	<p>Check for <b>ADDITIONAL VIDEOS &amp; ANIMATIONS</b>  @ <a href="http://www.jameshalderman.com/">http://www.jameshalderman.com/</a>  <b>WEB SITE REGULARLY UPDATED</b></p>
	<p><b>DEMONSTRATION: SHOW DRUM BRAKE COMPONENTS &amp; OPERATION</b></p>
	<p><b>DEMONSTRATION: SHOW STUDENTS A DISASSEMBLED DRUM BRAKE AND DESCRIBE ITS COMPONENT PARTS</b></p>
 	<p><b>NATEF MLR TASK A5A1 RESEARCH APPLICABLE VEHICLE AND SERVICE INFORMATION, VEHICLE SERVICE HISTORY, SERVICE PRECAUTIONS, AND TECHNICAL SERVICE BULLETINS.</b></p>
	<p><b>DEMONSTRATION: SHOW STUDENTS THE SHOE SUPPORT PADS ON THE BACKING PLATE THAT HELP MAINTAIN ALIGNMENT OF THE LININGS WITHIN THE BRAKE DRUM. SHOW STUDENTS THE WHEEL CYLINDERS, AND DEMONSTRATE HOW THEY WORK TO FORCE THE BRAKE SHOES OUTWARD AGAINST THE BRAKE DRUM</b></p>
	<p><b>VIDEO: DRUM BRAKE ADJUSTERS</b>  <b>WWW.MYAUTOMOTIVELAB.COM</b></p>
<p><small><a href="http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video640x480.php?title=DRUM%20BRAKE%20ADJUSTERS&amp;clip=PANDC/CHET/2012/AUTOMOTIVE/A5-B8.MOV&amp;caption=CHET/CHET_MYLABS/akamai/2012/AUTOMOTIVE/XML/A5-B8.ADB.XML">HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DRUM%20BRAKE%20ADJUSTERS&amp;CLIP=PANDC/CHET/2012/AUTOMOTIVE/A5-B8.MOV&amp;CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/XML/A5-B8.ADB.XML</a></small></p>	<p><b>DEMONSTRATION: SHOW STUDENTS EXAMPLES OF SERVO-BRAKE STAR-WHEELS ADJUSTERS AND DISCUSS HOW EACH WORKS.</b></p>
	<p><b>DISCUSSION: ASK STUDENTS TO DISCUSS HOW SERVO-BRAKE STAR-WHEEL ADJUSTERS USE THE BRAKING MOTION ITSELF TO ADJUST THE BRAKES. ASK STUDENTS TO TALK ABOUT HOW STAR-WHEEL ADJUSTERS WORK ON NON-SERVO SYSTEMS.</b></p>
 	<p><b>QUESTION</b></p>

## ICONS

## Ch58 DRUM BRAKES



### VIDEO: DRUM BRAKE DIAGNOSIS

[WWW.MYAUTOMOTIVELAB.COM](http://www.myautomotivelab.com)

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET\\_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DRUM%20BRAKE%20DIAGNOSIS%20AND%20REPAIR&CLIP=PANDC/CHET/2012/AUTOMOTIVE/B1.MOV&CAPTION=CHET/CHET\\_MYLABS/AKAMAI/2012/AUTOMOTIVE/XML/B1.ADB.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/VIDEO640X480.PHP?TITLE=DRUM%20BRAKE%20DIAGNOSIS%20AND%20REPAIR&CLIP=PANDC/CHET/2012/AUTOMOTIVE/B1.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/XML/B1.ADB.XML)



QUESTION

**DISCUSSION:** ASK STUDENTS TO DISCUSS THE STEPS TO DIAGNOSE DRUM BRAKES. WHAT STEPS ARE INVOLVED IN SERVICING DRUM BRAKES?



CUSTOMERS NOTICE BRAKE NOISE WHEN THE WEATHER WARMS UP IN NORTHERN CLIMATES. THIS IS THE FIRST TIME IN MONTHS THEY OPEN THEIR WINDOWS.



QUESTION

**DISCUSSION BRAKE FADE:** ask student to talk about causes of mechanical brake fade in drum brakes. Invite students to list ways to avoid dangerous heat build-up within brake drum. Ask students to discuss the causes and symptoms of gas fade. Why is this type of brake fade rare? Ask students to talk about how water fade happens and discuss problems it causes. How should the driver react to water fade? Talk about causes of lining fade in drum brakes. Ask students to explain what makes the brake lining slippery when this type of brake fade occurs



**DEMONSTRATION:** SHOW STUDENTS HOW TO DO QUICK-AND-EASY DRUM BRAKE ADJUSTMENT CHECK. DOES THE DRUM RING LIKE A BELL?



QUESTION

**DISCUSSION:** ASK STUDENTS TO TALK ABOUT WHY DRUM BRAKES NEED TO BE ADJUSTED PERIODICALLY, AND DISCUSS HOW THIS IS ACCOMPLISHED.



