

Automotive Heating and Air Conditioning, 8e

Chapter 13 Heating & Air-Conditioning System Service

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Automotive Heating and Air Conditioning, 8e . It correlates material to task lists specified by ASE and NATEF/ASEEducation.
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 learning objectives to students as listed below: 1. Describe how to verify AC compressor clutch operation. 2. Discuss normal AC discharge outlet temperatures. 3. Discuss how to verify proper heating and cooling airflow to the inside of the vehicle. 4. Explain how to inspect the AC condenser. 5. Discuss AC odors and how to eliminate them.
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 the 8th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

LINK CHP 13:

http://www.jameshalderman.com/links/book_hvac/ci/hvac_ci_ch_13.pptx

These Power Point files contain more than just the images

ICONS



ON-VEHICLE TASK

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1. SLIDE 1 Chapter 13 HEATING & AIR-CONDITIONING SERVICE

2. SLIDES 2 EXPLAIN OBJECTIVES

Check for ADDITIONAL VIDEOS & ANIMATIONS

@ <http://www.jameshalderman.com/>

WEB SITE IS CONSTANTLY UPDATED

Chapter 13 VIDEOS

http://www.jameshalderman.com/links/book_hvac/vid/ch13/video_frame.html

Crossword Puzzle (Microsoft Word) (PDF)

Word Search Puzzle (Microsoft Word) (PDF)

DISCUSSION: Ask students to talk about major components of blower motor system and their purpose. What should be checked for each component when blower motor fails to function?

ON-VEHICLE NATEF TASK Inspect and test A/C blower motor and circuit; perform necessary action

3. SLIDE 3-4 EXPLAIN AC System Working As Designed

5. SLIDE 5 EXPLAIN FIGURE 13-1 compressor is working if the center of the compressor clutch is rotating with the engine running.

6. SLIDE 6 EXPLAIN FIGURE 13-2 AC compressor drive belt tensioner is used to keep a constant and even tension on the drive belt so it can properly transfer engine torque to the AC compressor

7. SLIDE 7 EXPLAIN FIGURE 13-3 air-conditioning thermometer being used to check the discharge temperature at the center vents.

8. SLIDES 8-9 EXPLAIN HVAC System Inspection

10. SLIDE 10 EXPLAIN FIGURE 13-4 A dirty cabin filter removed from a Subaru that driver complained of poor cooling from the air conditioning system

11. SLIDE 11 EXPLAIN FIGURE 13-5 Heater hoses are the smaller coolant hoses that run from and back to the engine.

ICONS



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12. SLIDE 12 **EXPLAIN** FIGURE 13–6 air-conditioning condenser is located in front of the radiator and is therefore more likely to become partially restricted due to road debris and dirt.
13. SLIDE 13 **EXPLAIN** FIGURE 13–7 fin comb is used to straighten fins on the condenser to help increase airflow and heat transfer

DEMONSTRATION: Show students how to use a fin comb to straighten fins of condenser. Why might this action be necessary? FIGURE 65-14

14. SLIDE 14 **EXPLAIN** FIGURE 13–8 typical electronic leak detector being used to locate a possible leak in a system.

Some shops add yellow dye to AC system during a recharge to help locate a leak

15. SLIDE 15 **EXPLAIN** FIGURE 13–9 black light being used to look for refrigerant leakage after a fluorescent dye was installed in the system.

DISCUSSION: Ask students to discuss malfunctioning heater symptoms that point to a defective thermostat.

DEMONSTRATION: demo the below NATEF TASKS

ON-VEHICLE NATEF TASK Diagnose malfunctions in the HVAC electrical controls; determine necessary action

ON-VEHICLE NATEF TASK Perform cooling system pressure tests; perform necessary action.

ON-VEHICLE NATEF TASK Inspect engine cooling and heating system hoses and belts; perform necessary action.

Use a biocide to get rid of mildew that forms in the evaporator.



