



















Automatic Transmissions and Transaxles, 6e










Chapter 7 Clutches and Bands

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Automatic Transmissions and Transaxles, 6e . 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. Prepare for ASE Automatic Transmissions (A2) certification test content area "A" (General Transmission and Transaxle Diagnosis).2. Identify the components of a multiple-disc driving clutch and describe its operation.3. Identify the components of a one-way driving clutch and describe its operation.4. Discuss holding clutches and bands.5. Explain shift quality.
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	Ch07 Clutches and Bands
        	<ol style="list-style-type: none"> 1. SLIDE 1 CLUTCHES & BANDS 2. SLIDES 2-3 EXPLAIN OBJECTIVES <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <ol style="list-style-type: none"> 4. SLIDES 4-5 EXPLAIN Multiple-disc Driving Clutch 6. SLIDE 6 EXPLAIN FIGURE 7-6 A typical clutch piston area is determined by subtracting the area of the inner diameter from the area of the outer-circle diameter. 7. SLIDE 7 EXPLAIN FIGURE 7-7 Some clutch pistons use a middle seal so the piston will have two working areas. <p><u>Auto Transmission Clutch Operation</u></p> <p><u>DEMONSTRATION:</u> SHOW THE STUDENTS A DISASSEMBLED <u>CLUTCH PACK</u> AND IDENTIFY A FRICTION PLATE AND A STEEL PLATE.</p> <p><u>DEMONSTRATION:</u> SHOW EXAMPLES OF APPLY DEVICES SUCH AS A TRANSMISSION BAND, MULTIPLE-PLATE CLUTCH, & ONE-WAY CLUTCH. THEN INSTALL A BAND AROUND A DRUM AND SHOW THE STUDENTS HOW IT WILL HOLD A DRUM & CHANGE REACTION MEMBER IN PLANETARY</p> <ol style="list-style-type: none"> 8. SLIDE 8 EXPLAIN FIGURE 7-8 The baffle that supports the return springs also forms a chamber for release pressure. The clutch is released when fluid pressure enters this chamber as pressure is released from the apply side of the piston. 9. SLIDE 9 EXPLAIN FIGURE 7-9 Pressurized oil is sent to apply side of piston to force clutch discs together. <p><u>DEMONSTRATION:</u> SHOW FRICTION PLATE AND A STEEL PLATE, NOTING THAT THE FRICTION PLATE'S SPLINES ARE ON THE INNER EDGE, AND THE STEEL PLATE'S SPLINES ARE ON OUTER EDGE.</p>

ICONS	Ch07 Clutches and Bands
	<p><u>DISCUSSION:</u> DISCUSS HOW A CLUTCH PACK APPLIES AND RELEASES. WHAT WILL HAPPEN IF THE CLUTCH RELEASES TOO SLOWLY?</p>
	<p><u>DISCUSSION:</u> DISCUSS HOW FLUID TRAVELS AROUND THE TRANSMISSION THROUGH VARIOUS PASSAGES TO ACCOMPLISH DIFFERENT TASKS. WHAT WOULD HAPPEN IF THERE WERE NO FLUID PASSAGES?</p>
	<p>10. SLIDE 10 EXPLAIN One-Way Driving Clutch</p> <p>11. SLIDE 11 EXPLAIN FIGURE 7-13 (a) Roller one-way clutch in released (free) position. When the inner roller clutch race rotates faster than the outer support, the rollers move out of the wedge and are free to rotate, thereby unlocking one-way clutch. (b) Roller one way clutch in locked (held) position. Note how the rollers are wedged into ramp that is machined into outer support.</p>
	<p><u>One Way Roller Clutch</u></p> <p><u>Sprag Clutch</u></p>
	<p>12. SLIDE 12 EXPLAIN FIGURE 7-14 (a) The sprag in the holding (locked) position. Note how the long portion of the sprag is wedged between the inner and outer race. (b) The sprag in the released position. The inner race is free to rotate faster than the outer race.</p>
	<p>13. SLIDE 13 EXPLAIN Holding Clutches</p> <p>14. SLIDE 14 EXPLAIN FIGURE 7-17 The 41TE transaxle low/reverse clutch is a holding clutch. Note the splines in the case for the clutch plates.</p>
	<p><u>DEMONSTRATION:</u> SHOW THE STUDENTS EXAMPLES OF <u>HOLDING CLUTCH & DRIVING CLUTCH.</u></p>
	<p><u>DEMONSTRATION:</u> SHOW ONE-WAY CLUTCH. SHOW HOW IT TURNS ONE WAY, BUT NOT THE OTHER. WHAT WILL HAPPEN IF THE ONE-WAY CLUTCH FAILS?</p>
	<p><u>DISCUSSION:</u> HAVE THE STUDENTS COMPARE ROLLER CLUTCH & SPRAG TO SEE THE DIFFERENCE BETWEEN. IS ONE BETTER THAN THE OTHER?</p>

ICONS	Ch07 Clutches and Bands
	<p>15. SLIDES 15-17 EXPLAIN Bands</p> <p>18. SLIDE 18 EXPLAIN FIGURE 7-18 Transmission bands come in several designs and thicknesses</p>
	<p>18. SLIDE 18 EXPLAIN FIGURE 7-19 (a) This band uses an adjustable anchor that allows the clearance to be easily adjusted. (b) Note that the apply lever will increase apply force.</p>
	<p>19. SLIDES 19-22 EXPLAIN Shift Quality</p> <p>23. SLIDE 23 EXPLAIN FIGURE 7-23 band accumulator piston and spring being removed from GM 4T65-E.</p>
	<p>HANDS-ON TASK: HAVE THE STUDENTS RAISE VEHICLE ON A LIFT USING PROPER SAFETY PROCEDURES. ASK THEM TO DETERMINE WHETHER THE BANDS CAN BE ADJUSTED WITH THE TRANSMISSION IN VEHICLE.</p>
	<p><u>Auto Transmission Band & Servo Operation</u> <u>Auto Transmission Clutch Operation</u></p>
	<p><u>ANIMATION: SERVO OPERATION</u> <u>WWW.MYAUTOMOTIVELAB.COM</u> HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A14_ANIMATION/CHAPTER101_FIG_101_4/INDEX.HTM</p>
	<p><u>VIDEO: 1 MINUTE CHECKING SERVO OP.</u> <u>WWW.MYAUTOMOTIVELAB.COM</u> HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=CHECKING%20THE%20SERVO%20ASSEMBLY&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_TO_TRANSMISSION/A2T9.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_TRANSMISSION/XML/A2T9.XML</p>
	<p><u>DISCUSSION: DISCUSSION: HAVE THE STUDENTS TALK ABOUT THE PURPOSE OF AN ACCUMULATOR. WHAT MIGHT HAPPEN TO A CLUTCH OR A BAND IF THERE WERE NO ACCUMULATOR?</u></p>
	<p>24. SLIDES 24-25 EXPLAIN Summary</p>