

Light Vehicle Diesel Engines

Chapter 25 FIAT/CHRYSLER DIESEL ENGINE

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. Identify the major engine components of the 3.0-liter VM V-6 diesel engines. • 2. Explain the cooling system, air intake system, and the lubrication system service on the 3.0-liter VM V-6 diesel engines. • 3. Explain unique features of the 3.0-liter VM V-6 diesel upper engine, lower engine, and the engine timing system. 4. Perform component identification; verify the location and function of the major engine inputs and outputs of the VM 3.0-liter V-6 diesel engine. 5. Explain the location, function, and diagnosis of the low-pressure fuel system. 6. Identify the components, location, and function of the high-pressure fuel system. 7. Identify the components, function and operation of the exhaust aftertreatment system
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 24 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	CH24 FIAT/CHRYSLER DIESEL ENGINE
         	<p>1. SLIDE 1 CH25 FIAT/CHRYSLER DIESEL ENGINE</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <p><u>Light Diesel (111 Links)</u></p> <p>http://www.jameshalderman.com/books_a9.html Crossword Puzzle (Microsoft Word) (PDF) Word Search Puzzle (Microsoft Word) (PDF)</p> <p><u>SAFETY</u> 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.</p> <p>2. SLIDE 2 EXPLAIN FIGURE 25-1 VM Diesel 3.0-liter V-6 engine</p> <p><u>DISCUSSION:</u> CHART 25-1 specifications for 3.0-liter VM diesel engine.</p> <p><u>DEMONSTRATION:</u> EITHER HAVE AN ENGINE DISASSEMBLED OR TAKE ONE APART IN YOUR PRESENTATION</p> <p><u>HANDS-ON TASK:</u> OPTION IS TO HAVE STUDENTS DISASSEMBLE AN ENGINE</p>

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      	<p>3. SLIDE 3 EXPLAIN FIGURE 25–2 identification tag on lower right side of engine provides data on engine build</p> <p>4. SLIDE 4 EXPLAIN FIGURE 25–3 Engine oil specified in VM 3.0-liter engine per TSB #-18-078-16.</p> <p><u>DISCUSSION:</u></p> <p>5. SLIDE 5 EXPLAIN FIGURE 25–4 engine oil filter is a cartridge type to reduce landfill waste.</p> <p>DISCUSS FREQUENTLY ASKED QUESTION: Why Does This Engine Use an Oil Cooler?</p> <p>6. SLIDE 6 EXPLAIN FIGURE 25–5 Mopar coolant meets material standard MS 12106.</p> <p>7. SLIDE 7 EXPLAIN FIGURE 25–6 bedplate is attached to block that adds strength and prevents torsional twist.</p> <p>8. SLIDE 8 EXPLAIN FIGURE 25–7 timing chains move along two guides and are hydraulically tensioned.</p> <p>9. SLIDE 9 EXPLAIN FIGURE 25–8 variable geometry turbocharger provides the needed boost under all operating conditions</p> <p>POINT OUT TO THE STUDENTS THAT THIS IS AN INTERFERENCE FIT ENGINE & VALVE TIMING IS CRITICAL</p> <p>DISCUSS FREQUENTLY ASKED QUESTION: When Does the Water Need to be Drained?</p>

