Modern Automotive Technology Chapter 14

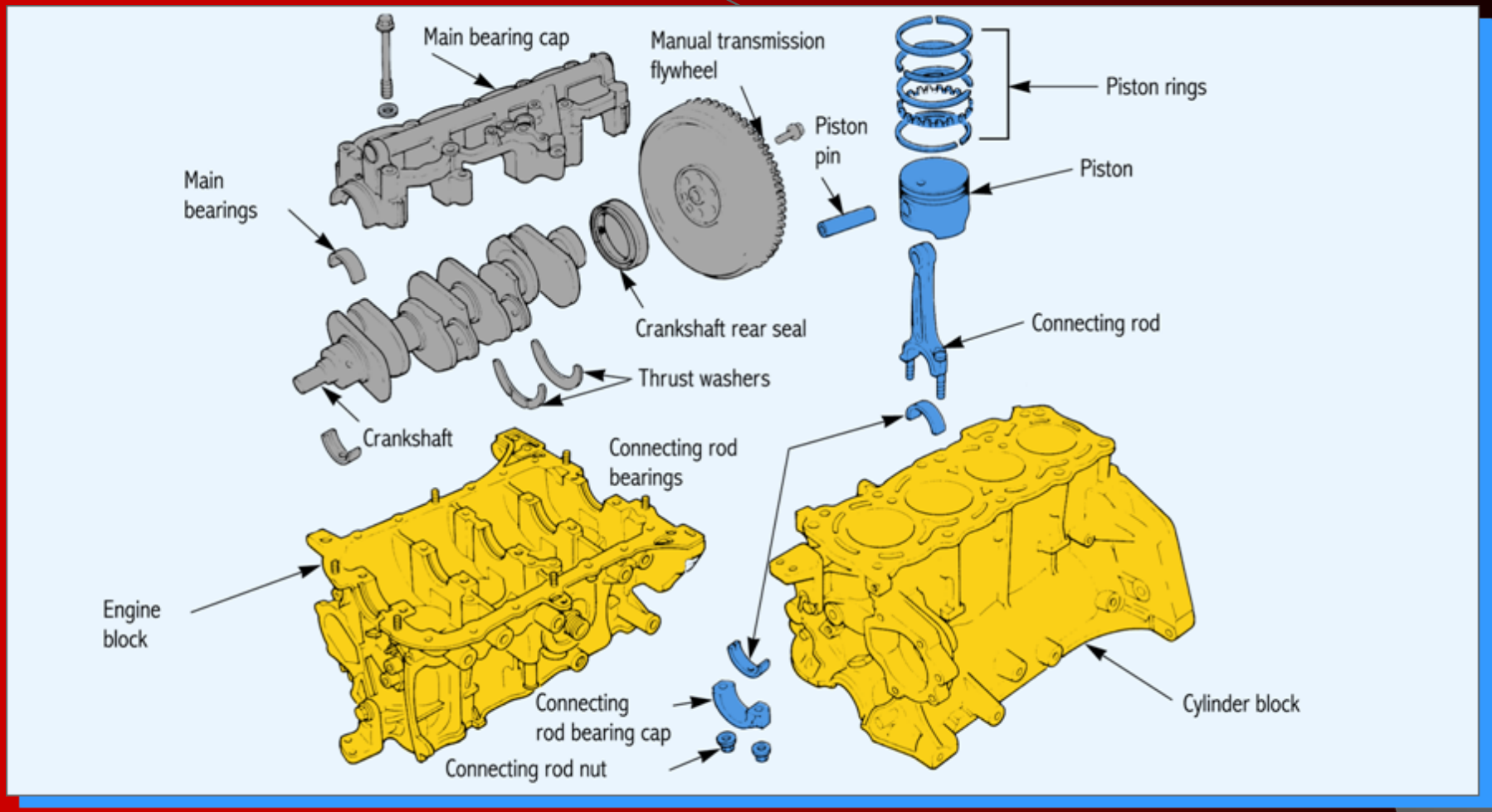
Engine Bottom End

North Montco Technical Career Center

Learning Objectives

- Compare the construction of different types of cylinder blocks.
- Explain how piston construction affects engine operation.
- Describe piston ring variations.
- Explain the construction of engine bearings.
- Compare design variations of different engine bottom end components.
- Explain safe practices when working with engine bottom end components.

Engine Bottom End



Includes the block, crankshaft, connecting rods, and piston assemblies

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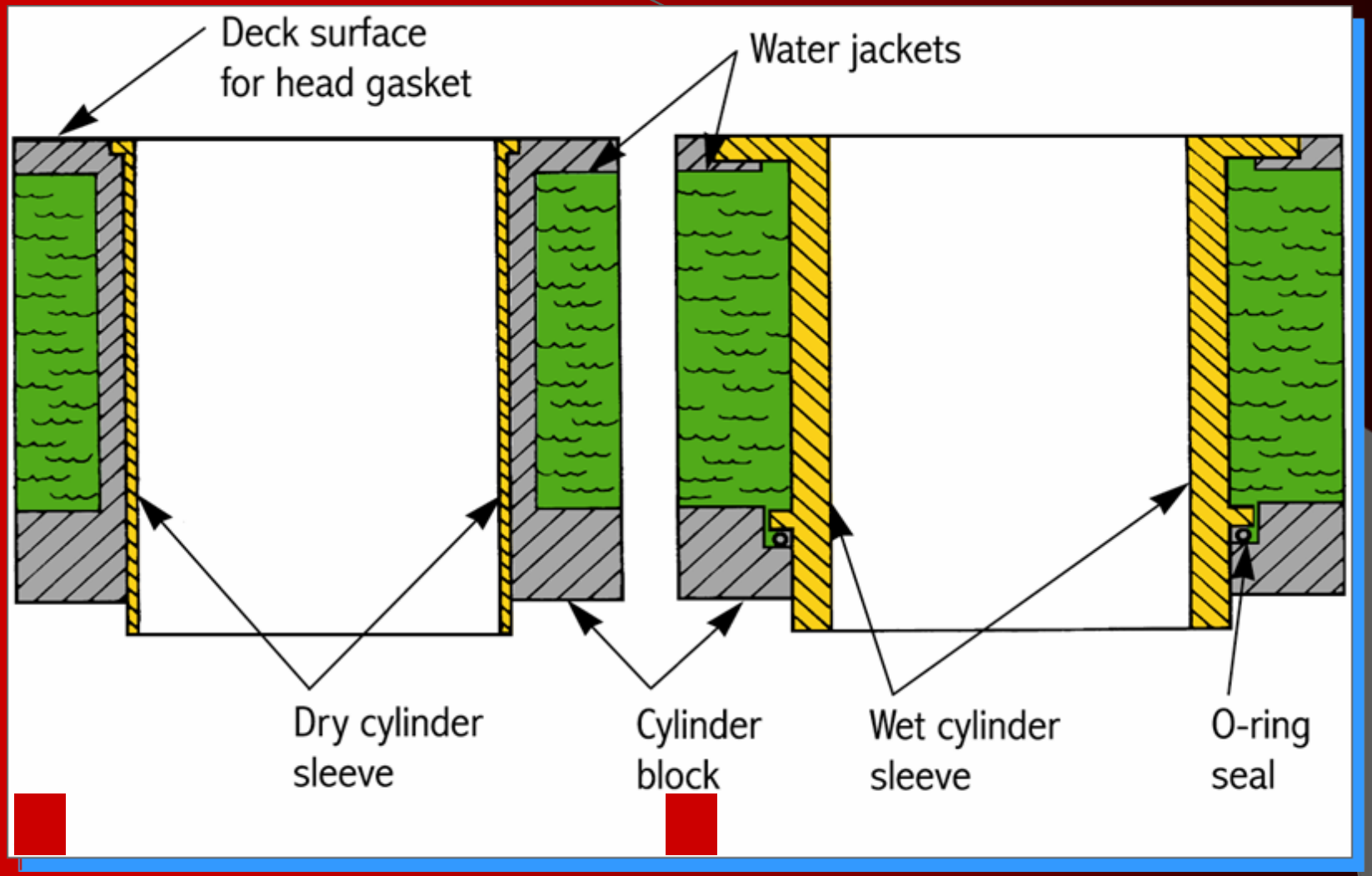
1. The metal, pipe-shaped inserts that fit into the cylinder block are known as the CYLINDER SLEEVES.

