









Automatic Transmissions and Transaxles, 6e

Chapter 4 Hydraulic System Parts and Operations

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. Discuss the specifications and types of automatic transmission fluids (ATF).3. Discuss hydraulic principles and Pascal's Law.4. Describe the types and operation of automatic transmission/transaxle pumps.5. Explain the different methods for controlling fluid flow and regulating pressure.6. Identify the types of hydraulic seals.7. Discuss ATF filters, heaters, and coolers.
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	Ch04 Hydraulic System Parts & Operations
	<p>1. SLIDE 1 HYDRAULIC SYSTEM PARTS & OPERATIONS</p>
	<p>2. SLIDES 2-3 EXPLAIN OBJECTIVES</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p>
	<p>4. SLIDES 4-6 EXPLAIN Automatic Transmission Fluid</p>
	<p>7. SLIDE EXPLAIN FIGURE 4-1 Fluid pressure is used to apply clutches and bands. The pressure and calculated volume index readings of the fluid in the unit can be monitored using a scan tool.</p> <p>DISCUSSION: HAVE THE STUDENTS' COUNT HOW MANY DIFFERENT TYPES OF FLUID IN CHART 4-1. WHAT TYPE OF ATF DO THEIR OWN VEHICLES USE? TALK WITH THE STUDENTS ABOUT HOW VITAL IT IS TO USE CORRECT</p>
	<p>DISCUSSION: DISCUSS THE PURPOSES AND FUNCTIONS THAT AUTOMATIC TRANSMISSION FLUID HAS. WHAT IS VISCOSITY?</p>
	<p>DEMONSTRATION: SHOW SAMPLES OF SEVERAL DIFFERENT TYPES OF ATF SUCH AS TYPE F, DEXRON, DEXRON VI, AND MERCON V.</p>
	<p>VIDEO: 2 MINUTES ATF CONDITION WWW.MYAUTOMOTIVELAB.COM <small>HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DIAGNOSING%20PROBLEMS%20RELATED%20TO%20FLUID%20CONDITION&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_TRANSMISSION/A2T1.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_TRANSMISSION/XML/A2T1.XML</small></p>
	<p>OPTIONAL HANDS-ON TASK (TIME PERMITTING): STUDENTS DO AN EXPERIMENT PROVING THAT LUBRICANT REDUCES FRICTION. ATTACH A FISHING SCALE, OR A SIMILAR SCALE, TO A SMALL PIECE OF WOOD. HAVE STUDENTS MEASURE AMOUNT OF "WEIGHT" REQUIRED TO PULL PIECE OF WOOD OVER ANOTHER PIECE OF WOOD. THEN HAVE THEM COAT WOOD WITH ATF AND MEASURE PULL REQUIRED.</p>

ICONS

Ch04 Hydraulic System Parts & Operations



8. SLIDES 8-10 EXPLAIN Hydraulic Principles and Pascal's Law

11. SLIDE 11 EXPLAIN FIGURE 4-5 Fluid pressure is transmitted undiminished in all directions. Note that the pressure is equal throughout the system.

Basic Hydraulic System

DEMONSTRATION: SHOW A PUMP FROM AN AUTOMATIC TRANSMISSION. SHOW THEM HOW TORQUE CONVERTER DRIVES THE PUMP.

12. SLIDE 12 EXPLAIN Pumps

13. SLIDE 13 EXPLAIN FIGURE 4-9 As pump rotates, a low pressure (vacuum) is created as the pumping members move apart in one area, and atmospheric pressure will force fluid into this area. Pressure is created where the pumping members move together.

14. SLIDE 14 EXPLAIN Pumps

Pressure Regulator Valve

15. SLIDE 15 EXPLAIN Controlling Fluid Flow

16. SLIDE 16 EXPLAIN FIGURE 4-15 A spool valve resembles a spool for thread (top).




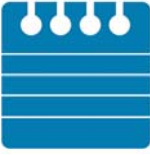





17. SLIDES 17-20 EXPLAIN Controlling Fluid Pressure

21. SLIDE 21 EXPLAIN Figure 4-17 When pressure on the face of the pressure regulator valve overcomes spring force, the valve moves to open the exhaust port

22. SLIDE 22 EXPLAIN Hydraulic Seals



DISCUSSION: DISCUSS DIFFERENT TYPES OF HYDRAULIC SEALS. IS THERE A RIGHT OR WRONG WAY TO INSTALL A SEAL?

ICONS	Ch04 Hydraulic System Parts & Operations
	<p>23. SLIDE 23 EXPLAIN ATF Filters, Heaters, and Coolers</p>
	<p>24. SLIDE 24 EXPLAIN FIGURE 4-12 A surface filter traps particles that are too big to pass through the openings in the screen.</p>
	<p>25. SLIDE 25 EXPLAIN ATF Filters, Heaters, and Coolers</p>
	<p>DEMONSTRATION: SHOW EXAMPLES OF A TRANSMISSION COOLER BUILT IN A RADIATOR AND AN EXAMPLE OF A LIQUID-TO-AIR COOLER THAT GOES IN FRONT OF THE RADIATOR</p>
	<p>POINT OUT TO THE STUDENTS THAT AN OVERHEATED TRANSMISSION CAN CAUSE MAJOR ENGINE DAMAGE BY CAUSING THE TORQUE CONVERTER TO BALLOON. THIS COULD CAUSE THE CRANKSHAFT THRUST BEARING TO WEAR VERY QUICKLY, DAMAGING THE CRANKSHAFT & BLOCK.</p>
	<p>DISCUSSION: DISCUSS THE FACT THAT A LIQUID-TO-LIQUID TRANSMISSION COOLER, SUCH AS THAT LOCATED IN THE RADIATOR, DOUBLES AS A HEATER WHEN THE TEMPERATURE IS VERY COLD. WHAT HAPPENS TO OIL WHEN IT IS COLD?</p>
	<p>DISCUSSION: SHOW TRANSMISSION COOLER CUTOUT LOCATED IN THE RADIATOR. WHAT WOULD HAPPEN IF THE COOLER FAILED AND COOLANT CONTAMINATED ATF?</p>
	<p>HANDS-ON TASK (TIME PERMITTING): HAVE THE STUDENTS RESEARCH THE FUNCTIONS AND POSSIBLE PROBLEMS OF AN AUTOMATIC TRANSMISSION COOLER.</p>
	<p>26. SLIDES 26-27 EXPLAIN Summary</p>
