DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

CYLINDER HEAD

Material

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

Intake and Exhaust Valves, Valve Springs, Valve Spring Retainer Keys and Retainers, Camshaft Phaser and Sprocket, VCT System Oil Filter, Camshaft Bearing Caps and Camshaft

NOTE: LH shown in illustration, RH similar.

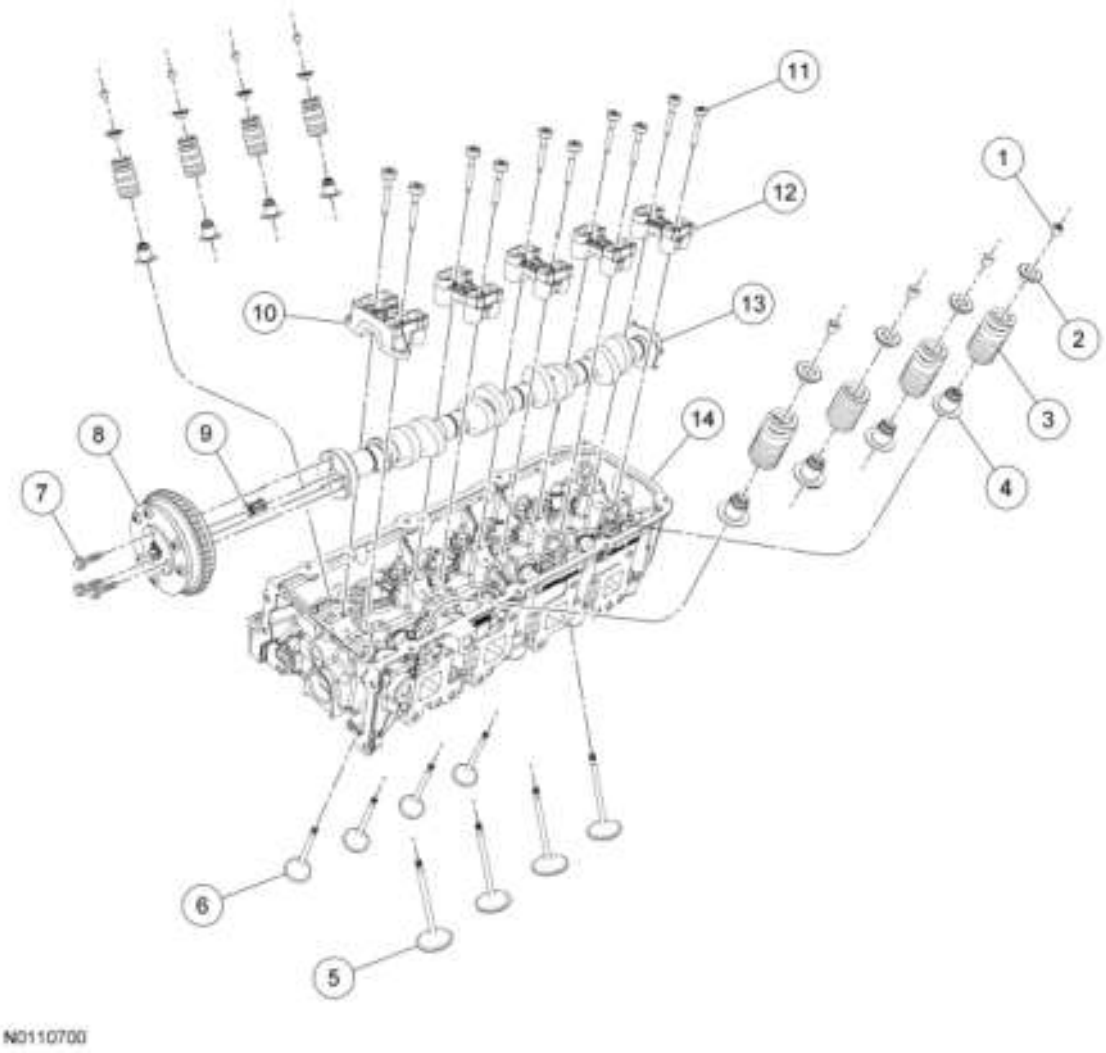

Fig. 346: Exploded View Of Cylinder Head
Courtesy of FORD MOTOR CO.