2. Like cam grinding, PISTON TAPER is normally used to maintain the correct piston-to-cylinder clearance.

Cylinder Sleeves

- There two basic types of sleeves:
  - dry sleeves
  - wet sleeves

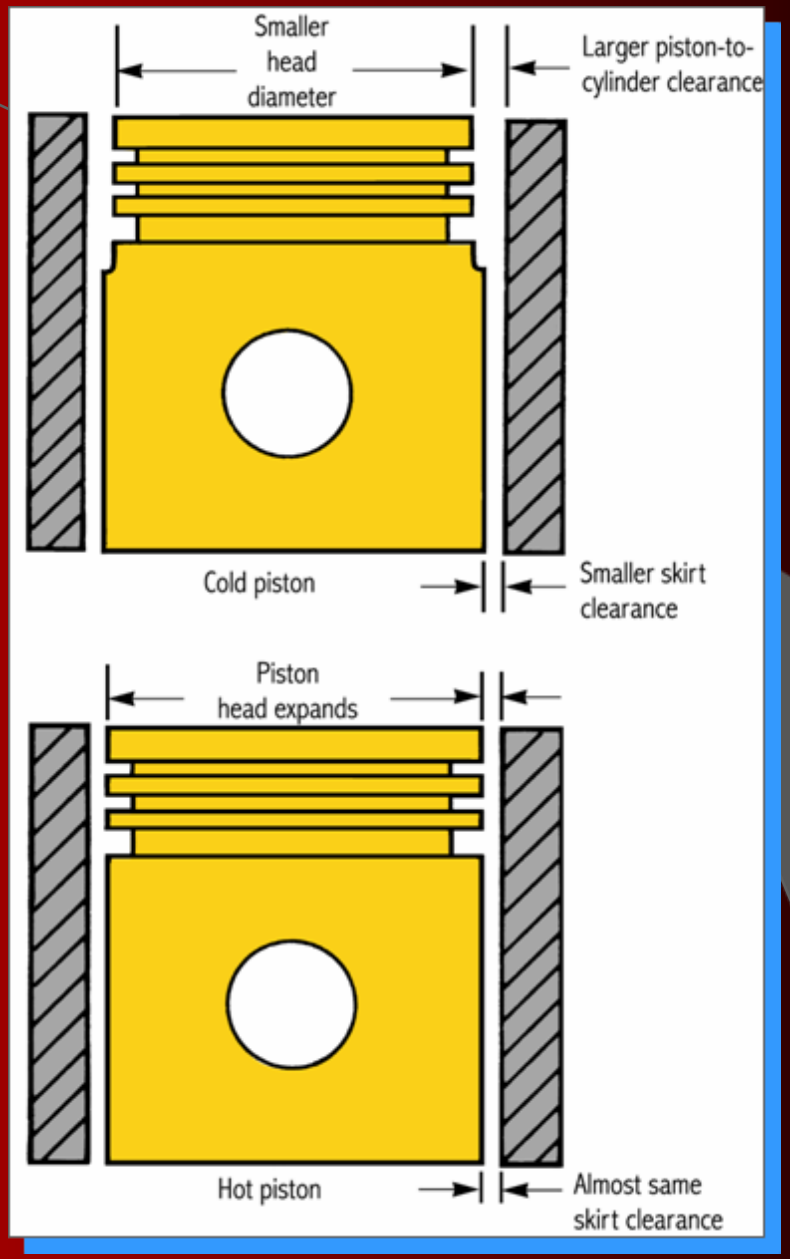
Sleeve Installations



Dry sleeve

Wet sleeve

Piston Taper



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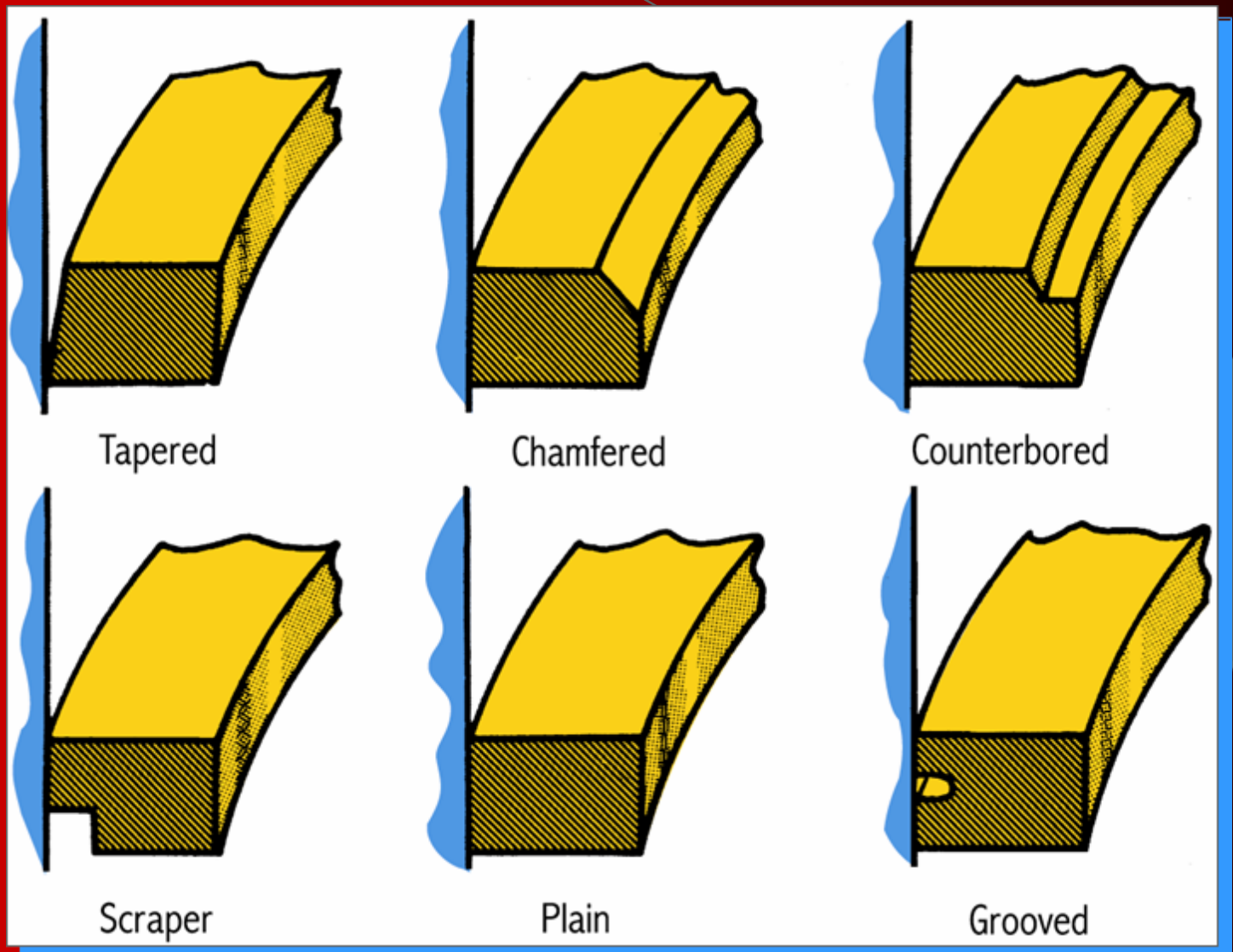
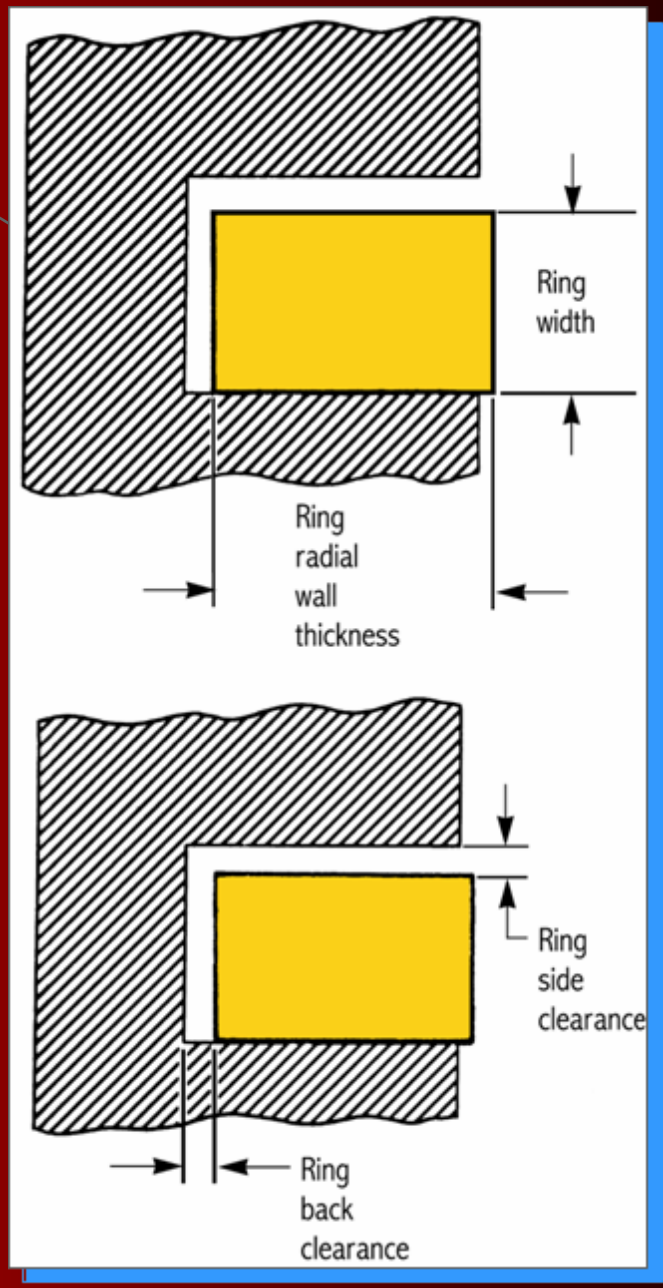
3. COMMPRESSION RINGS prevent pressure leakage into the crankcase and wipe some of the oil from the cylinder walls.

