

62. **⚠ CAUTION:** The cylinder head must be cool before removing it from the engine. Cylinder head warpage can result if a warm or hot cylinder head is removed.

⚠ CAUTION: Place clean shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine.

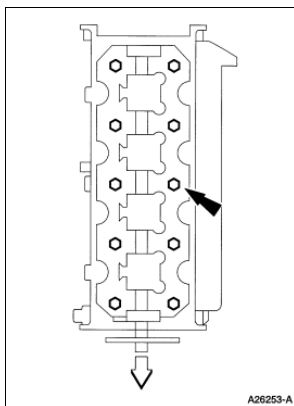
⚠ CAUTION: The cylinder head bolts must be discarded and new bolts installed. They are tighten-to-yield designed and cannot be reused.

⚠ CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

⚠ CAUTION: Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.

Remove the bolts and the RH cylinder head.

- Discard the cylinder head gasket.
- Discard the cylinder head bolts.



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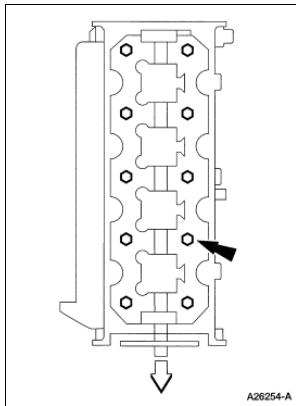
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⚠ CAUTION: Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.

Remove the bolts and the LH cylinder head.

- Discard the cylinder head gasket.
- Discard the cylinder head bolts.



64. **⚠ CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

⚠ CAUTION: Observe all warnings or cautions and follow all application directions contained on the packaging of the silicone gasket remover and the metal surface prep.

NOTE: If there is no residual gasket material present, metal surface prep can be used to clean and prepare the surfaces.

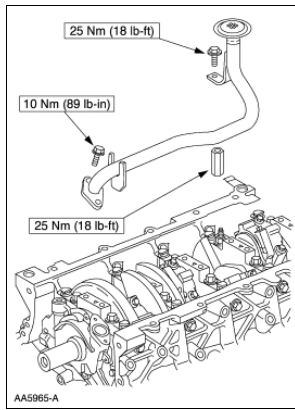
Clean the cylinder head-to-cylinder block mating surfaces of both the cylinder head and the cylinder block.

1. Remove any large deposits of silicone or gasket material with a plastic scraper.
2. Apply silicone gasket remover, following package direction, and allow to set for several minutes.
3. Remove the silicone gasket remover with a plastic scraper. A second application of silicone gasket remover may be required if residual traces of silicone or gasket material remain.
4. Apply metal surface prep, following package directions, to remove any remaining traces of oil or coolant, and to prepare the surfaces to bond with the new gasket. Do not attempt to make the metal shiny. Some staining of the metal surfaces is normal.

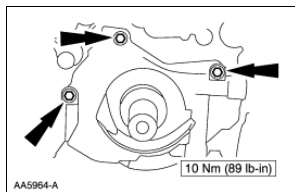
65. **NOTE:** The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

Support the cylinder head on a bench with the head gasket side up. Inspect all areas of the deck face with a straightedge, paying particular attention to the oil pressure feed area. The cylinder head must not have depressions deeper than 0.0254 mm (0.001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.001 in).

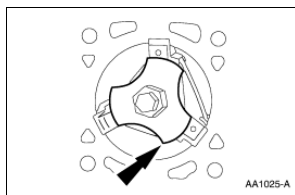
66. Remove the oil pump screen cover and tube, and the spacer.



67. Remove the oil pump.



68. Before removing the pistons, inspect the top of the cylinder bores. If necessary, remove the ridge or carbon deposits from each cylinder using a cylinder ridge reamer, following the manufacturer's instructions.

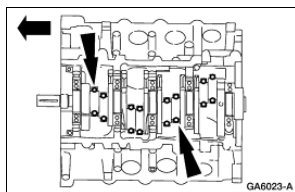


69. **⚠ CAUTION: Do not stamp the top of pistons, as ring land damage can occur.**

NOTE: Connecting rods and rod caps should be numbered to retain correct orientation.

Remove the connecting rod caps for piston numbers 1 and 6.

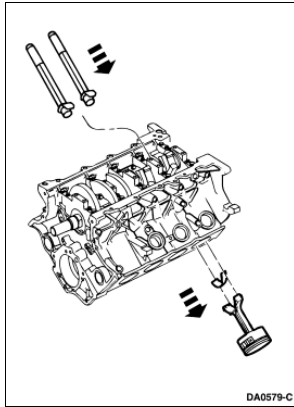
- Discard the bolts.



