























Automotive Heating and Air Conditioning, 7e










Chapter 5 Air-Conditioning Compressors and Service



Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Automotive Heating and Air Conditioning, 7e . 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.	<p>Explain the chapter learning objectives to the students.</p> <ol style="list-style-type: none"> 1. Prepare for the ASE Heating and Air Conditioning (A7) certification test content area "A" (A/C System Service, Diagnosis and Repair). 2. State the different types of A/C compressors. 3. Discuss the parts and operation of compressor clutches. 4. Discuss compressor valves and switches. 5. Explain A/C compressor diagnosis and service.
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	Ch03 A/C Compressors and Service
       <p>QUESTION</p>     	<p>1. SLIDE 1 AIR-CONDITIONING COMPRESSORS AND SERVICE</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 4-5 EXPLAIN Different Types of A/C Compressors</p> <p><u>SWASH PLATE COMPRESSOR</u></p> <p><u>COMPACT VARIABLE COMPRESSOR 1</u></p> <p><u>COMPACT VARIABLE COMPRESSOR 2</u></p> <p><u>SWASH PLATE COMPRESSOR</u></p> <p><u>SCOTCH YOKE COMPRESSOR</u></p> <p><u>SCROLL COMPRESSOR</u></p> <p><u>WOBBLE PLATE COMPRESSOR</u></p> <p><u>DISCUSSION: DISCUSS PURPOSE AND FUNCTION OF AN A/C COMPRESSOR</u></p> <p><u>DEMONSTRATION: SHOW POSITIVE DISPLACEMENT PISTON COMPRESSOR AND HOW IT WORKS</u></p> <p><u>DEMONSTRATION: SHOW REED VALVE INSIDE A COMPRESSOR AND DISCUSS HOW IT FUNCTIONS.</u></p> <p><u>COMPRESSOR REED VALVE OPERATION</u> <u>WWW.MYAUTOMOTIVELAB.COM</u></p> <p><small>HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A77_ANIMATION/CHAPTER48 FIG 48 34/INDEX.HTM</small></p> <p>6. SLIDE 6 EXPLAIN Parts & Operation of Compressor Clutches</p> <p><u>CLUTCH APPLICATION</u></p> <p><u>COMPRESSOR CLUTCH CONTROL</u></p> <p><u>COMPRESSOR CLUTCH RPM SENSOR</u></p>

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	<p>7. SLIDE 7 EXPLAIN Figure 5–9 The electromagnetic clutch assembly includes the clutch field coil, where the magnetic field is created; the clutch pulley, which rides on the pulley bearing; and the clutch hub, which is attached to the input shaft of the compressor. The small shims are added or deleted as needed to adjust the air gap between the clutch hub and the clutch pulley.</p>
	<p>DISCUSSION: DISCUSS HOW AN ELECTROMAGNETIC CLUTCH WORKS TO CONTROL THE COMPRESSOR</p>
	<p>8. SLIDE 8 EXPLAIN Compressor Valves and Switches</p>
	<p>9. SLIDE 9 EXPLAIN Figure 5–16 Check service information for the exact purpose and function of each of the switches located on the compressor because they can vary according to make, model, and year of manufacture of vehicle and can also vary as to what compressor is used</p>
	<p>DISCUSSION: ASK STUDENTS TO DESCRIBE 3 TYPES OF SWITCHES THAT MUST BE FUNCTIONAL TO ENGAGE COMPRESSOR CLUTCH AND HOW EACH FUNCTIONS.</p>
	<p>10. SLIDE 10 EXPLAIN Compressor Valves and Switches</p>
	<p>11. SLIDE 11 EXPLAIN Figure 5–17 Typical air-conditioning pressure switches. Check service information to determine the purpose and function of each switch for the vehicle being inspected.</p>
	<p>12. SLIDE 12 EXPLAIN Compressor Valves and Switches ANY TIME YOU REPLACE A COMPRESSOR DUE TO MECHANICAL PROBLEMS, FLUSHING AC SYSTEM IS RECOMMENDED. THIS HELPS ENSURE THAT NEW COMPRESSOR IS FREE FROM METAL DEBRIS THAT COULD SHORTEN ITS LIFE.</p>
	<p><u>NATEF MAST TASK A7A2</u> RESEARCH APPLICABLE VEHICLE & SERVICE INFORMATION, VEHICLE SERVICE HISTORY, SERVICE PRECAUTIONS, & TECHNICAL SERVICE BULLETINS.</p>
	<p><u>NATEF MAST TASK A7B4</u> IDENTIFY HYBRID VEHICLE A/C SYSTEM ELECTRICAL CIRCUITS AND THE SERVICE/SAFETY PRECAUTIONS.</p>

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	<p>13. SLIDES 13-19 EXPLAIN A/C Compressor Diagnosis and Service</p>
	<p><u>DEMONSTRATION: SHOW STUDENTS HOW TO PERFORM THE RADIO POP TRICK.</u></p>
	<p><u>RADIO "POP" TRICK</u></p>
	<p><u>DEMONSTRATION: SHOW A/C COMPRESSOR ELECTROMAGNETIC CLUTCH & DESCRIBE ITS PURPOSE & FUNCTION. SHOW <u>CLUTCH ENGAGING.</u> EXPLAIN HOW DIODE PREVENTS VOLTAGE SPIKE THAT COULD CAUSE DAMAGE TO PCM.</u></p>
	<p>20. SLIDE 20 EXPLAIN Figure 5–18 After removing retaining nut from A/C compressor shaft, a special puller is used to remove the compressor clutch plate (hub).</p> <p>21. SLIDE 21 EXPLAIN Figure 5–19a pulley assembly removed using a special puller on Dodge truck.</p> <p>22. SLIDE 22 EXPLAIN Figure 5–19b The pulley assembly includes the bearing which may or may not be a replaceable part, depending on the compressor.</p>
	<p><u>NATEF MAST TASK A7B1 INSPECT AND REPLACE A/C COMPRESSOR DRIVE BELTS, PULLEYS, AND TENSIONERS; DETERMINE NECESSARY ACTION. P1</u></p>
	<p><u>NATEF MAST TASK A7B2 INSPECT, TEST, SERVICE OR REPLACE A/C COMPRESSOR CLUTCH COMPONENTS AND/OR ASSEMBLY; CHECK COMPRESSOR CLUTCH AIR GAP; ADJUST AS NEEDED. P2</u></p>
	<p><u>NATEF MAST TASK A7B3 REMOVE, INSPECT, AND REINSTALL A/C COMPRESSOR AND MOUNTINGS; DETERMINE RECOMMENDED OIL QUANTITY. P2</u></p>
	<p><u>NATEF MAST TASK A7D2: DIAGNOSE A/C COMPRESSOR CLUTCH CONTROL SYSTEMS; DETERMINE NECESSARY ACTION. P2</u></p>

ICONS	Ch03 A/C Compressors and Service
 	<p>23. SLIDE 23 EXPLAIN A/C Compressor Diagnosis and Service</p> <p>24. SLIDE 24 EXPLAIN Summary</p>