4. Located on the head of the piston, the PISTON NOTCH is frequently used to indicate piston pin offset.

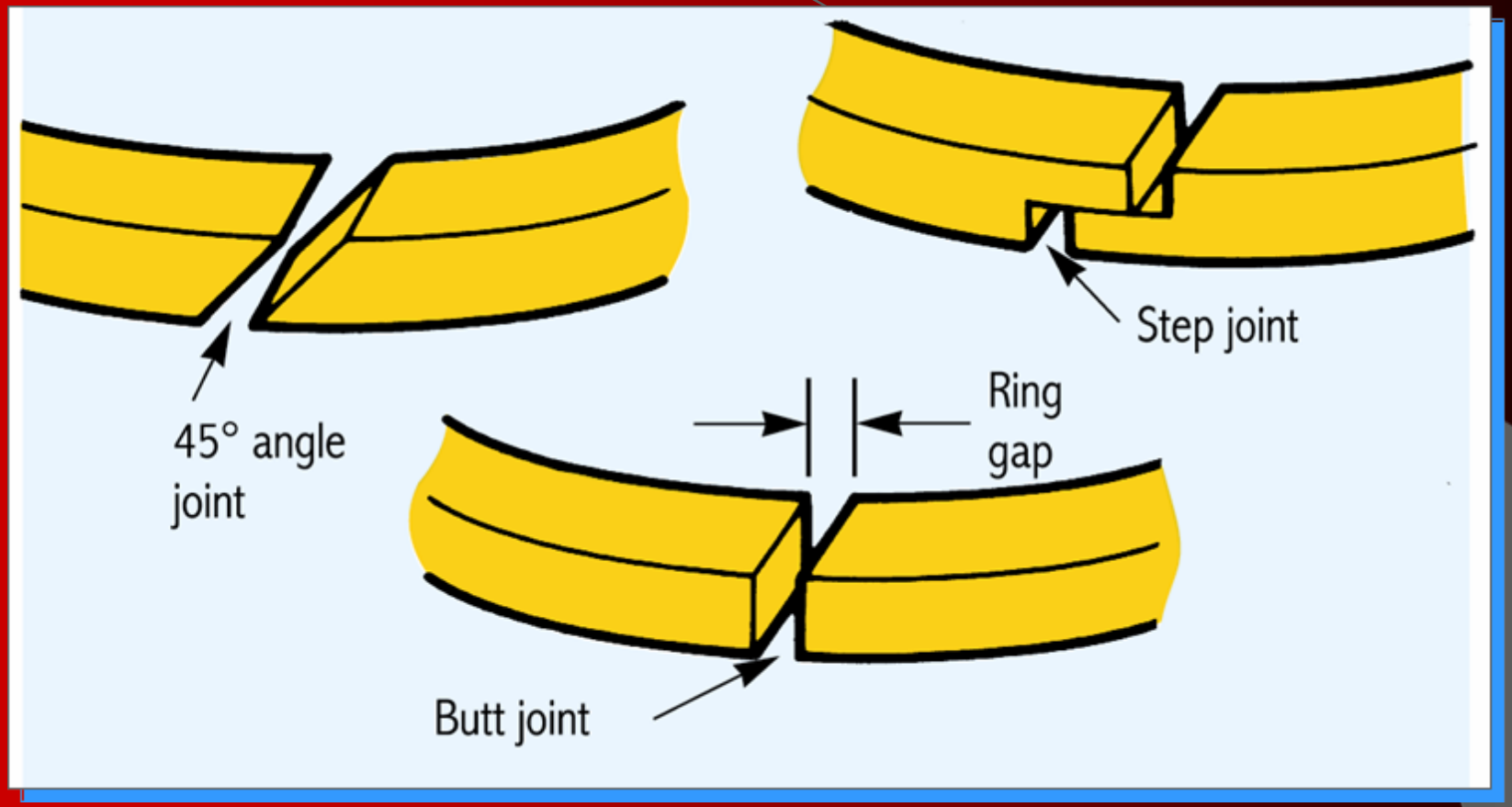
Compression Rings



Piston Ring Dimensions



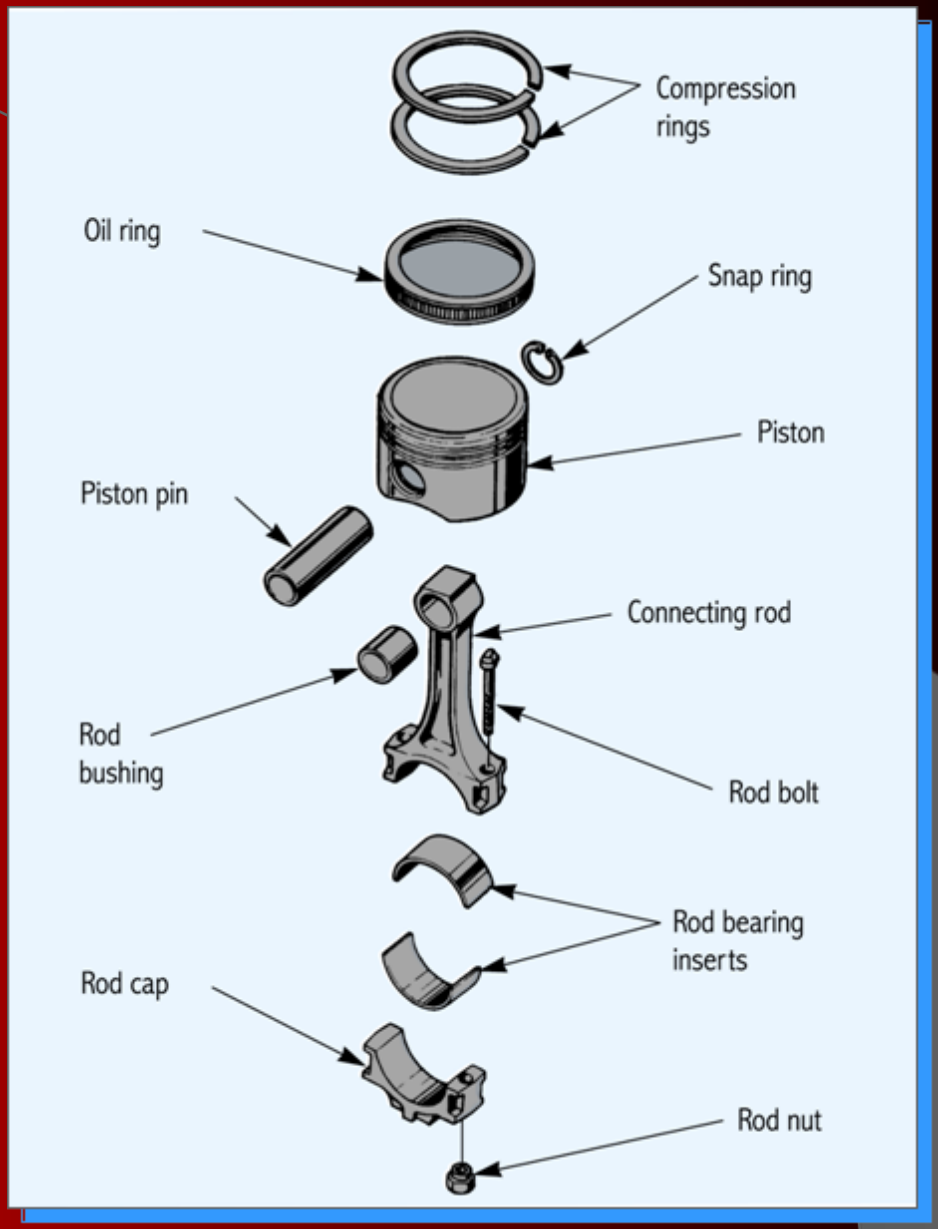
Piston Ring Gap



Most piston rings use a butt joint