ITEM DESCRIPTION CHART

Item	Part Number	Description
1	6518	Valve spring retainer key (16 required)
2	6514	Valve spring retainer (8 required)
3	6513	Valve spring (8 required)
4	6A517	Valve seal (8 required)
5	6505	Exhaust valve (4 required)
6	6507	Intake valve (4 required)
7	W712998	Camshaft phaser and sprocket bolt (3 required)
8	6C524	Camshaft phaser and sprocket
9	6C683	Variable Camshaft Timing (VCT) system oil filter
10	6B280	Camshaft front bearing cap
11	W714203	Camshaft bearing cap bolt (10 required)
12	6B284	Camshaft bearing cap (4 required)
13	6A274	Camshaft
14	6050	Cylinder head

Disassembly

1. **NOTE: Damage to the camshaft phaser and sprocket assembly will occur if mishandled or used as a lifting or leveraging device.**

NOTE: Only use hand tools to remove the camshaft phaser and sprocket assembly or damage may occur to the camshaft or camshaft phaser and sprocket.

Using a 26 mm (1.023 in) wrench on the flats of the camshaft to secure the camshaft, remove the 3 RH camshaft phaser and sprocket bolts and the camshaft phaser and sprocket.

- Discard the 3 camshaft phaser and sprocket bolts.

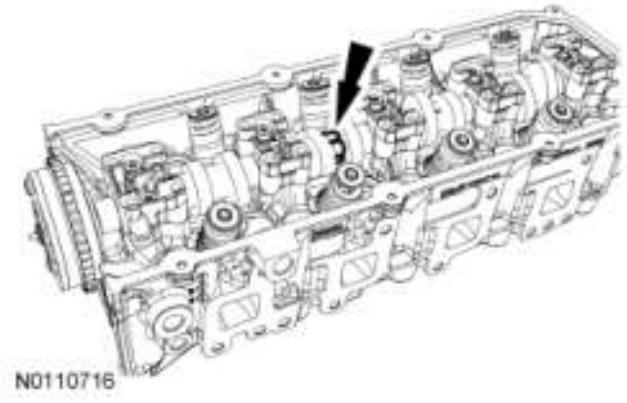

Fig. 347: Locating Flats Of Camshaft
Courtesy of FORD MOTOR CO.

2. Remove and discard the Variable Camshaft Timing (VCT) system oil filter.

3. **NOTE: If the components are to be reinstalled, they must be installed into their**

original locations. Failure to follow this instruction may result in engine damage.

3. Remove the 10 bolts and the 5 camshaft bearing caps.

4. Remove the camshaft.

NOTE: If the components are to be reinstalled, they must be installed into their original locations. Failure to follow this instruction may result in engine damage.

5. Using a valve spring compressor, remove the valve spring retainer keys, valve spring retainer, the valve spring and the valve seal.

- Discard the valve seal.

6. Remove the valve from the cylinder head.
7. Repeat the previous 2 steps for each valve.
8. Inspect the components. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION -- F150** .
9. Check the cylinder head for distortion. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION -- F150** .

Assembly

All cylinder heads

NOTE: Lubricate the valve stem with clean engine oil prior to installation.

1. Install the valve into the cylinder head.

NOTE: Lubricate the valve seal and valve stem with clean engine oil prior to installation.

2. Position a new valve seal onto the valve stem.

3. Using a valve stem oil seal installer, install the new valve seal.

NOTE: If the components are to be reinstalled, they must be installed into their original locations. Failure to follow this instruction may result in engine damage.

4. Using a valve spring compressor, install the valve spring, the valve spring retainer and the valve spring retainer keys.

5. Repeat the previous 4 steps for each valve.
6. Lubricate the camshaft and camshaft journals with clean engine oil and install the camshaft.