CHECK BACKING PLATE SUPPORT PADS FOR WEAR. IF THEY ARE GROOVED THEY CAN BE BUILT UP WITH A WIRE FEED WELDER AND GROUND FLAT.



**NATEF MLR TASK A5A2:** DESCRIBE PROCEDURE FOR PERFORMING A ROAD TEST TO CHECK BRAKE SYSTEM OPERATION, INCLUDING AN ANTI-LOCK BRAKE SYSTEM (ABS).

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4. SLIDES 4-5 EXPLAIN Brake Drum Removal

6. SLIDE 6 EXPLAIN Figure 58-1 Tinnerman nuts are used at the assembly plant to prevent the brake drum from falling off until the wheels are installed.

7. SLIDE 7 EXPLAIN Figure 58-2 Turning bolts that are threaded into brake drum forces drum off of the hub.

**DISCUSSION: DISCUSS HOW TO REMOVE A BRAKE DRUM THAT IS RUSTED TO WHEEL HUB. WHAT METHODS ARE MOST EFFECTIVE IN LOOSENING DRUM? ASK STUDENTS TO TALK ABOUT HOW TO REMOVE A BRAKE DRUM WHEN BRAKE SHOES HAVE WORN INTO DRUM. WHAT METHOD IS RECOMMENDED FOR DEALING WITH THIS PROBLEM?**

**DEMONSTRATION: SHOW HOW TO PERFORM CUTTING-THE-NAILS TRICK TO REMOVE A BRAKE DRUM WHEN LININGS HAVE WORN A GROOVE INTO DRUM.**

8. SLIDE 8 EXPLAIN Figure 58-3 If the brake shoes have worn into the drum, the adjuster can be backed in after removing the access plug. After removing the plug, use a wire or a screwdriver to move the adjusting lever away from the starwheel, then turn the starwheel with a brake adjusting tool, often called a “brake spoon.”

**HANDS-ON TASK: once brake drum is removed, inspect backing plate for wear. If backing plate shows excessive wear, have students replace it. If not, have them service backing plate. Have students remove return, or retracting, springs of drum brakes, remove hold-down springs and other brake parts. Ask students to inspect return, hold-down, and connecting springs and determine whether they can be reused or need to be replaced.**

**SAFETY ISSUE: RECOMMEND THAT STUDENTS USE A SOLVENT TO WET DOWN BRAKE SHOES & BRAKE COMPONENTS AFTER BRAKE DRUM IS REMOVED TO PREVENT SPREAD OF AIRBORNE ASBESTOS. ADVISE THEM TO TAKE PROPER PRECAUTIONS, SUCH AS USING A LIQUID SOAKING AGENT, BEFORE REMOVING A BRAKE DRUM TO BE SURE THAT ANY ASBESTOS PARTICLES INSIDE DO NOT BECOME AIRBORNE.**

## ICONS

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### **DISPOSE OF BRAKE CLEAN AND CLEANING SOLVENTS USE TO WET DOWN THE BRAKES ACCORDING TO EPA REGULATIONS.**





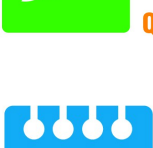

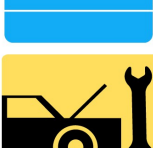







9. **SLIDE 9 EXPLAIN FIGURE 58-4** Using side-cut pliers to cut the heads off of the hold-down pins (nails) from the backing plate to release the drum from the shoes.
10. **SLIDES 10-11 EXPLAIN** Drum Brake Disassembly
12. **SLIDE 12 EXPLAIN Figure 58-5** liquid soaking solvent, such as brake cleaner, should be used to wet the linings. The purpose of wetting lining material to prevent possibility of asbestos from lining becoming airborne. Asbestos is only hazardous when asbestos dust is airborne and is breathed in during brake system service
13. **SLIDE 13 EXPLAIN Figure 11-6** Using a brake spring tool to release a return (retracting) spring from the anchor pin & **FIGURE 58-7** A special tool, called a hold-down spring tool, being used to depress and rotate the retainer.
14. **SLIDES 14-16 EXPLAIN** Inspecting the Backing Plate