Piston Assembly

This piston has a full-floating piston pin



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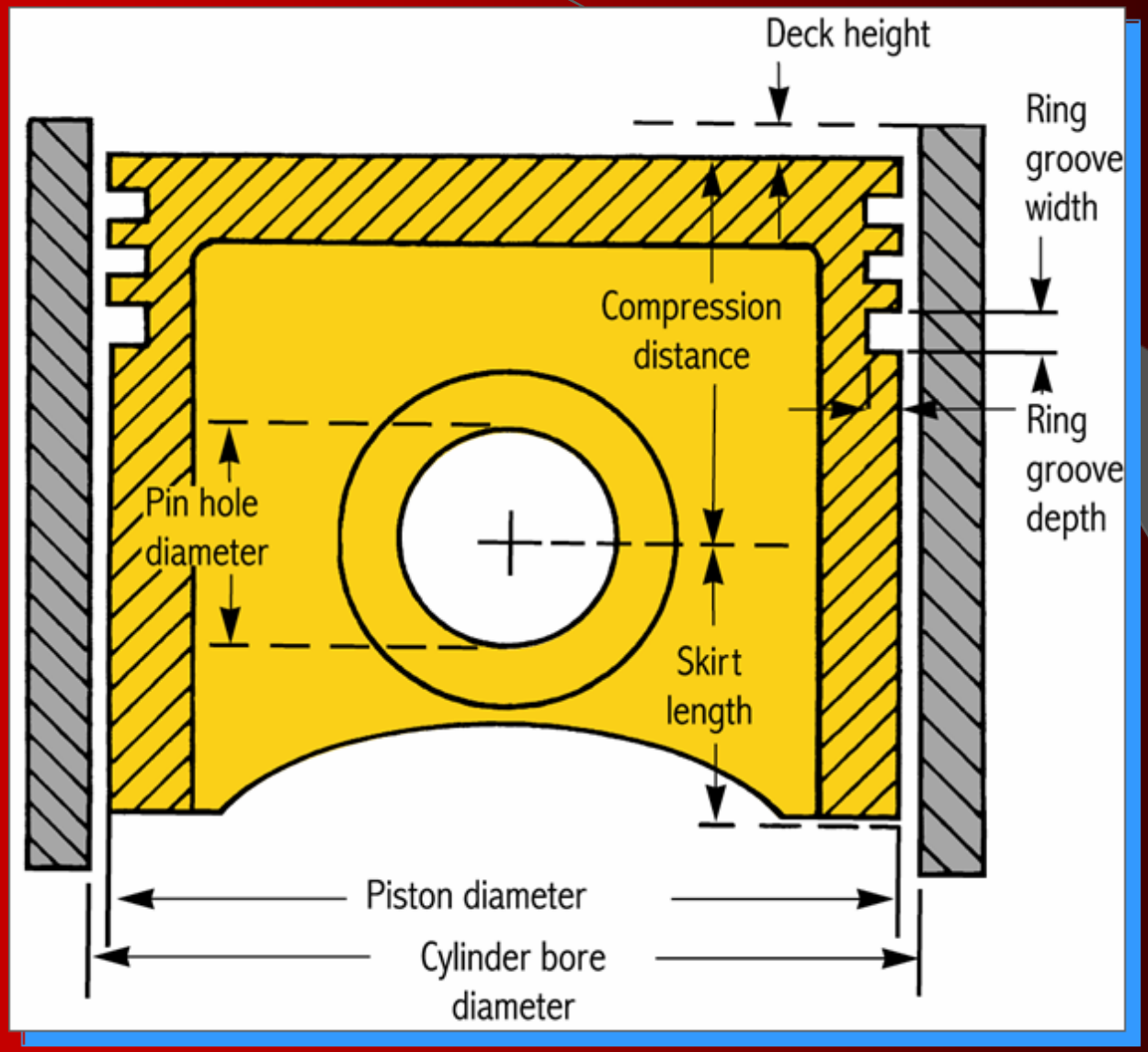
5. When engine parts are chosen and installed in a certain position to improve fit or clearance between parts, this is known as SELECT FIT.