LH cylinder head

7. **NOTE: If the components are to be reinstalled, they must be installed into their original locations. Failure to follow this instruction may result in engine damage.**

Position the camshaft bearing caps in their original locations and install the 10 bolts in the sequence shown in illustration in 2 stages.

- Stage 1: Tighten to 9 Nm (80 lb-in).
- Stage 2: Tighten an additional 90 degrees.

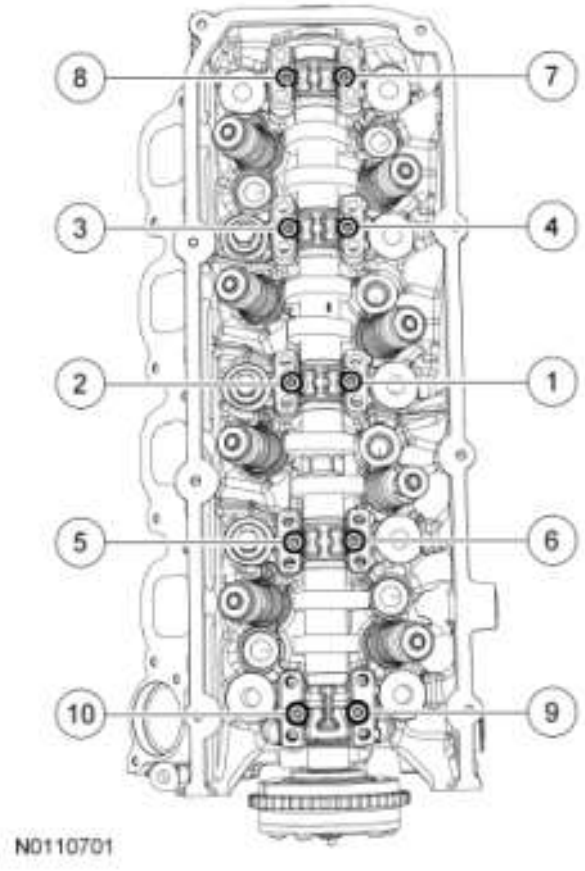

Fig. 348: Identifying Camshaft Bearing Caps Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

RH cylinder head

8. **NOTE: If the components are to be reinstalled, they must be installed into their original locations. Failure to follow this instruction may result in engine damage.**

Position the camshaft bearing caps in their original locations and install the 10 bolts in the sequence shown in illustration in 2 stages.

- Stage 1: Tighten to 9 Nm (80 lb-in).
- Stage 2: Tighten an additional 90 degrees.

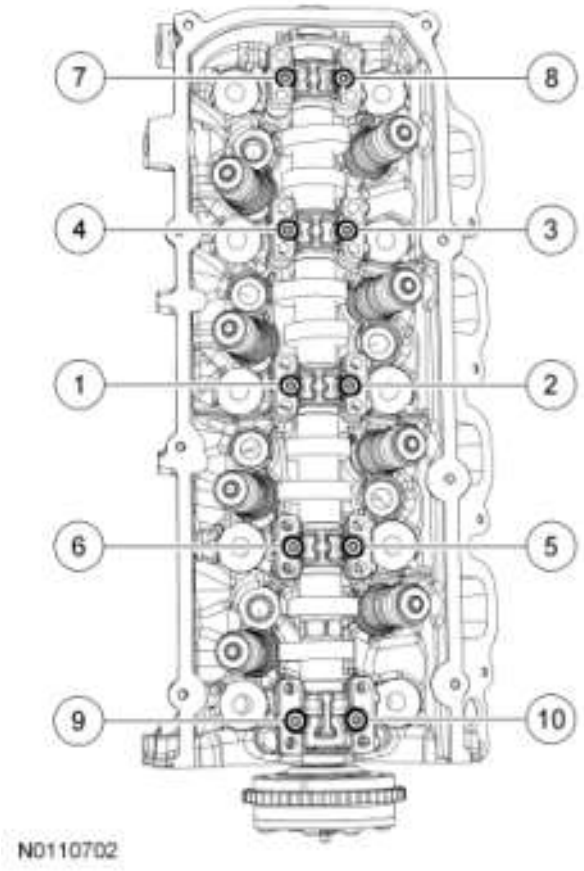

Fig. 349: Identifying Camshaft Bearing Caps Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