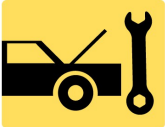

### **Removing Brake Drum**









### **Removing Brake Drum AutoZone** **Brake Drum Service**

17. **SLIDE 17 EXPLAIN Figure 58-8** A typical rusty backing plate shoe pad. This can cause the brakes to squeak when the shoes move outward during a brake application and again when the brake pedal is released.
18. **SLIDE 18 EXPLAIN Figure 58-9** Applying lithium grease to the raised pads on the backing plate.
19. **SLIDES 19-21 EXPLAIN** Drum Brake Lining Inspection
22. **SLIDE 22 EXPLAIN Figure 58-10** rule of thumb is that lining should be at least thickness of nickel. This applies to both drum brake shoes & disc brake pads, **EXPLAIN Figure 58-11** Cracked brake lining must be replaced.

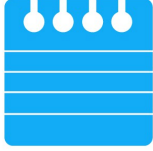








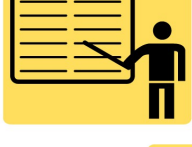

**DEMONSTRATION: SHOW HOW LINING TABLE ON BRAKE SHOE SUPPORTS FRICTION MATERIAL THAT CONSTITUTES BRAKE LINING. SHOW STUDENTS HOW SHOE WEB TRANSFERS TO LINING TABLE FORCE THAT ACTIVATES SHOE. DESCRIBE PURPOSE OF HOLES AND NOTCHES IN SHOE WEB.**







ICONS	Ch58 DRUM BRAKES
	<p><b>DISCUSSION:</b> DISCUSS HOW RIVETED BRAKE LININGS ARE ATTACHED TO THE LINING TABLE OF A DRUM BRAKE SHOE. WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF THIS METHOD OF BRAKE SHOE ASSEMBLY?</p>
	<p><b>DEMONSTRATION:</b> SHOW LINING EDGE CODES ON A DRUM BRAKE SHOE, AND EXPLAIN THE MEANING OF <u>LETTERS &amp; NUMBERS</u> EMBEDDED IN LINING. SHOW <u>LINING CODES</u> RELATING TO COEFFICIENT OF FRICTION. ASK STUDENTS TO INTERPRET MEANING OF THESE CODES.</p>
	<p><b>BONDING</b> ELIMINATES THE CHANCE OF BRAKE MATERIAL BUILDING UP IN THE RIVET HOLES</p>
	<p><b>DISCUSSION:</b> DISCUSS HOW BRAKE LININGS ARE BONDED TO BRAKE SHOES. INVITE STUDENTS TO COMPARE RIVETING AND BONDING OF BRAKE LININGS AND TO SUGGEST WHICH IS PREFERABLE FOR PASSENGER VEHICLE USE.</p>
	<p><b>WHEN INSPECTING AND CLEANING RIVETED SHOES</b> REMOVE HARDENED BRAKE DUST FROM THE RIVET HOLES. THIS MATERIAL WILL CUT INTO THE DRUMS LONG BEFORE THE RIVETS TOUCH THE DRUM.</p>
	<p><b>HANDS-ON TASK:</b> HAVE STUDENTS INSPECT DRUM BRAKE LINING, MEASURING ITS THICKNESS BY USING A MICROMETER, TO DETERMINE WHETHER BRAKE LINING NEEDS TO BE REPLACED.</p>
	<p>23. SLIDE 23 EXPLAIN Brake Spring Inspection</p>
	<p>24. SLIDE 24 EXPLAIN FIGURE 58–12 top spring is a good-looking spring because all coils of the spring are touching each other. The bottom spring is stretched and should be discarded. The arrow points to the back side of the spring, which goes into a hole in the brake shoe. The open loop of the spring is not strong enough to keep from straightening out during use. Using the back side of the hook provides a strong, long-lasting hold in brake shoe.</p>
	<p><b>DEMONSTRATION:</b> SHOW STUDENTS EXAMPLES OF BRAKE SHOE RETURN SPRINGS, DEMONSTRATE HOW THEY RETRACT SHOES TO THEIR UNAPPLIED POSITION. SHOW STUDENTS HOW BRAKE SHOE</p>
	
	
	
	
	