6. THRUST WASHERS are sometimes used to limit crank end play.

Piston Dimensions

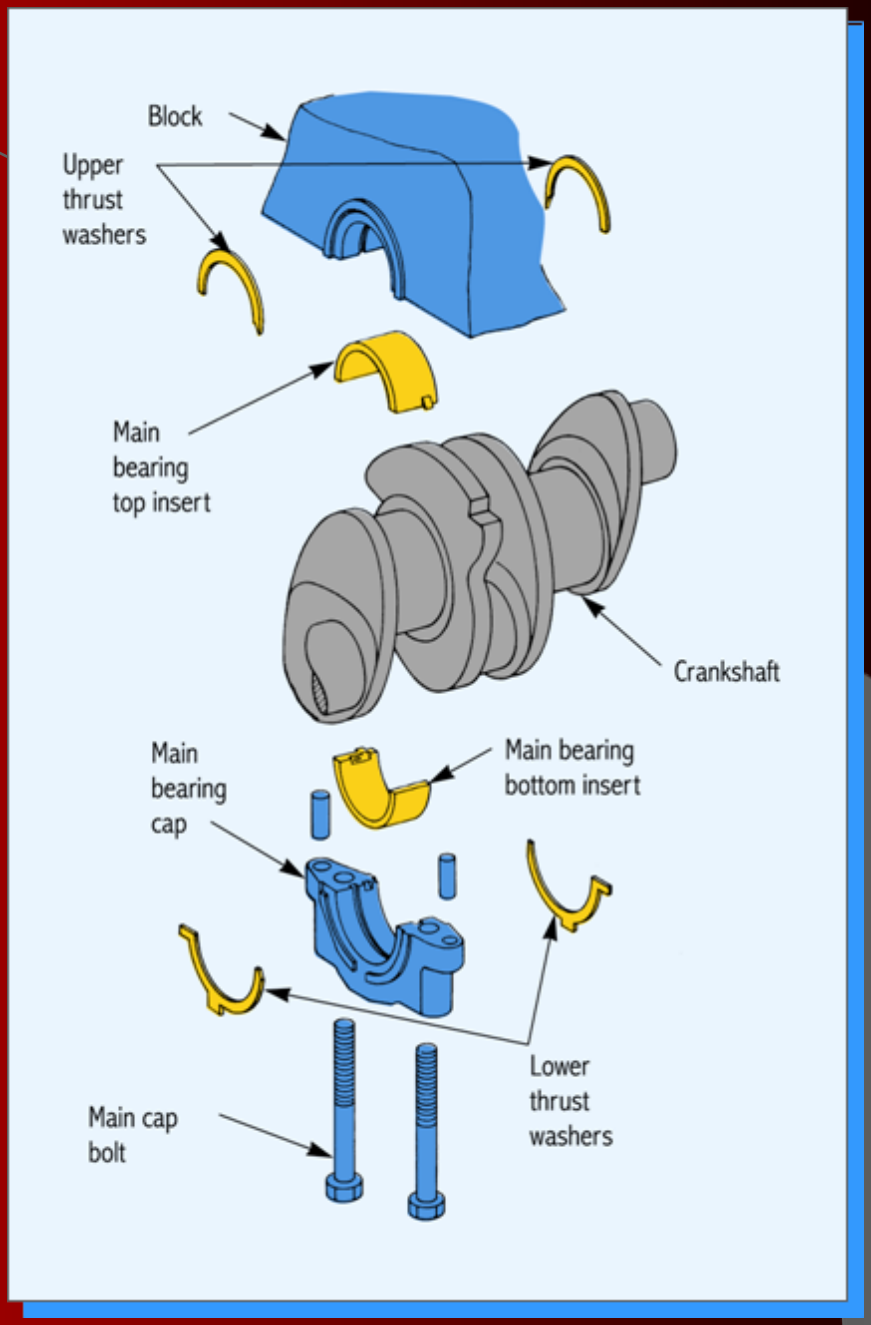


Main Thrust Bearing and Washers

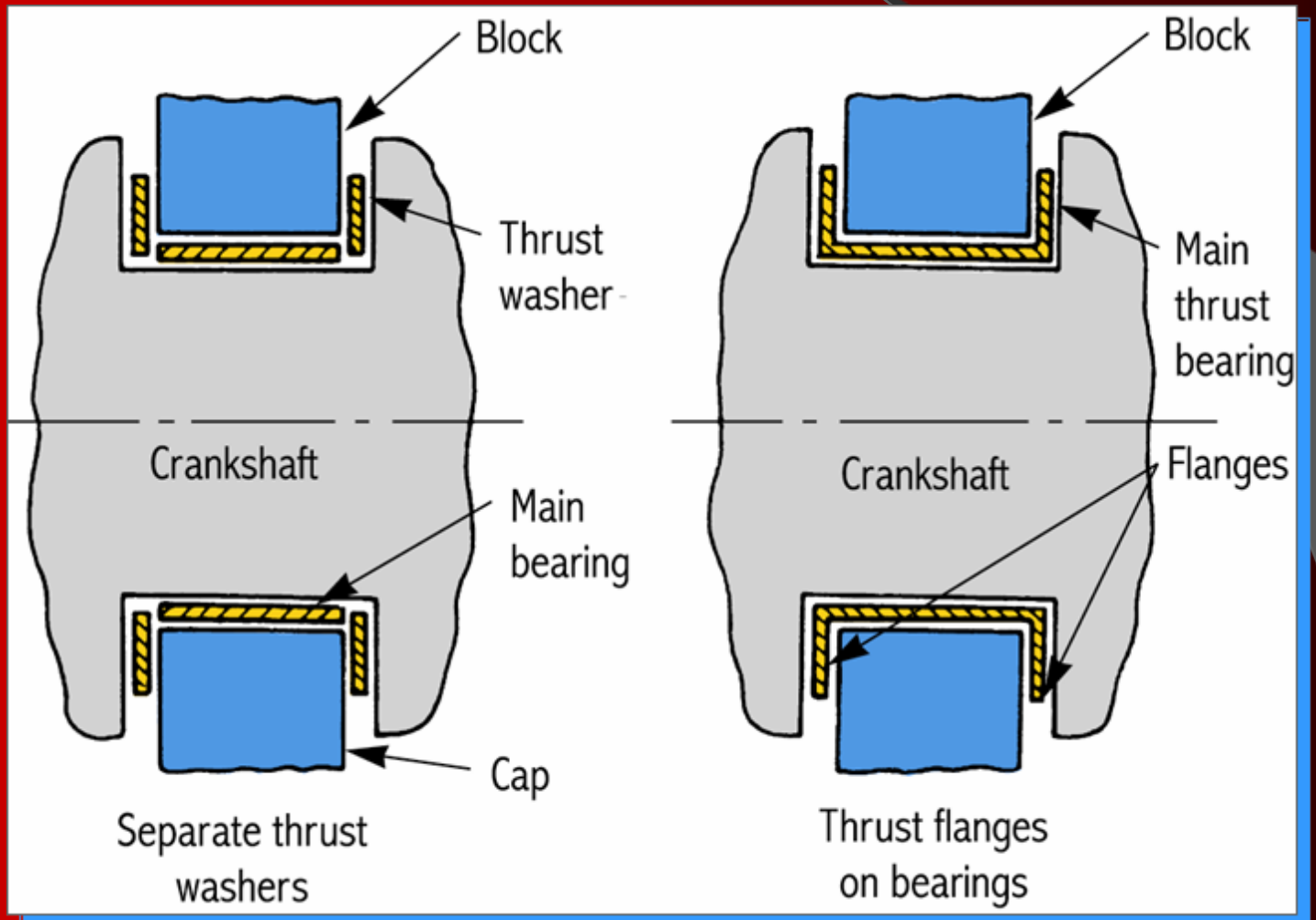
- Main thrust bearing
  - limits crankshaft end play
  - thrust flanges are formed on the main bearing sides, almost touching the thrust surfaces machined on the crankshaft
- Thrust washers
  - used instead of a thrust bearing to limit crank end play