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	<p>10. SLIDE 10 EXPLAIN FIGURE 25–9 saddle tank configuration used on the Grand Cherokee uses a jet pump and delivery pump.</p>
	<p>11. SLIDE 11 EXPLAIN FIGURE 25–10 filter assembly contains the filter, water separator, water drain, and fuel heater.</p>
	<p><u>DEMONSTRATION: HOW TO DRAIN THE FUEL FILTER</u></p>
	<p><u>HANDS-ON TASK: HAVE STUDENTS DRAIN THE FUEL FILTER</u></p>
	<p>12. SLIDE 12 EXPLAIN FIGURE 25–11 high-pressure pump is a two-cylinder design and has separate outlet for each side of motor.</p>
	<p><u>SAFETY HIGH-PRESSURE FUEL LINES DELIVER FUEL UNDER EXTREME PRESSURES. USE EXTREME CAUTION WHEN LOOKING FOR LEAKS AS FUEL UNDER PRESSURE MAY PENETRATE SKIN CAUSING INJURY OR DEATH</u></p>
	<p>13. SLIDE 13 EXPLAIN FIGURE 25–12 injector is solenoid controlled and utilizes a control chamber to quickly open and close the nozzle.</p>
	<p>14. SLIDE 14 EXPLAIN FIGURE 25–13 calibration code for each injector must be programmed into PCM to ensure precise amount of fuel is delivered.</p>
	<p><u>DEMONSTRATION: LOCATING INJECTOR calibration code</u></p>
	<p><u>HANDS-ON TASK: HAVE STUDENTS LOCATE INJECTOR CALIBRATION CODE AND COMPARE CODES ON SCAN TOOL WITH THOSE ON THE ENGINE.</u></p>

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	<p><u>DEMONSTRATION:</u> HOW TO TIME THE HPFP TO ENGINE</p>
	<p>HANDS-ON TASK: HAVE STUDENTS TIME THE HPFP TO ENGINE</p>
	<p><u>DEMONSTRATION:</u> HOW TO REPLACE THE FUEL FILTER</p>
	<p>HANDS-ON TASK: HAVE STUDENTS REPLACE THE FUEL FILTER</p>
	<p>15. SLIDE 15 EXPLAIN FIGURE 25–14 crankshaft position sensor is mounted on the bedplate behind the flywheel.</p>
	<p>16. SLIDE 16 EXPLAIN FIGURE 25–15 camshaft position sensor is mounted on right side of timing cover and is triggered by exhaust camshaft.</p>
	<p><u>DEMONSTRATION:</u> POINT OUT ALL INPUT SENSORS & OUTPUT ACTUATORS ON ENGINE</p>
	<p><u>DEMONSTRATION:</u> HOW the FUEL INJECTORS OPERATE, USE SCAN TOOL TO DEMO OPERATION USING PARAMETERS</p>
	<p><u>DEMONSTRATION:</u> IF YOU HAVE TRAINER USE IT TO EXPLAIN ECM/PCM OPERATION. IF NOT USE THE SCAN TOOL & SHOW INPUTS PROVIDING DATA TO COMPUTER</p>
	<p>17. SLIDE 17 EXPLAIN FIGURE 25–16 boost pressure sensor is mounted on top of intake manifold and it allows PCM to monitor intake air pressure.</p>
	<p>18. SLIDE 18 EXPLAIN FIGURE 25–17 coolant temperature sensor is mounted on front of engine below upper radiator hose, and provides engine temperature data needed to calculate fuel delivery and target idle.</p>

ICONS**CH24 FIAT/CHRYSLER DIESEL ENGINE****EXPLAIN TECH TIP “Check for Soot”**

19. **SLIDE 19 EXPLAIN FIGURE 25–18** mass air flow sensor provides PCM with air density information needed to calculate proper EGR flow.

20. **SLIDE 20 EXPLAIN FIGURE 25–19** wide band O₂ sensor is used to calculate EGR flow in order to minimize NO_x emissions.

EXPLAIN TECH TIP Do Not Test Glow Plugs with 12 Volts

21. **SLIDE 21 EXPLAIN FIGURE 25–20** EGR valve is mounted on end of EGR cooler. Together they reduce level of NO_x emissions by controlling flow and temperature of EGR gasses.

22. **SLIDE 22 EXPLAIN FIGURE 25–21** air flow control valve creates negative intake air pressure that increases flow of EGR gasses.

23. **SLIDE 23 EXPLAIN FIGURE 25–22** aftertreatment system is designed to reduce tailpipe emissions to meet current model year requirements.