


Automotive Engines Theory and Servicing
Ninth Edition

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Theory and Servicing
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Chapter 30
Engine Blocks



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OBJECTIVES

30.1 Explain the construction of engine blocks.
30.2 Explain the procedure for engine block service.
30.3 Explain block preparation for assembly.

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ENGINE BLOCKS (1 OF 2)

- The engine block, which is the supporting structure for the entire engine, is made from one of the following:
 - Gray cast iron
 - Cast aluminum
 - Die-cast aluminum alloy
- Block Manufacturing

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ENGINE BLOCKS (2 OF 2)

- Aluminum Blocks
- Bedplate Design Blocks
- Casting Numbers
- Block Deck
- Cooling Passages
- Lubricating Passages
- Main Bearing Caps



FIGURE 30-2 An expansion (core) plug is used to block the opening in the cylinder head or block the holes where the core sand was removed after the part was cast.

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ENGINE BLOCK SERVICE (1 OF 3)

- Procedures
 - All parts of the block must be of the correct size and they must be aligned
 - The parts must also have the proper finishes if the engine is to function dependably for a normal service life.

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ENGINE BLOCK SERVICE (2 OF 3)

- Engine blueprinting is the reconditioning of all the critical surfaces and dimensions so that the block is actually like new.
- After a thorough cleaning, the block should be inspected for cracks or other flaws before machine work begins.

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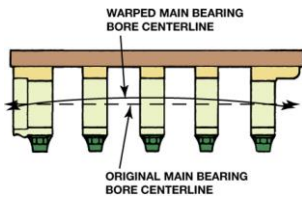
ENGINE BLOCK SERVICE (3 OF 3)

- After the block has been cleaned and cracked checked, the block should be prepared in the following sequence.
 - Operation 1 Main bearing housing bore alignment, often called "align boring" (or honing)
 - Operation 2 Machining of the block deck surface parallel to the crankshaft
 - Operation 3 Cylinder boring and honing

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FIGURE 30-16 The main bearing bores of a warped block usually bend into a bowed shape. The greatest distortion is in the center bores.



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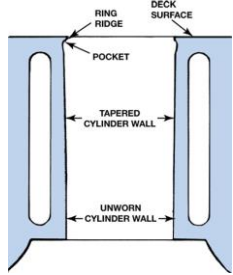
FIGURE 30-21 Grinding the deck surface of the block.



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FIGURE 30–22 Cylinders wear in a taper, with most of the wear occurring at the top of the cylinder where the greatest amount of heat and pressure are created. The ridge is formed because the very top part of the cylinder is not contacted by the rings.



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BLOCK PREPARATION FOR ASSEMBLY (1 OF 2)

- Block Cleaning
 - Use a sandpaper cone to chamfer the top edge of the cylinder.

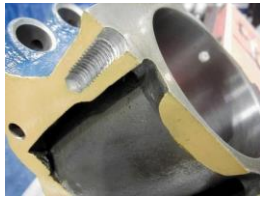


FIGURE 30–34 Notice on this cutaway engine block that some of the head bolt holes do not extend too far into the block and dead end. Debris can accumulate at the bottom of these holes and it must be cleaned out before final assembly.

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BLOCK PREPARATION FOR ASSEMBLY (2 OF 2)

- Block Detailing
 - All oil passages (galleries) should be cleaned
 - All tapped holes should have the sharp edges at the top of the holes removed
 - Coat the newly cleaned block with fogging oil

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FIGURE 30–35 A tread chaser or bottoming tap should be used in all threaded holes before assembling the engine.



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SUMMARY (1 OF 2)

- Engine blocks are either cast iron or aluminum.
- Cores are used inside a mold to form water jackets and cylinder bores.
- The block deck is the surface to which the cylinder head attaches.

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SUMMARY (2 OF 2)

- The cylinder should be bored and/or honed to match the size of the pistons to be used.
- All bolt holes should be chamfered and cleaned with a thread chaser before assembly.

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