Thrust Washers

Washers slide into place between the crankshaft and block



Main Thrust Bearing and Washers



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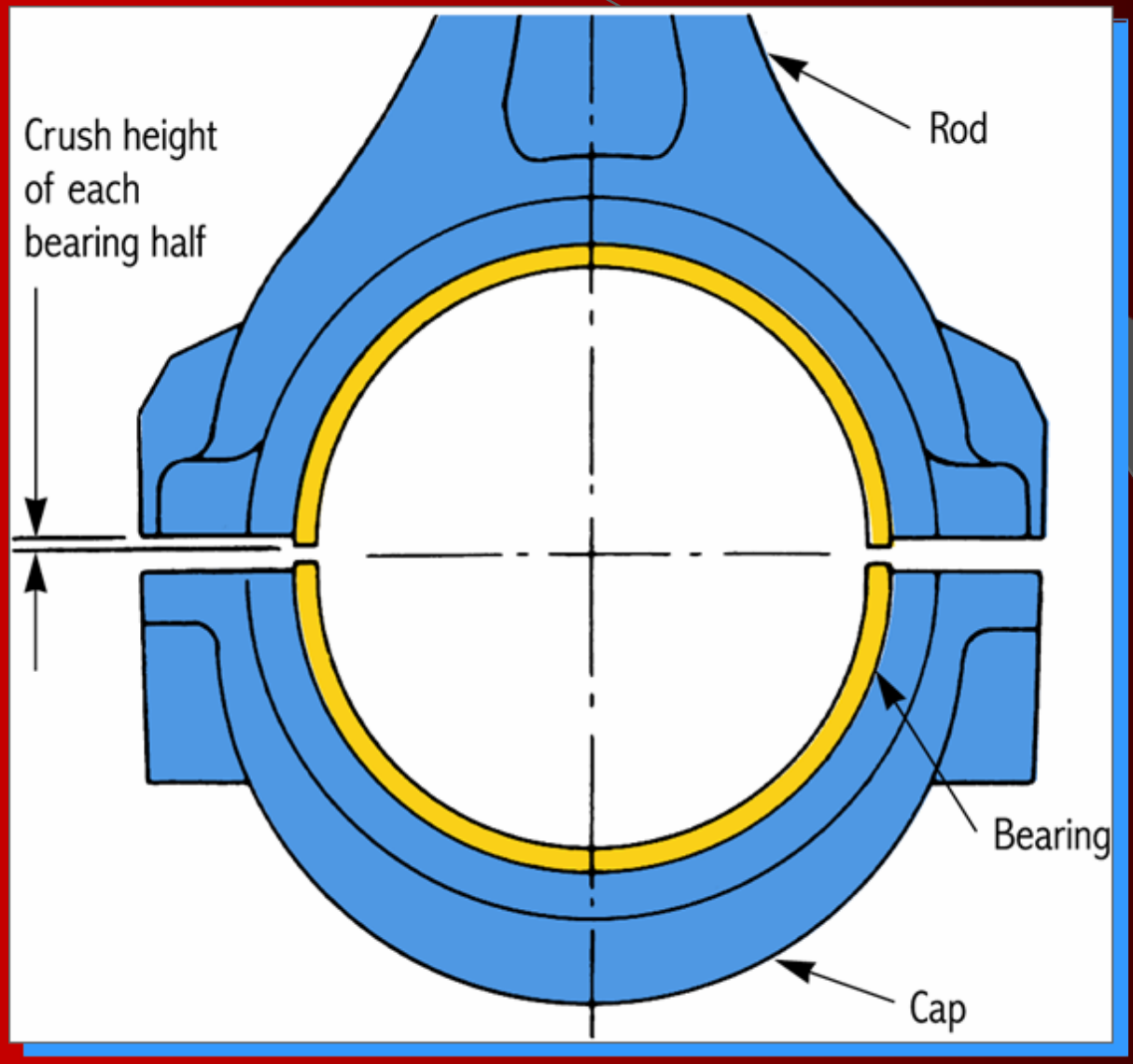
7. BEARING CRUSH helps prevent a bearing from spinning inside its bore during engine operation.

8. Rail-spacer and one-piece are two types of OIL RINGS.

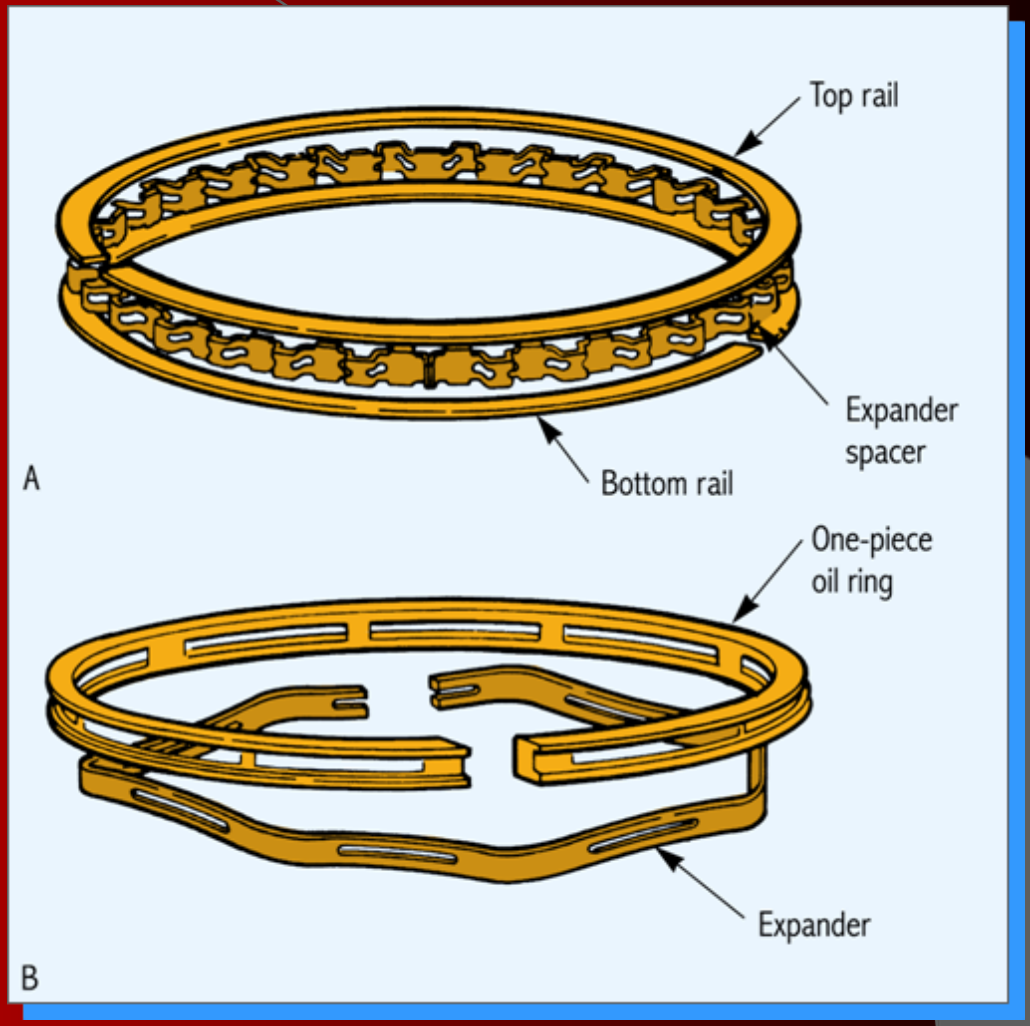
Bearing Crush



Oil Rings

A. Three-piece ring (most common)

B. One-piece ring made from cast iron



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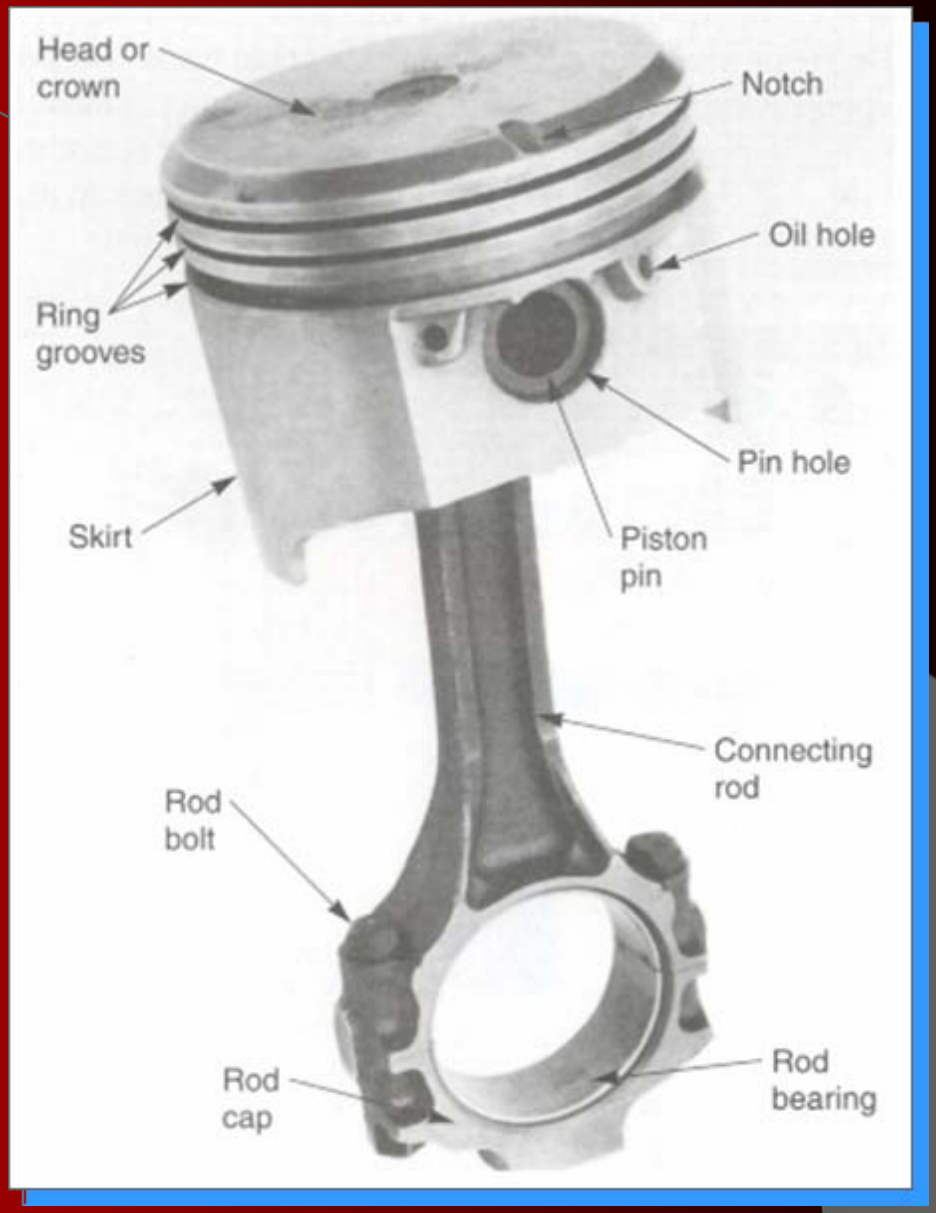
9. VALVE RELIEFS are small indentations either cast or machined in the piston crown.

