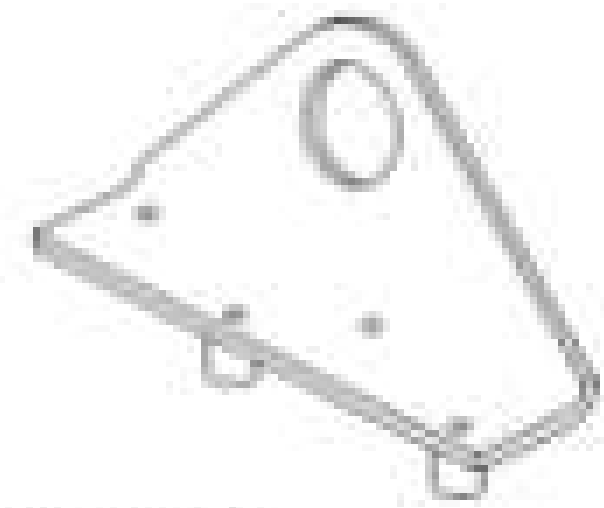


# DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

## CYLINDER HEAD

Special Tool(s)

### SPECIAL TOOLS CHART

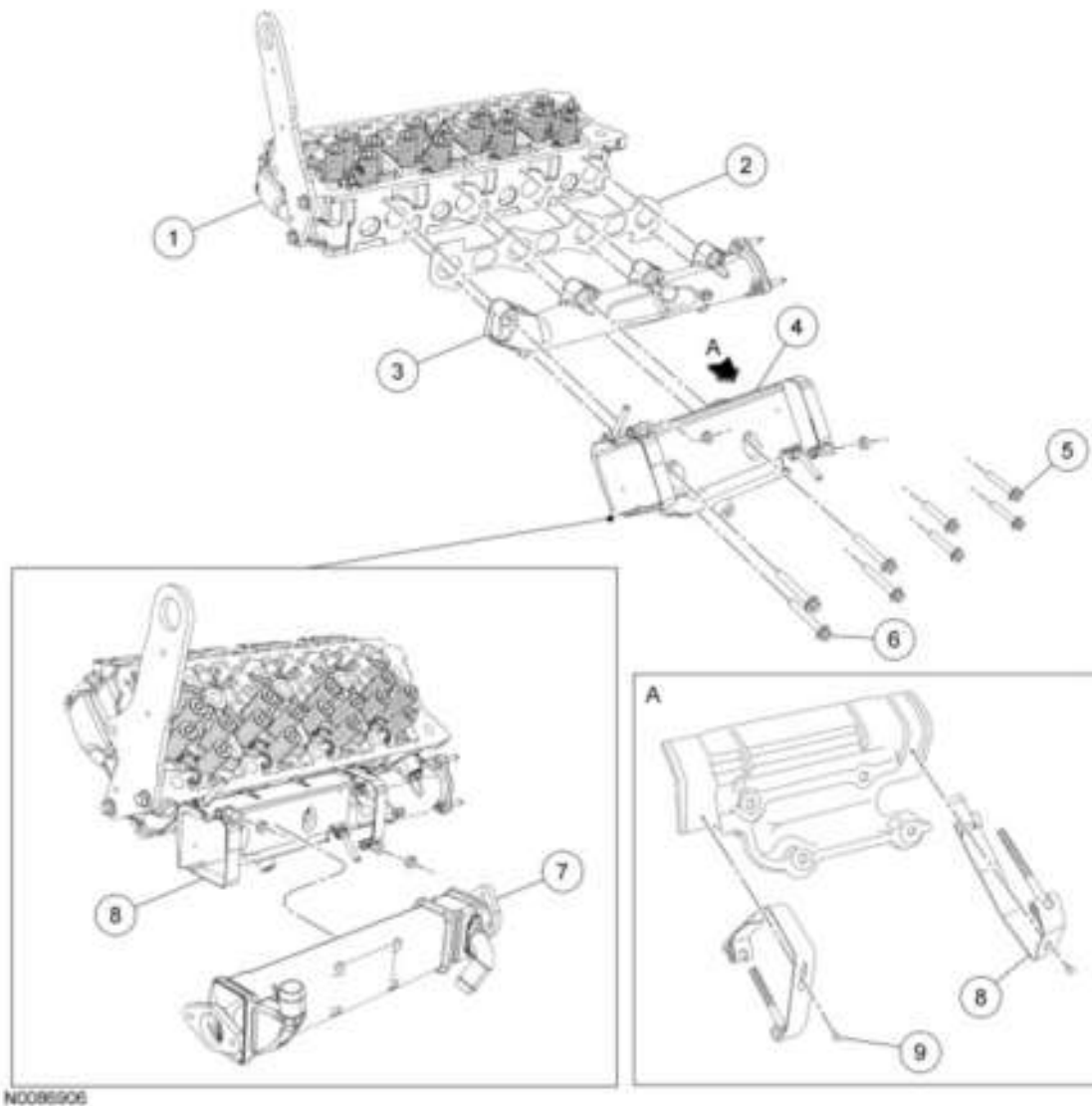
 <p>ST2597-A</p>	<p>Lifting Bracket, Cylinder Head 303-759</p>
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Material

### MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft® SAE 15W-40 Super Duty Diesel Motor Oil XO-15W40-QSD (US); CXO-15W40-LSD12 (Canada); or equivalent	WSS-M2C171-E

LH Exhaust Manifold

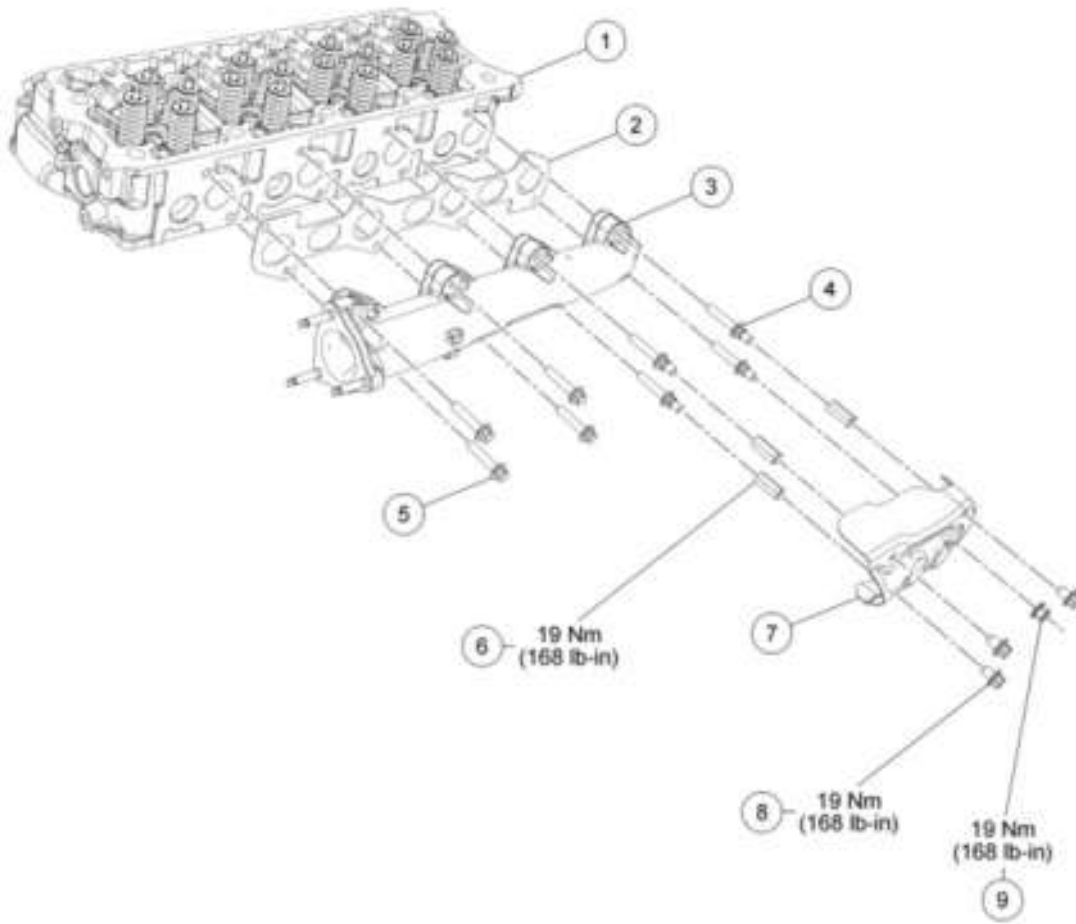


**Fig. 1065: Identifying LH Exhaust Manifold**  
 Courtesy of FORD MOTOR CO.

**PART DESCRIPTION CHART**

Item	Part Number	Description
1	6049	Cylinder head
2	9448	Exhaust manifold gasket
3	9430	Exhaust manifold
4	9F465	EGR cooler bracket
5	-	Bolt (4 required)
6	W302652	Bolt (4 required)
7	9F464	Horizontal EGR cooler
8	8287	EGR cooler clamp (2 required)
9	W302549	Pin (2 required)