70. **⚠ CAUTION: Do not scratch cylinder walls or crankshaft journals with the connecting rod.**

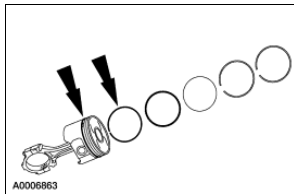
NOTE: Before removing pistons, inspect the top of the cylinder bores. If necessary, remove the ridge or carbon deposits from each cylinder using a cylinder ridge reamer following the manufacturer's instructions.

Remove the piston removing pistons number 1 and 6 through the top of the cylinder block.



71. Repeat the previous two steps to remove the remaining pistons, rotating the crankshaft 90 degrees between piston pairs 3 and 5, 4 and 7, 2 and 8.

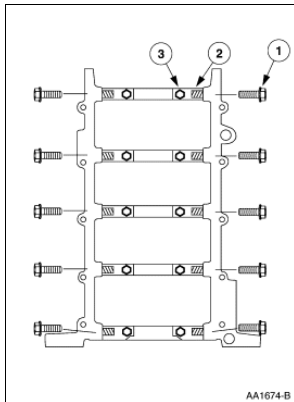
72. Remove the piston rings.



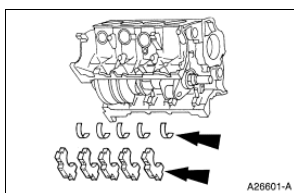
73. Clean and inspect pistons. For additional information, refer to [Section 303-00](#).

74. Remove the crankshaft bearing cap fasteners.

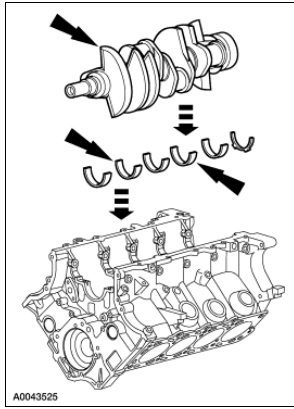
1. Remove and discard the cross-mounted main cap bolts.
2. Loosen the jackscrews.
3. Remove and discard the main cap bolts.



75. Remove the main bearing cap and the crankshaft main bearings from the cylinder block.




76. Remove the crankshaft, crankshaft main bearings and the thrust washer.



Cylinder Head  [Printable View \(236 KB\)](#)

Special Tool(s)

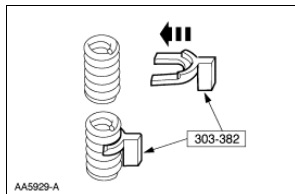
 ST1330-A	Compressor, Valve Spring 303-381(T91P-6565-A)
 ST1331-A	Compressor Spacer, Valve Spring 303-382 (T91P-6565-AH)
 ST1332-A	Installer, Valve Stem Oil Seal 303-383 (T91P-6571-A)

Material

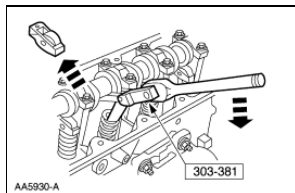
Item	Specification
Super Premium SAE 5W-20 Motor Oil 5W20-QSP or equivalent	WSS-M2C153-H

Disassembly

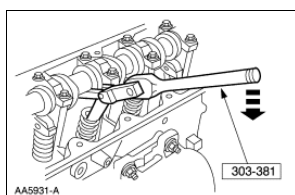
1. Install the special tool.



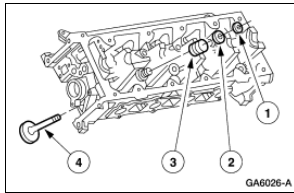
2. Using the special tool, remove the roller followers.



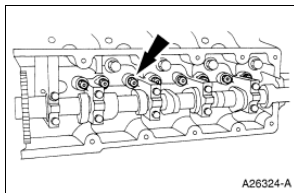
3. Using the special tool, compress the valve spring.



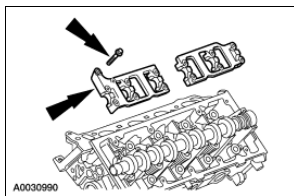
4. Remove the valves.
 1. Remove the valve spring retainer keys.
 2. Remove the valve spring retainers.
 3. Remove the valve spring.
 4. Remove the valves.



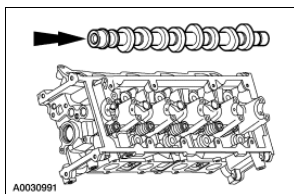
5. Remove the hydraulic lash adjusters.



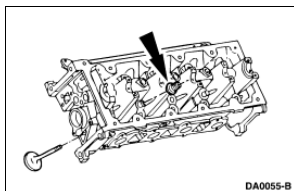
6. Remove the bolts and the camshaft bearing caps.



7. Remove the camshaft (6250).



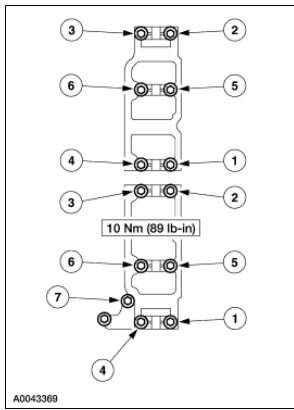
8. Remove the valve stem seals.