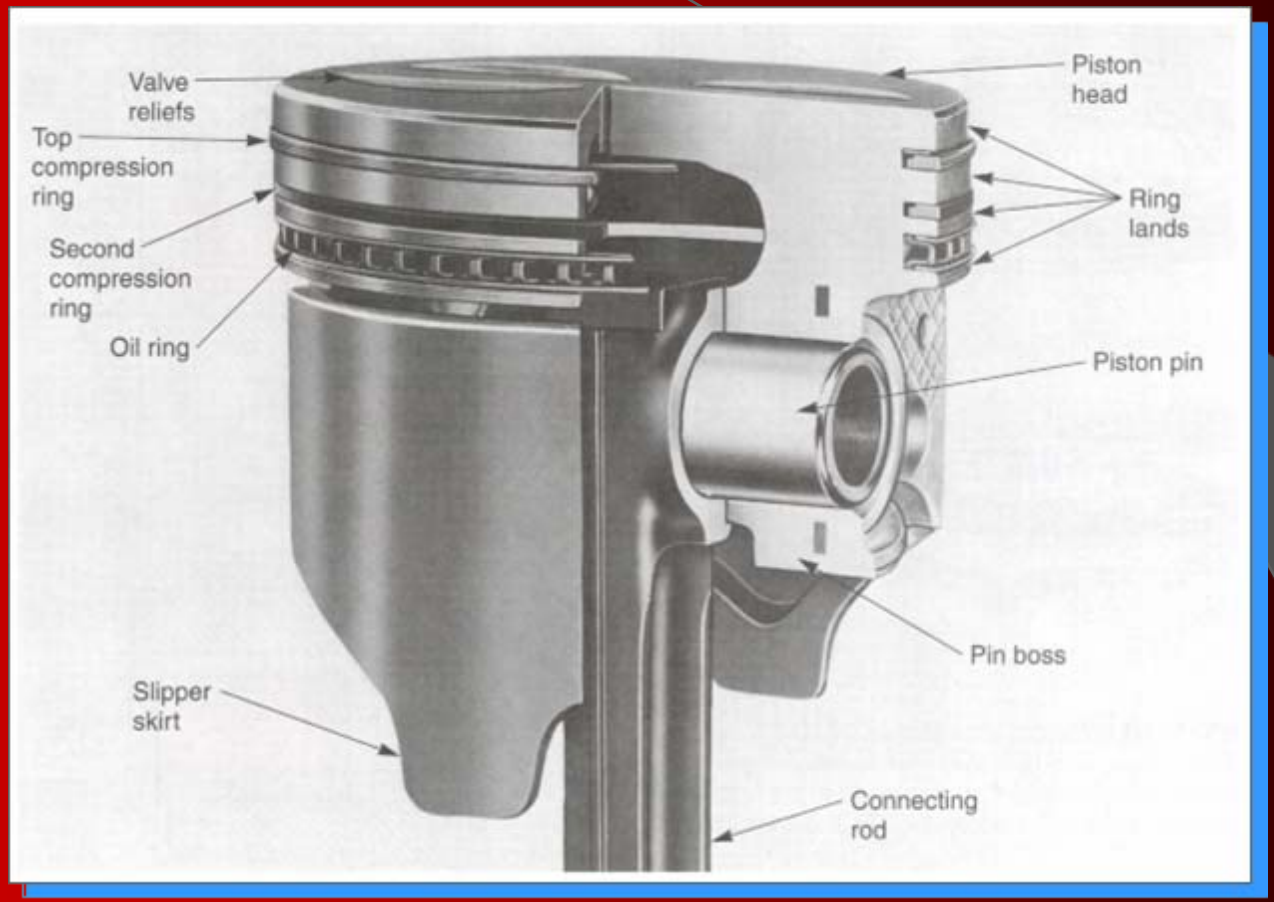
10. When the portion below the piston pin ends are removed, a SLIPPER SKIRT is produced.

Piston Assembly

Piston notch indicates the front of the piston



Slipper Skirt Piston



Valve reliefs provide piston-to-valve clearance

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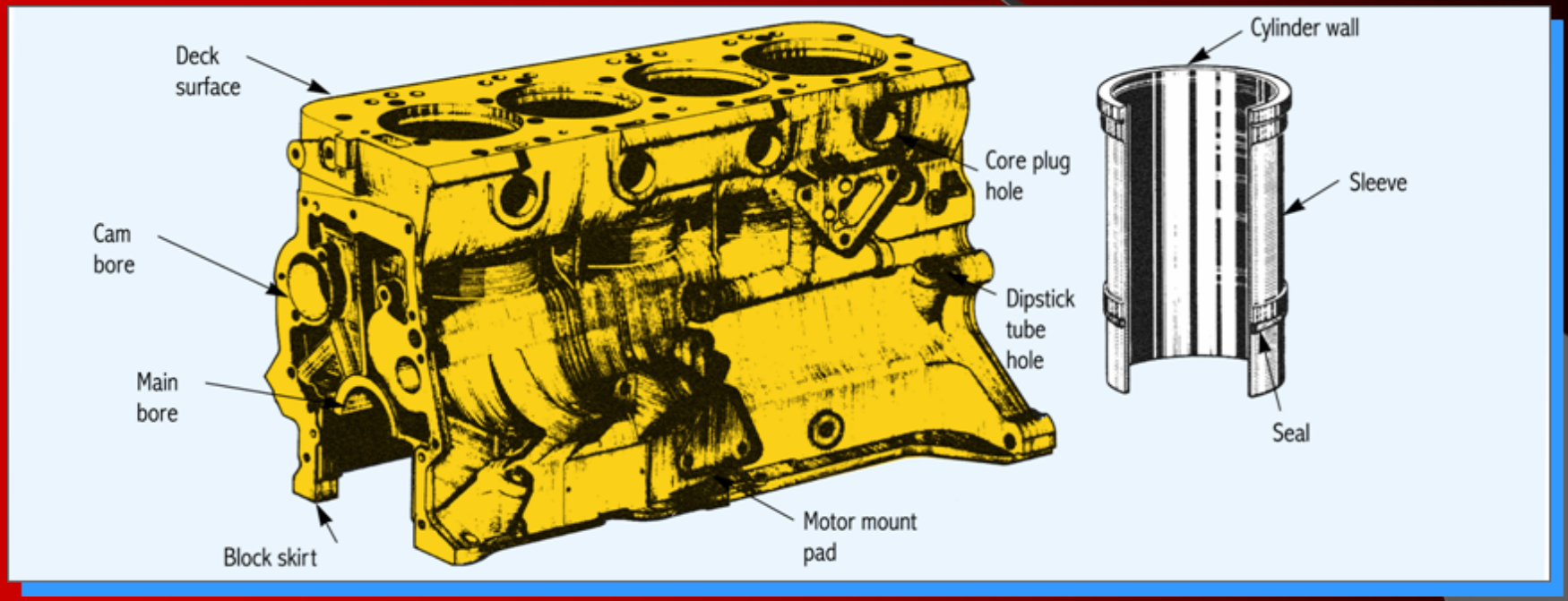
11. LINE BORING refers to a machining operation that cuts a series of holes through the block for the crankshaft bearings.

