

Light Vehicle Diesel Engines

Chapter 12 Fuel Supply and Low Pressure Fuel Systems

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This Light Vehicle Diesel Engines 1st text provides complete coverage of light duty diesel engine components, operation, and diagnosis. It correlates material to task lists specified by ASE and NATEF and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, and Real World Fixes: www.jameshalderman.com contains Videos, Animations, and Task Sheets for use in the lab and classroom.
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.
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 as listed: <ol style="list-style-type: none"> 1. Prepare for the Light Vehicle Diesel Engine (A9) ASE certification fuel system diagnosis and repair area ("F"). 2. Describe the function of the low-pressure fuel systems. 3. Identify the components in the low-pressure fuel system. 4. Discuss the need for service and repair of the low pressure fuel system. 5. Explain the need for controlling the temperature of the fuel.
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.

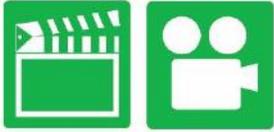
NOTE: This lesson plan is based on the 1st Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

LINK CHP 12 Chapter Images USE BELOW LINK

http://www.jameshalderman.com/books_a9.html

NOTE: You can use Chapter Images or Power Point files: Though out Power Point Presentations, you will find questions and answers on slides that can be used for discussion.

ICONS



CH12 Fuel Supply/Low Pressure Fuel Systems

1. SLIDE 1 CH12 FUEL SUPPLY AND LOW PRESSURE FUEL SYSTEMS

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
@ <http://www.jameshalderman.com/>
WEB SITE IS CONSTANTLY UPDATED

Light Diesel (111 Links)

http://www.jameshalderman.com/books_a9.html

Crossword Puzzle (Microsoft Word) (PDF)

Word Search Puzzle (Microsoft Word) (PDF)

SAFETY Always be very careful when working on a Diesel engine that is running with air intake removed. Because most diesel **ENGINES DO NOT USE** a throttle plate, objects can very easily be sucked into engine, causing serious engine damage. **MOST OEMs offer intake covers.**

DISCUSS FREQUENTLY ASKED QUESTION:
What Are the Pump Nozzle Sizes?

DISCUSSION: CHART 12-1 Fuel pump nozzle size standardized except for use by over-road truck stops where high fuel volumes and speedy refills require larger nozzles compared to passenger vehicle station nozzles.

2. **SLIDE 2 EXPLAIN FIGURE 12-1** fuel tank is used to store the fuel and to allow fuel to recirculate from the return system, and cool after absorbing heat from the high-pressure pump and the injectors

ICONS



CH12 Fuel Supply/Low Pressure Fuel Systems

3. **SLIDE 3 EXPLAIN FIGURE 12–2** jet pump siphons fuel from the opposite side of the saddle tank to ensure the supply pump delivers fuel to the engine from both sides of the tank equally.
4. **SLIDE 4 EXPLAIN 12–4 lift pump** pushes fuel through filtration system to high-pressure pump at correct pressure and with adequate volume
5. **SLIDE 5 EXPLAIN FIGURE 12–5** low-pressure pump can be an in-tank or out-of-tank variety, depending on the system design.
6. **SLIDE 6 EXPLAIN FIGURE 12–6** Many manufacturers recommend that water be drained once a month to ensure there is no damage to the high-pressure fuel system.
7. **SLIDE 7 EXPLAIN FIGURE 12–7** second filter in a dual filter system is located on engine assembly. Both filters are replaced at same time following recommended service procedures.
8. **SLIDE 8 EXPLAIN FIGURE 12–8** fuel heater keeps the fuel from gelling in cold weather
9. **SLIDE 9 EXPLAIN FIGURE 12–9** fuel cooler is used to control density of fuel so that high temperatures do not have a negative effect on engine performance.
10. **SLIDE 10 EXPLAIN FIGURE 12–10** water-in-fuel sensor uses electrical conductivity to sense the water in the fuel. If the conductivity is above a specific level, the warning lamp on the dash is illuminated

DEMONSTRATION: HOW TO CHECK FUEL SYSTEM WATER IN FUEL SENSOR & HEATER USING SCAN TOOL

HANDS-ON TASK: ;STUDENTS CHECK FUEL SYSTEM WATER IN FUEL SENSOR & HEATER USING SCAN TOOL

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	<p>11. SLIDE 11 EXPLAIN FIGURE 12–11 low-pressure fuel system can be tested with a traditional fuel pressure gauge and the required adapters..</p>
	<p>12. SLIDE 12 EXPLAIN FIGURE 12–12 low-pressure pump is being tested for adequate volume.</p>
	<p>13. SLIDE 13 EXPLAIN FIGURE 12–13 return volume from the injectors and the high-pressure pump is being measured.</p> <p><u>DEMONSTRATION: HOW TO CHECK FUEL PRESSURE AND VOLUME</u></p>
	<p><u>HANDS-ON TASK: ;STUDENTS CHECK FUEL PRESSURE AND VOLUME</u></p>