Assembly

1. **NOTE:** Lubricate all moving parts with clean engine oil prior to assembly.

To install, reverse the removal procedure.

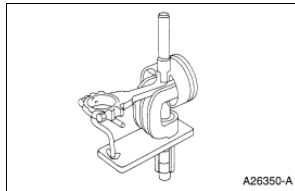


Piston  [Printable View \(65 KB\)](#)**Material**

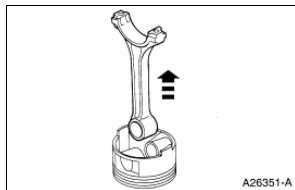
Item	Specification
Super Premium SAE 5W-20 Motor Oil XO-5W20-QSP or equivalent	WSS-M2C153-H

Disassembly

1. Press the piston pin out of the connecting rod and piston assembly.



2. Remove the connecting rod from the piston.

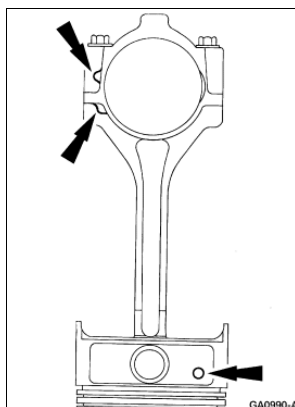


3. Clean and inspect the piston and connecting rod. For additional information, refer to [Section 303-00](#).

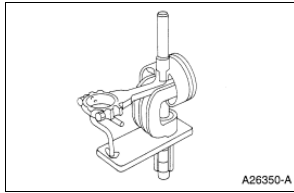
Assembly

1. **NOTE:** Connecting rod must be installed into piston with identification markings toward front.

Position the connecting rod in the piston.



2. Press the piston into the piston and connecting rod assembly.



3. Install the piston rings.

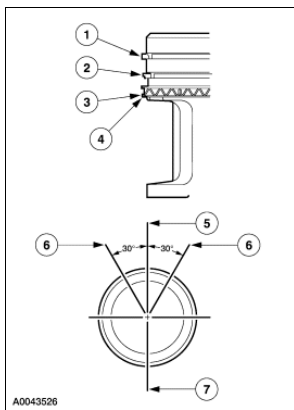
1. Using a suitable ring expander tool install the upper compression ring with the top side identification mark towards the dome.
2. Using a suitable ring expander tool install the lower compression ring with the top side identification mark towards the dome.
3. **NOTE:** Assemble with end gaps up.

Using a suitable tool install the piston oil control segment ring spacer.

4. **NOTE:** Install one segment ring above and one segment ring below the spacer.


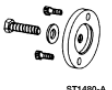



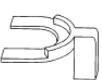




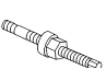

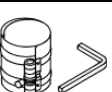
Using a suitable tool install the piston oil control segment rings.

5. Orient the upper compression ring gap to the center line at the rear of the piston, parallel to the wrist pin bore.
6. Orient the oil control ring gaps as shown.
7. Orient the expander ring gap and lower compression ring gap as shown.



Engine  [Printable View \(2543 KB\)](#)

Special Tool(s)

 <p>ST1337-A</p>	<p>Guides, Connecting Rod 303-442 (T93P-6136-A)</p>
 <p>ST1480-A</p>	<p>Installer, Crankshaft Rear Oil Seal 303-518 (T95P-6701-DH)</p>
 <p>ST1479-A</p>	<p>Installer, Crankshaft Rear Oil Seal 303-516 (T95P-6701-BH)</p>
 <p>ST1482-A</p>	<p>Installer, Crankshaft Rear Oil Slinger 303-517 (T95P-6701-CH)</p>
 <p>ST1185-A</p>	<p>Impact Slide Hammer 100-001 (T50T-100-A)</p>
 <p>ST1331-A</p>	<p>Compressor Spacer, Valve Spring 303-382 (T91P-6565-AH)</p>
 <p>ST1602-A</p>	<p>Spreader Bar 303-D089 (D93P-6001-A3)</p>
 <p>ST1604-A</p>	<p>Lifting Bracket, Engine 303-D087 (D93P-6001-A1)</p>
 <p>ST1603-A</p>	<p>Lifting Bracket, Engine 303-D088 (D93P-6001-A2)</p>
 <p>ST1701-A</p>	<p>Lifting Bracket Set, Engine 303-D074 (D91P-6001-A)</p>
 <p>ST1287-A</p>	<p>Installer, Crankshaft Vibration Damper 303-102 (T74P-6316-B)</p>
 <p>ST1328-A</p>	<p>Installer, Front Cover Oil Seal 303-335 (T88T-6701-A)</p>
	<p>Compressor, Piston Ring 303-D032 (D81L-6002-C) or equivalent</p>