ICONS	Ch58 DRUM BRAKES
	<p><b>HOLD DOWNS KEEP BRAKE SHOES FIRMLY AGAINST SUPPORT PADS ON BACKING PLATE TO PREVENT NOISE, VIBRATION, AND WEAR. DEMONSTRATION: SHOW STUDENTS HOW TO DO THE DROP TEST TO TEST THE RETURN SPRINGS. DID THE SPRING RING OR MAKE A THUD? ASK STUDENTS TO INTERPRET THE RESULTS OF THE TEST.</b></p>
	<p>25. SLIDE 25 EXPLAIN FIGURE 58-13 Many wheel cylinders are bolted to the support plate (backing plate). The O-ring seal helps keep water and dirt out of the drum brake.</p> <p>26. SLIDE 26 EXPLAIN FIGURE 58-14 (a) Some wheel cylinders are simply clipped to the backing plate. (b) This special tool makes it a lot easier to remove the wheel cylinder clip. A socket (1 1/8 in., 12 point) can be used to push the clip back onto the wheel cylinder.</p> <p>27. SLIDE 27 EXPLAIN FIGURE 58-15 This starwheel adjuster is damaged and must be replaced. A lack of proper lubrication can cause the starwheel to become frozen in one place and not adjust properly.</p>
	<p><b>SLIGHT SIGN OF BRAKE FLUID BEHIND THE WHEEL CYLINDER DUST BOOT IS OKAY. IT IS WHAT KEEPS THE SEAL LUBRICATED. ANYMORE THAN A SMALL TRACE INDICATES SEAL LEAKS.</b></p>
	<p>28. SLIDES 28-29 EXPLAIN DRUM HARDWARE KIT</p> <p>30. SLIDE 30 EXPLAIN FIGURE 58-16 Pre-assembly of the starwheel adjuster with its connecting spring often helps when reassembling a drum brake &amp; EXPLAIN FIGURE 58-17 Sometimes it is necessary to cross the shoes when pre-assembling the starwheel adjuster and connecting spring.</p>
	<p><b>HANDS-ON TASK: HAVE STUDENTS REMOVE AND REPLACE HOLD DOWN SPRINGS USING THE PROPER TOOL FOR THE JOB. USE A LAB VEHICLE OR ATECH SIMULATOR</b></p>
	<p>31. SLIDE 31 EXPLAIN FIGURE 58-18 Brake spring pliers being used to install the connecting spring</p> <p>32. SLIDE 32 EXPLAIN Figure 58-19 Notice that brake shoe is not contacting anchor pin. This often occurs when the parking brake cable is stuck or not adjusted properly.</p>

ICONS	Ch58 DRUM BRAKES
	<p><b><u>DEMONSTRATION:</u> SHOW STUDENTS THE <u>PARKING BRAKE LINKAGE</u> ON A REAR DRUM BRAKE AND DISCUSS HOW IT WORKS.</b></p>
	<p><b><u>DEMONSTRATION:</u> SHOW STUDENTS EXAMPLES OF BRAKE DRUMS AND ASK THEM TO TALK ABOUT FUNCTION OF RIBS OR FINS AROUND THE OUTER EDGE OF THE DRUM.</b></p>
	<p><b>THE HOLD-DOWN PINS HAVE REFERENCE NUMBERS ON THE BACK OF THEM TO IDENTIFY THEIR APPLICATION.</b></p>
	<p><b><u>DEMONSTRATION:</u> SHOW STUDENTS HOW TO PERFORM MASKING-TAPE TRICK TO PREVENT CONTAMINATION OF BRAKE LININGS DURING INSTALLATION.</b></p>
	<p><b><u>DISCUSSION:</u> HAVE STUDENTS TALK ABOUT OTHER WAYS THEY CAN KEEP THE BRAKE LININGS FREE OF CONTAMINATION</b></p>
	<p>33. SLIDE 33 EXPLAIN FIGURE 58–20 first step in using a brake shoe clearance gauge is to adjust it to the drum inside diameter and tighten the lock screw. &amp; EXPLAIN FIGURE 58–21 Place gauge over shoes and adjust the brakes until they contact the inside of gauge.</p>
	<p>34. SLIDE 34 EXPLAIN FIGURE 58–22 To prevent getting grease on the lining, the wise service technician covers the friction material with masking tape. The tape is removed after the brake shoes have been installed..</p>
	<p><b><u>DEMONSTRATION:</u> SHOW THE STUDENTS THE PROCEDURE YOU USE TO <u>ASSEMBLE DRUM BRAKE SHOES</u>. LET THEM KNOW THAT THERE IS NO MANUFACTURE RECOMMENDATION FOR THIS PROCESS. WHAT WORKS BEST FOR THEM TO ACCOMPLISH THE OUTCOME IS OKAY</b></p>
	<p><b><u>DISCUSSION:</u> HAVE STUDENTS TALK ABOUT WHY YOU DON'T USE A SCREW DRIVER OR PLIERS TO INSTALL AND REMOVE RETURN SPRINGS. (PLIERS NICK THE PAINT ON THE SPRINGS AND ACCELERATE CORROSION)</b></p>



