

Automotive Technology 6th Edition

Chapter 38 ENGINE INSTALLATION & BREAK-IN

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This Automotive Technology 6th text provides complete coverage of automotive components, operation, design, and troubleshooting. It correlates material to task lists specified by ASE and ASEEducation (NATEF) and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, Case Studies, Videos, Animations, and ASEEducation (NATEF) Task Sheets.
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 the chapter learning objectives to the students as listed: <ol style="list-style-type: none"> 1. Discuss the pre-installation checklist. 2. Explain the procedure for transmission installation. 3. Explain the process of dressing the engine and engine installation. 4. Explain engine start and discuss the break-in precautions of an overhauled engine.
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.

NOTE: This lesson plan is based on the 6th Edition Chapter Images found on Jim's web site @

www.jameshalderman.com

DOWNLOAD Chapter 38 Chapter Images: From

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

NOTE: You can use Chapter Images or possibly Power Point files:

ICONS

Ch38 Installation & Start-up

1. SLIDE 1 CH38 ENGINE INSTALLATION & BREAK-IN

DISCUSSION: Ask students to discuss parts that should already have been replaced when installing an engine. Some examples are spark plugs, gaskets, and spark plug wires.

Check for **ADDITIONAL VIDEOS & ANIMATIONS** @
<http://www.jameshalderman.com/>

WEB SITE IS CONSTANTLY UPDATED

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

DOWNLOAD

Crossword Puzzle (Microsoft Word) (PDF)

Word Search Puzzle (Microsoft Word) (PDF)

ENGINE INSTALLATION



DISCUSS FREQUENTLY ASKED QUESTION: What Is Break-In Engine Oil? Many years ago, vehicle manufacturers used straight weight oil, such as SAE 30 nondetergent engine oil, as break-in oil. Today, the engine oil recommended for break-in (running in) is the same type of oil that is recommended for use in the engine. No special break-in oil is recommended or used by the factory in new vehicles. Always use the specified viscosity oil as recommended by the OEM

DEMONSTRATION: Show how to inspect and find damaged or worn parts before an engine is to be installed. Examples include cracked or damaged hoses, damaged core plugs (freeze plugs), and other components.

HANDS-ON TASK: Install some damaged or worn parts on an engine. Have students inspect engine to see if they can properly locate & identify bad parts.

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3. SLIDE 3 **EXPLAIN** Figure 38-2 Bell housing alignment dowel pins are used to ensure proper alignment between block and transmission.

Many parts suppliers have clutch kits that include a pressure plate, a disc, & related hardware. Do not forget that machining the flywheel is an important step.

DISCUSSION: Have students discuss other tips they could use to help install an engine.



SAFETY weight of the engine & transmission can exceed 1,000 pounds. Never let the assembly rest on any part of the vehicle that could be damaged, such as a fender, radiator, or other components. Never go under the engine while it is being supported with just the hoist.

4. SLIDE 4 **EXPLAIN** Figure 38-3 Headless long bolts can be used to help install a transmission to the engine.
5. SLIDE 5 **EXPLAIN** Figure 38-4 The internal splines inside the torque converter must be properly aligned with all of the splines of the automatic transmission.

When installing automatic transmission, make sure that torque converter is properly seated in the front pump. If engine is started & converter is not seated properly, it could damage pump and torque converter.

6. SLIDE 6 **EXPLAIN** Figure 38-5 It is often easier to install all of the accessory drive belts before the engine is installed in the vehicle.
7. SLIDE 7 **EXPLAIN** Figure 38-6 fixture installed that is used as a place to attach the hosting chains.

DEMONSTRATION: Show difference between good engine coolant & bad engine coolant. Have containers of both on hand to show them difference. With an installed engine, new coolant should always be used.

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Some engines may need to be cranked longer because they use hydraulic lifters that need to be pressurized before they properly open the valves.

8. **SLIDE 8 EXPLAIN** Figure 38-7 Even though the dash gauge may show normal operating temperature, a scan tool or an infrared pyrometer can also be used to verify proper coolant temperature.

DISCUSSION: Ask students to discuss the role of computers in engine replacement in a modern vehicle.

DEMONSTRATION: Using a factory scan tool, show students how to program an Engine Computer Module. It may be necessary to do this when installing an engine so the computer can operate properly.

ON-VEHICLE ASE EDUCATION TASK Remove and install engine



Education Foundation

DEMONSTRATION: Show students how to properly run an OBD-II drive cycle using a scan tool. If the vehicle does not pass, the customer cannot get an emissions sticker in most states.