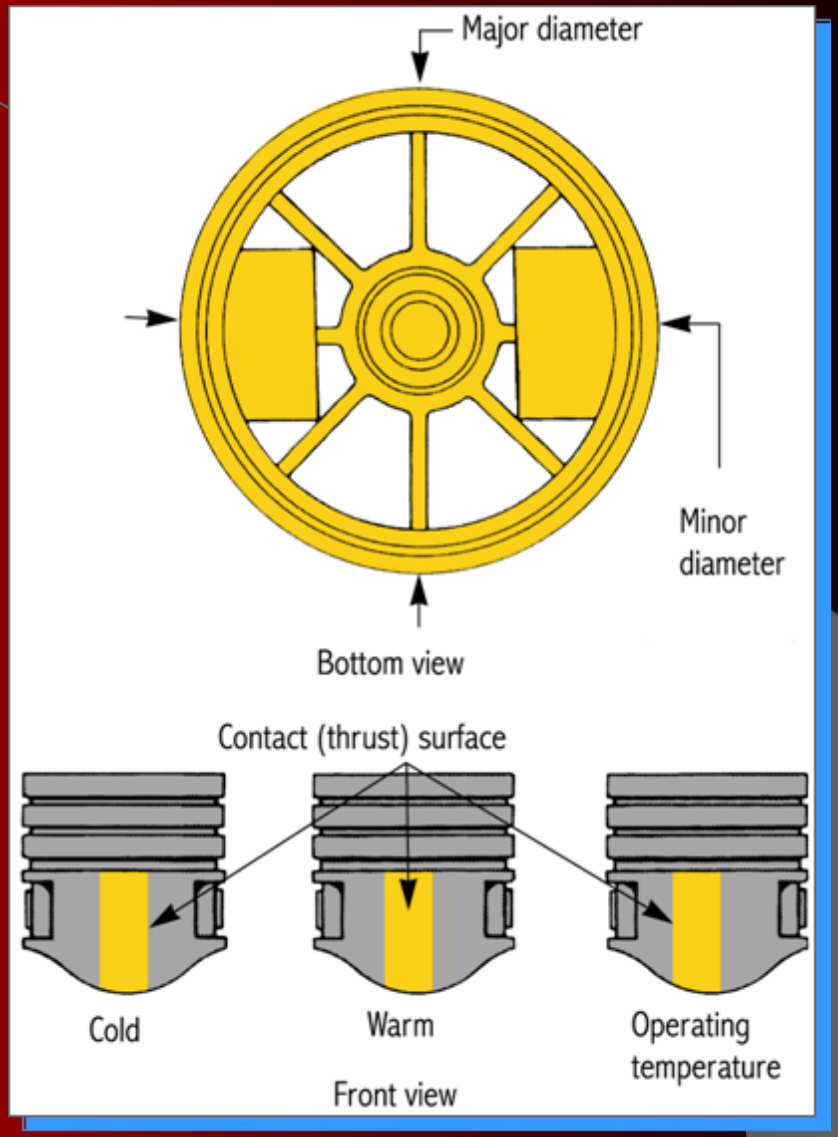
12. A CAM GROUND PISTON is machined slightly out-of-round when viewed from the top.

Cylinder Block



Cylinders may be integral parts of the block or formed by pressed-in liners

Cam-Ground Piston



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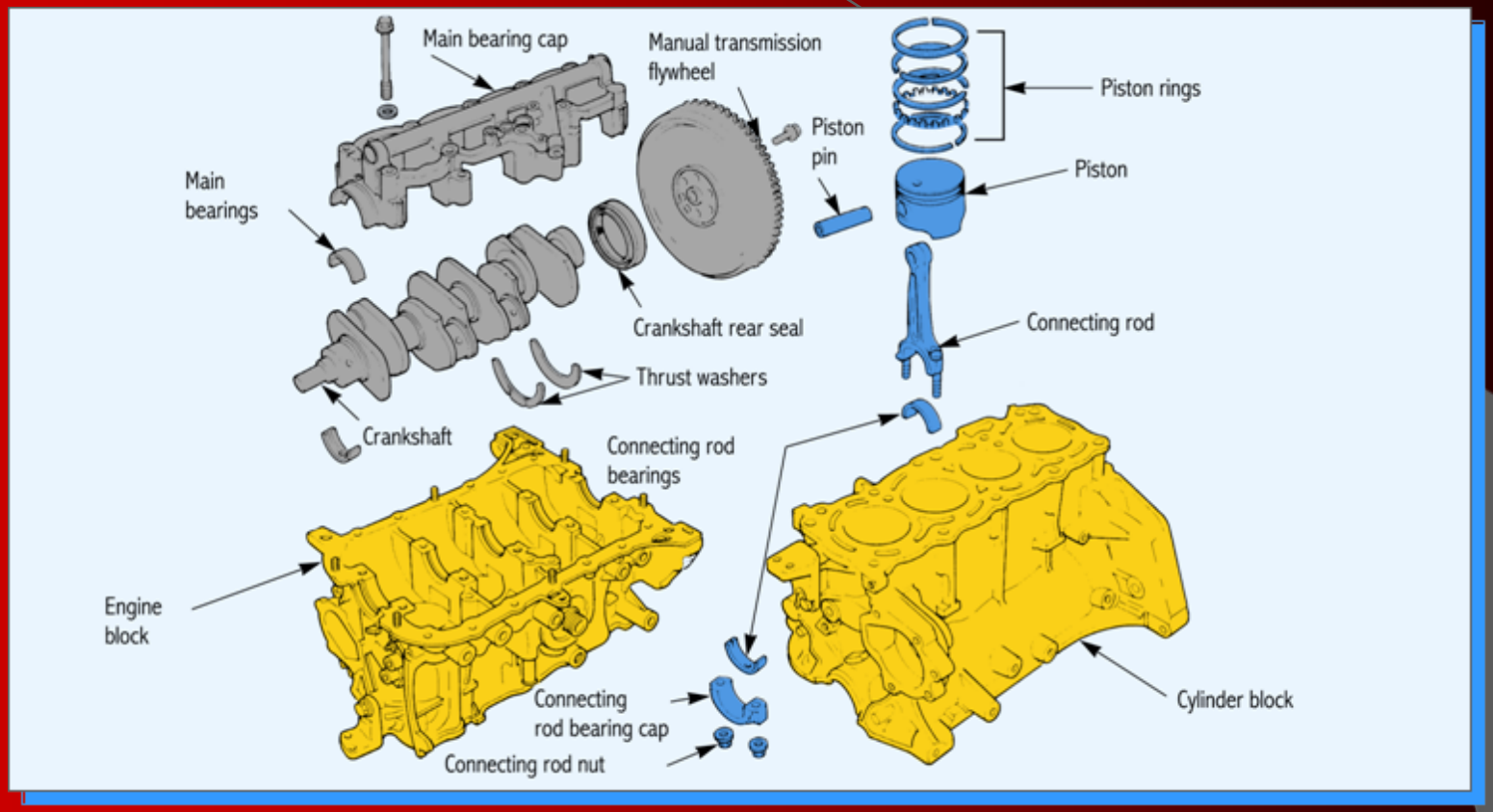

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