All cylinder heads

9. Install the new **VCT** system oil filter into the camshaft, with the open end facing the front of the engine.

NOTE: Damage to the camshaft phaser and sprocket assembly will occur if mishandled or used as a lifting or leveraging device.

10. Using a 26 mm (1.023 in) wrench on the flats of the camshaft to secure the camshaft, tighten the 3 new LH camshaft phaser and sprocket bolts in 2 stages:

- Stage 1: Tighten to 9 Nm (80 lb-in).
- Stage 2: Tighten an additional 90 degrees.

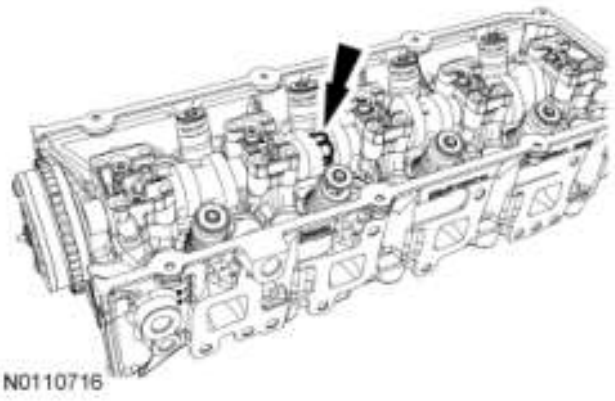

Fig. 350: Locating Flats Of Camshaft
Courtesy of FORD MOTOR CO.

PISTON

Material

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

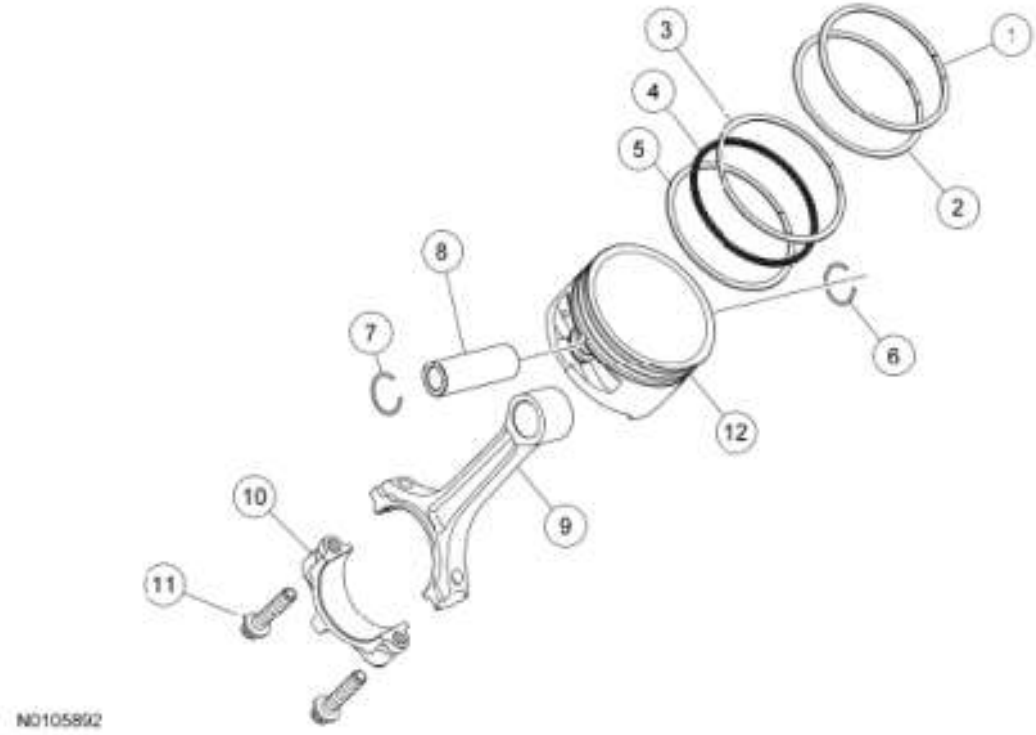

Fig. 351: Exploded View Of Piston
Courtesy of FORD MOTOR CO.

