Engine Measurements: Bottom End

Engine Oil Bearing Clearance Measurements:
Using Either Micrometers and Telescoping Gauges or Plastigage
Learning Objectives

- Recognize the two most common ways to measure engine bearing oil clearance?
- Understand the importance of engine measurements
- Find symptoms of excess engine bearing oil clearance
- Determine which measurements are more precise
- Determine additional crankshaft measurements
Engine Top End

- Camshaft bearing caps not torqued properly
- Improperly torqued valve cover bolt
- Leaking cover gasket
- Front seal
- Cap nut
- Worn camshaft
- Worn adjusting disc
- Worn valve keepers
- Weakened valve springs
- Deteriorated valve stem seal
- Worn cam follower
- Damaged valve retainer
- Valve spring seat
- Valve spring guide
- Worn valve guide
- Cylinder head bolt
- Leaking oil seal
- Cylinder head warped or cracked
- Burned valves
- Blown cylinder head gasket
Engine Front End
Bottom End
Close-up of Bottom End
Remove Piston Rod Cap & Visually Inspect Bearings For Wear
Measure Crankshaft Journal For:

- Out of round
- Taper
- Excess wear (nicks, gouges, corrosion)
Checking Oil Bearing Clarence With Crankshaft Out of the Engine

Using a micrometer

And a telescoping gauge
Measure Journal In Two Different Places: Usually 180° Apart
Measure Engine Bearing Wear

Install piston rod cap onto rod with **engine bearings** in place

Torque piston rod nuts/bolts to manufactures **torque specs**
Telescoping Gauges

Other Size Gauges
Using Telescopic Gauges

CAUTION! Never turn knob more than ¼ turn, tool damage can occur!
Measuring Piston Rods

Measure in Two Places to Check For Out of Round & Taper
Measure Crankshaft To Oil Bearing Clearance

- Measure telescoping gauge with micrometer
- Compare measurements with crankshaft measurements
- Are they within spec?
Measure Crankshaft To Oil Bearing Clearance Using Plastigage
Checking Oil Bearing Clarence With Crankshaft In The Engine

As before:

Use a micrometer to measure the crankshaft in two places.
Plastigage

Always place Plastigage lengthwise across a journal

Place a piece of Plastigage on the crankshaft journal
Install Bearing Caps

Coat bearing surface with oil so Plastigage doesn’t stick to the bearing

Torque to manufactures specs
Remove Bearing Cap

Caution!

- Never rotate crankshaft while Plastigage is installed!
- Severe damage can be caused to the engine
Reading Plastigage

1. Crushed Plastigage
2. Bearing oil clearance
   - Is clearance within manufactures specs?
Additional Information

- Place Plastigage on the “no-load” side of the journal
- Check crankshaft end-play using a dial indicator
- Only use lint free rags to wipe bearing and journal surfaces
- Only use oil from a sealed bottle
- Never use grease to pre-lube an engine
Review

- What are the two most common ways to measure engine bearing oil clearance?
- Why is this measurement important?
- What is a symptom of excess engine bearing oil clearance?
- Which of the two measurements is more precise?
- What additional crankshaft measurements are required?