

# Light Vehicle Diesel Engines

## Chapter 16 SERVICE PROCEDURES

### 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: <a href="http://www.jameshalderman.com">www.jameshalderman.com</a> 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"> <li>1. Prepare for the ASE Light Vehicle Diesel Engine (A9) ASE certification test content area "D" (Lubrication and Cooling Systems Diagnosis and Repair).</li> <li>2. Perform the maintenance pre-check on a modern diesel equipped light-duty vehicle.</li> <li>3. Discuss the need to service the intake air system.</li> <li>4. Identify the correct oil and filter for the engine being serviced.</li> <li>5. Discuss the need for servicing the cooling system.</li> <li>6. Explain how to service the fuel system on a modern diesel engine.</li> <li>7. Discuss how to service the diesel exhaust fluid system on an equipped vehicle</li> </ol>
Establish the Mood or Climate	Provide a <b>WELCOME</b> , 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 1<sup>st</sup> Edition Chapter Images found on Jim's web site @ [www.jameshalderman.com](http://www.jameshalderman.com)

**LINK CHP 16 Chapter Images USE BELOW LINK**

[http://www.jameshalderman.com/books\\_a9.html](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	CH16 SERVICE PROCEDURES
	<p><b>1. SLIDE 1 CH16 SERVICE PROCEDURES</b></p> <p>Check for <b>ADDITIONAL VIDEOS &amp; ANIMATIONS</b>  @ <a href="http://www.jameshalderman.com/">http://www.jameshalderman.com/</a>  <b>WEB SITE IS CONSTANTLY UPDATED</b></p> <p><b><u>Light Diesel (111 Links)</u></b></p> <p><a href="http://www.jameshalderman.com/books_a9.html">http://www.jameshalderman.com/books_a9.html</a>  <b>Crossword Puzzle (Microsoft Word) (PDF)</b>  <b>Word Search Puzzle (Microsoft Word) (PDF)</b></p> <p><b><u>SAFETY</u></b> Always be very careful when working on a Diesel engine that is running with air intake removed. Because most diesel <b>ENGINES DO NOT USE</b> a throttle plate, objects can very easily be sucked into engine, causing serious engine damage. <b>MOST OEMs offer intake covers.</b>  <b><u>DISCUSSION: CHART 12-1</u></b></p> <p><b>2. SLIDE 2 EXPLAIN FIGURE 16-1</b> over-full oil dipstick is an indication that system was over-filled on a previous service or something is leaking into crankcase. It is not uncommon for fuel to get past piston rings and contaminate oil. If technician finds this condition, further diagnosis will be necessary.</p>

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	<p>3. <b>SLIDE 3 EXPLAIN FIGURE 16–2</b> presence of DTC may provide insight into how the vehicle is being operated or maintained. The technician can use this data to investigate further or to make specific recommendations about needed service.</p>
	<p>4. <b>SLIDE 4 EXPLAIN FIGURE 16–3</b> air intake restriction gauge allows technician to determine condition of air filter element without opening air filter housing. This will eliminate the possibility of misdiagnosing a dirty element and miss installation of filter element after it is inspected.</p>
	<p><b>EXPLAIN TECH TIP Use Air Filter Gauge as a Guide</b></p>
	<p>5. <b>SLIDE 5 EXPLAIN FIGURE 16–4</b> proper oil must be used when servicing any diesel engine. Engine oil with a rating of CJ-4 meets the service requirements for most late model light-duty diesel engines.</p>
	<p>6. <b>SLIDE 6 EXPLAIN FIGURE 16–5</b> Diesel engines manufactured for use after January 1, 2017, may require the use of diesel motor oil that has a rating of CK-4</p>
	<p><b>EXPLAIN TECH TIP Color of the Coolant</b></p>
	<p>7. <b>SLIDE 7 EXPLAIN FIGURE 16–6</b> Cooling system test strips that are used on diesel engines need to test the level of nitrates, as well as determine the freeze point and the alkalinity of the coolant.</p>
	<p><b><u>DEMONSTRATION: HOW TO CHECK COOANT USING TEST STRIPS</u></b></p>
	<p><b><u>HANDS-ON TASK: STUDENTS CHECK COOANT USING TEST STRIPS</u></b></p>
	<p>8. <b>SLIDE 8 EXPLAIN FIGURE 16–7</b> Many manufacturers recommend that the water be drained every 30 days. When all the water is drained only diesel fuel will be coming out of the drain..</p>
	<p><b><u>DEMONSTRATION: HOW TO DRAIN FUEL FILTER</u></b></p>
	<p><b><u>DEMONSTRATION: HOW TO DRAIN FUEL FILTER</u></b></p>

## ICONS



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### **HANDS-ON TASK: ;STUDENTS DRAIN FUEL FILTER**

- 9. SLIDE 9 EXPLAIN FIGURE 16–8** operator must ensure that only diesel exhaust fluid (DEF) gets into DEF system, and only diesel fuel gets into fuel tank. The presence of DEF in fuel tank or presence of diesel fuel in DEF reservoir can lead to expensive repairs.
- 10. SLIDE 10 EXPLAIN FIGURE 16–9** Crystalized diesel exhaust fluid (DEF) can cause harm to the vehicle and needs to be discarded.