ITEM DESCRIPTION CHART

Item	Part Number	Description
1	6150	Piston compression upper ring
2	6152	Piston compression lower ring
3	6159	Piston oil control upper segment ring
4	6161	Piston oil control spacer
5	6159	Piston oil control lower segment ring
6	6140	Piston pin retainer
7	6140	Piston pin retainer
8	6135	Piston pin
9	6200	Connecting rod
10	-	Connecting rod bearing cap (part of 6200)
11	6414	Connecting rod bearing cap bolt (2 required)
12	6110	Piston

Disassembly

WARNING: Since the retainer ring has a tendency to spring out, cover the end of the pin bore with a hand or shop rag when removing the ring. Wear eye protection. Failure to follow these instructions may result in serious personal injury.

1. Remove the piston rings from the piston.
   - Discard the piston rings.
2. Mark the piston and connecting rod on the same side for assembly reference.

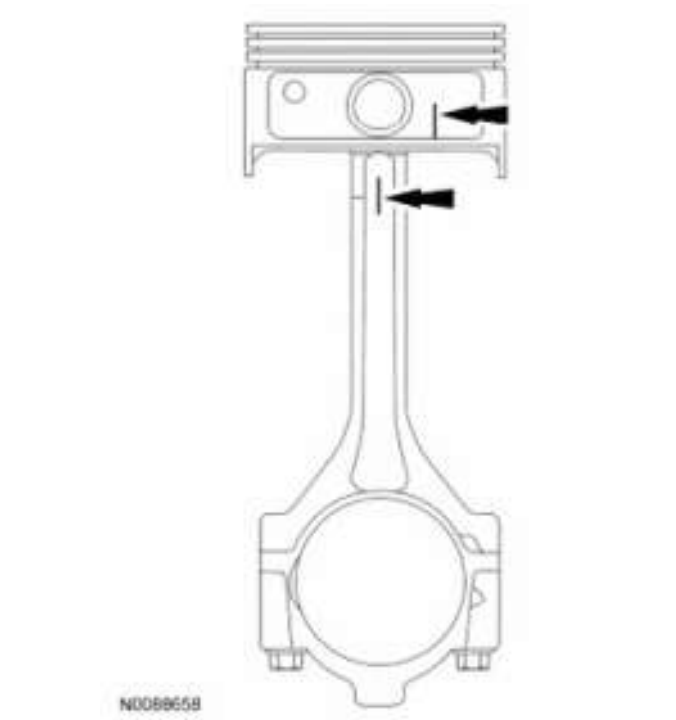

Fig. 352: Locating Mark On Piston And Connecting Rod
Courtesy of FORD MOTOR CO.

3. Remove the 2 piston pin retainers and the piston pin.
4. Separate the piston from the connecting rod.
5. Clean and inspect the piston and connecting rod. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION -- F150** .

Assembly

NOTE: The connecting rod must be installed into the piston with the marks made during disassembly on the same side. If a new piston or connecting rod is being installed, it can be installed in either direction.

1. Position the connecting rod in the piston.

Fig. 353: Locating Mark On Piston And Connecting Rod
Courtesy of FORD MOTOR CO.

2. Lubricate the piston pin and pin bore with clean engine oil.
3. Install the piston pin in the piston and connecting rod assembly.
4. Install the 2 piston pin retaining clips in the piston.
5. Lubricate the piston and the new piston rings with clean engine oil.
6. Install the piston rings onto the piston.