ICONS	Ch58 DRUM BRAKES
	<p><b>HOLD BACK OF RETURN SPRING PIN AGAINST THE BACKING PLATE WITH YOUR FINGER WHILE PUSHING ON SPRING WITH HOLD DOWN SPRING TOOL. MOVE CLEARANCE TOOL UP AND DOWN ON THE SHOES TO DETERMINE THE WIDEST SPOT.</b></p>
	<p><b>35. SLIDE 35 EXPLAIN</b> Lubrication Checklist</p>
	<p><b><u>DEMONSTRATION:</u> HOW STUDENTS HOW TO ADJUST THE REINSTALLED DRUM BRAKES BY USING A BRAKE SHOE CLEARANCE GAUGE</b></p>
	<p><b>STAR-WHEEL ADJUSTERS WHEELS SHOULD BE CHECKED FOR TOOTH WEAR</b></p>
	<p><b><u>DEMONSTRATION:</u> SHOW STUDENTS HOW TO ADJUST LEVER-LATCH AUTOMATIC ADJUSTER.</b></p>
	<p><b><u>DISCUSSION:</u> ASK STUDENTS TO DISCUSS HOW A LEVER-LATCH AUTOMATIC ADJUSTER WORKS TO ADJUST LINING-TO-DRUM CLEARANCE.</b></p>
	<p><b><u>DISCUSSION:</u> ASK STUDENTS TO TALK ABOUT HOW A STRUT-QUADRANT AUTOMATIC ADJUSTER WORKS. HAVE STUDENTS IDENTIFY THE ADJUSTER'S COMPONENT PARTS AND COMPARE ITS OPERATION TO THAT OF A LEVER-LATCH AUTOMATIC ADJUSTER.</b></p>
	<p><b><u>HANDS-ON TASK:</u> HAVE STUDENTS USE ADJUSTING LINK MECHANISM TO FINE-TUNE CLEARANCE BETWEEN THE BRAKE LINING AND THE DRUM.</b></p>
	<p><b>36. SLIDES 36-53 OPTIONAL EXPLAIN DRUM BRAKE SERVICE</b></p>
	<p><b><u>NATEF MLR TASK A5C1</u> REMOVE, CLEAN, INSPECT, AND MEASURE BRAKE DRUM DIAMETER; DETERMINE NECESSARY ACTION</b></p>
	

ICONS	Ch58 DRUM BRAKES
	<p><b><u>NATEF MLR TASK A5C2</u> REFINISH BRAKE DRUM AND MEASURE FINAL DRUM DIAMETER; COMPARE WITH SPECIFICATIONS.</b></p>
	<p><b><u>NATEF MLR TASK A5C3</u> REMOVE, CLEAN, AND INSPECT BRAKE SHOES, SPRINGS, PINS, CLIPS, LEVERS, ADJUSTERS/SELF-ADJUSTERS, OTHER RELATED BRAKE HARDWARE, AND BACKING SUPPORT PLATES; LUBRICATE AND REASSEMBLE.</b></p>
	<p><b><u>NATEF MLR TASK A5C4</u> INSPECT WHEEL CYLINDERS FOR LEAKS AND PROPER OPERATION; REMOVE AND REPLACE AS NEEDED.</b></p>
	<p><b><u>NATEF MLR TASK A5C5</u> PRE-ADJUST BRAKE SHOES AND PARKING BRAKE; INSTALL BRAKE DRUMS OR DRUM/HUB ASSEMBLIES AND WHEEL BEARINGS; PERFORM FINAL CHECKS AND ADJUSTMENTS.</b></p>
	<p><b><u>NATEF MLR TASK A5C6</u> INSTALL WHEEL AND TORQUE LUG NUTS.</b></p>
	<p><b><u>SEARCH INTERNET: RESEARCH THE SELF-SERVO CHARACTERISTIC OF DRUM BRAKES, WHICH INCREASES STOPPING POWER WITHOUT ADDITIONAL EFFORT BY THE DRIVER.</u></b></p>