Automatic Transmissions and Transaxles, 7e

Chapter 2 Automatic Transmissions Fluid, Filters and Coolers

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers Automatic Transmissions and Transaxles 7th Edition. It correlates material to task lists specified by **ASE and ASEEducation (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. 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 ATF filters, heaters, and coolers.
Establish the Mood or Climate	Provide a *WELCOME,* 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 automatic Transmissions & Transaxle 7th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

DOWNLOAD CHP 2: Chapter Images

ICONS	Ch02 AT Fluid, Filters and Coolers
	**1. SLIDE 1 Automatic Transmissions Fluid, Filters and Coolers**
	**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 http://www.jameshalderman.com/books_a2.html to familiarize your class with the terms in this chapter & then discuss them**
	**DOWNLOAD Crossword Puzzle** **DOWNLOAD Word Search Puzzle**
	**2. SLIDE 2 EXPLAIN FIGURE 2–1** ATF being drained from a recycling center automatic transaxle still looks bright red in this unit being used for training..
	**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**
	**3. SLIDE 3 EXPLAIN FIGURE 2–2** use of the factory-specific fluid is the recommend fluid to insure the best possible shifting and transmission operation. **4. SLIDE 4 EXPLAIN FIGURE 2–3** Multi-vehicle, or universal fluid, is designed to meet the specifications of many types of fluids, making it popular with independent shops that service many makes and models of vehicles. **5. SLIDE 5 EXPLAIN FIGURE 2–4** Aftermarket additives are available that can convert friction-modified ATF into highly friction-modified ATF.
	**DISCUSS CHART 2-1**

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	**DEMONSTRATION: SHOW SAMPLES OF SEVERAL DIFFERENT TYPES OF ATF SUCH AS TYPE F, DEXRON, DEXRON VI, AND MERCON V.**
	**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.**
	**BASIC HYDRAULIC SYSTEM (VIEW) (DOWNLOAD)**
	PRESSURE REGULATOR VALVE (VIEW) (DOWNLOAD)
	6. **SLIDE 6 EXPLAIN FIGURE 2–5** A surface filter traps particles that are too big to pass through the openings in the screen.
	7. **SLIDE 7 EXPLAIN FIGURE 2–6** The surface area of a surface filter is reduced somewhat by the material that makes up the screen. The size of the screen openings determines how small of a particle can be filtered.
	**DISCUSSION: HOLD A DISCUSSION ON WHEN YOU CHANGE THE OIL AND FILTER ON AN AUTOMATIC TRANS. WHY HAS THE CHANGE INTERVAL INCREASED TO 100,000 MILES?**
	**DEMONSTRATION: SHOW DIFFERENT TYPES OF TRANSMISSION FILTERS**
	8. **SLIDE 8 EXPLAIN FIGURE 2–7** A depth filter is a group of woven fibers of a certain thickness. Foreign particles are trapped at different levels as they try to flow through.
	9. **SLIDE 9 EXPLAIN FIGURE 2–8** Engine coolant from the engine block flows through the passages in the warmer/cooler, and then out through the thermostatic valve to the upper radiator tank. The thermostatic valve uses a wax element–type valve to control the flow of engine coolant through the case-mounted cooler/warmer. The thermostatic valve improves the ATF warm-up times and

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	maintains ATF temperature within the optimum operating range between 170°F and 180°F (77°C and 82°C).
DEMO	**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 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.**
	10. **SLIDE 10 EXPLAIN FIGURE 2–9** The life of automatic transmission fluid drops drastically when the temperature increases above normal.
QUESTION	**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?**
	EXPLAIN FREQUENTLY ASKED QUESTION: WHAT IS A "TURBULATOR"?
	11. **SLIDE 11 EXPLAIN FIGURE 2–10** Automatic transmission fluid is routed from the torque converter, where most of the heat is generated, to the radiator where it is cooled. The fluid then returns to the transmission/transaxle to lubricate the bearings and bushings. 12. **SLIDE 12 EXPLAIN FIGURE 2–11** Cold fluid tends to stick to the walls of a plain tube cooler (top). The turbulator causes fluid turbulence to promote mixing so all of the fluid cools (bottom). 13. **SLIDE 13 EXPLAIN FIGURE 2–12** If the vehicle is being used for towing and it is not equipped with a supplemental cooler, an aftermarket cooler can be installed.
QUESTION	**DISCUSSION: SHOW TRANSMISSION COOLER CUTOUT LOCATED IN THE RADIATOR. WHAT WOULD HAPPEN IF THE COOLER FAILED AND COOLANT CONTAMINATED ATF?**

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	**14. SLIDE 14 EXPLAIN FIGURE 2–13** While most automatic transmissions use an internal filter only, this Allison transmission uses a spin-on-type filter that is designed to be replaced as part of routine service. There is another filter inside that is designed to be replaced only if the unit is overhauled or repaired. **14. SLIDE 14 EXPLAIN FIGURE 2–14** If an all-wheel-drive vehicle must be towed, it should be either on (a) a flatbed truck or (b) a dolly.
	**EXPLAIN TECH TIP: DON'T TOW A VEHICLE WITH THE DRIVE WHEELS ON THE GROUND**
	**HANDS-ON TASK (TIME PERMITTING): HAVE THE STUDENTS RESEARCH THE FUNCTIONS AND POSSIBLE PROBLEMS OF AN AUTOMATIC TRANSMISSION COOLER.**