**RH Exhaust Manifold**



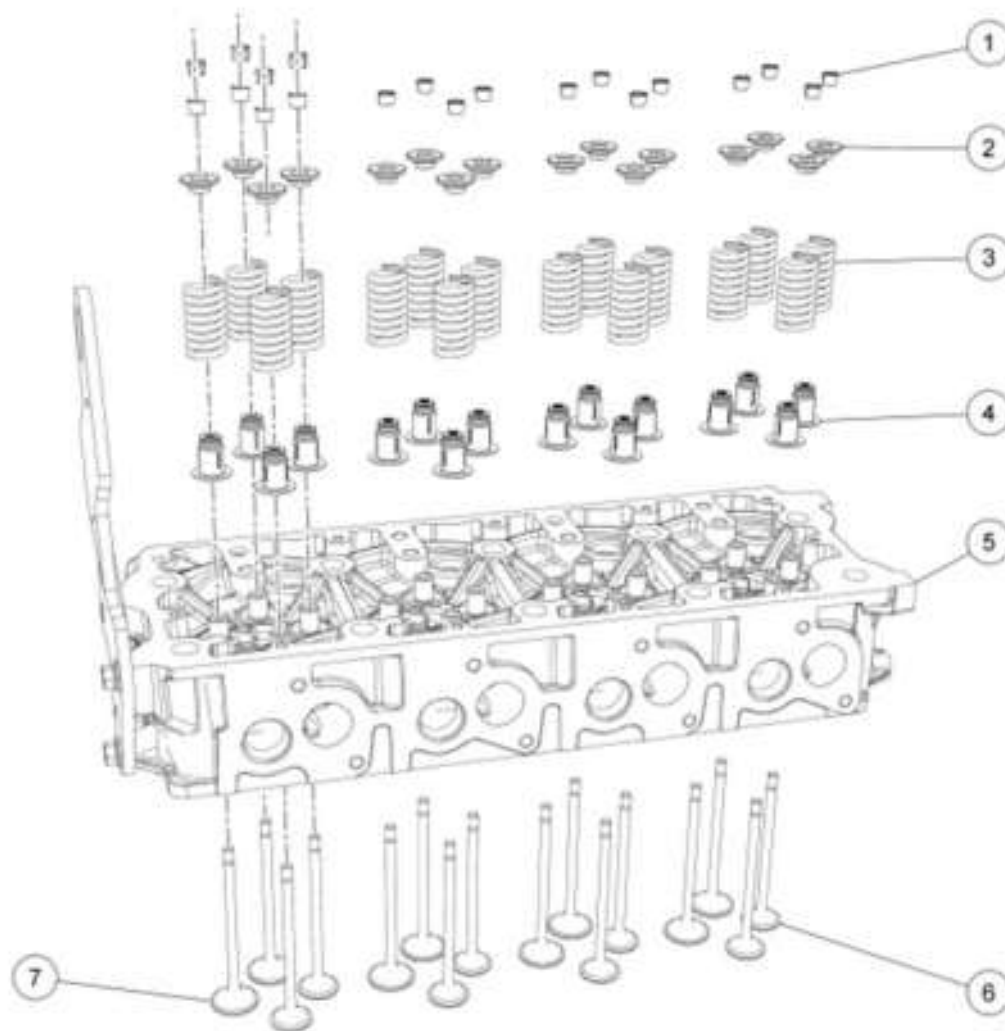
N0076152

**Fig. 1066: Identifying RH Exhaust Manifold With Torque Specifications**  
 Courtesy of FORD MOTOR CO.

**PART DESCRIPTION CHART**

Item	Part Number	Description
1	6049	Cylinder head
2	9448	Exhaust manifold gasket
3	9430	Exhaust manifold
4	-	Stud bolt (4 required)
5	-	Bolt (4 required)
6	W302498	Spacer (3 required)
7	95F223	Heat shield
8	W302499	Bolt (3 required)
9	W302494	Retaining nut

**LH Cylinder Head**



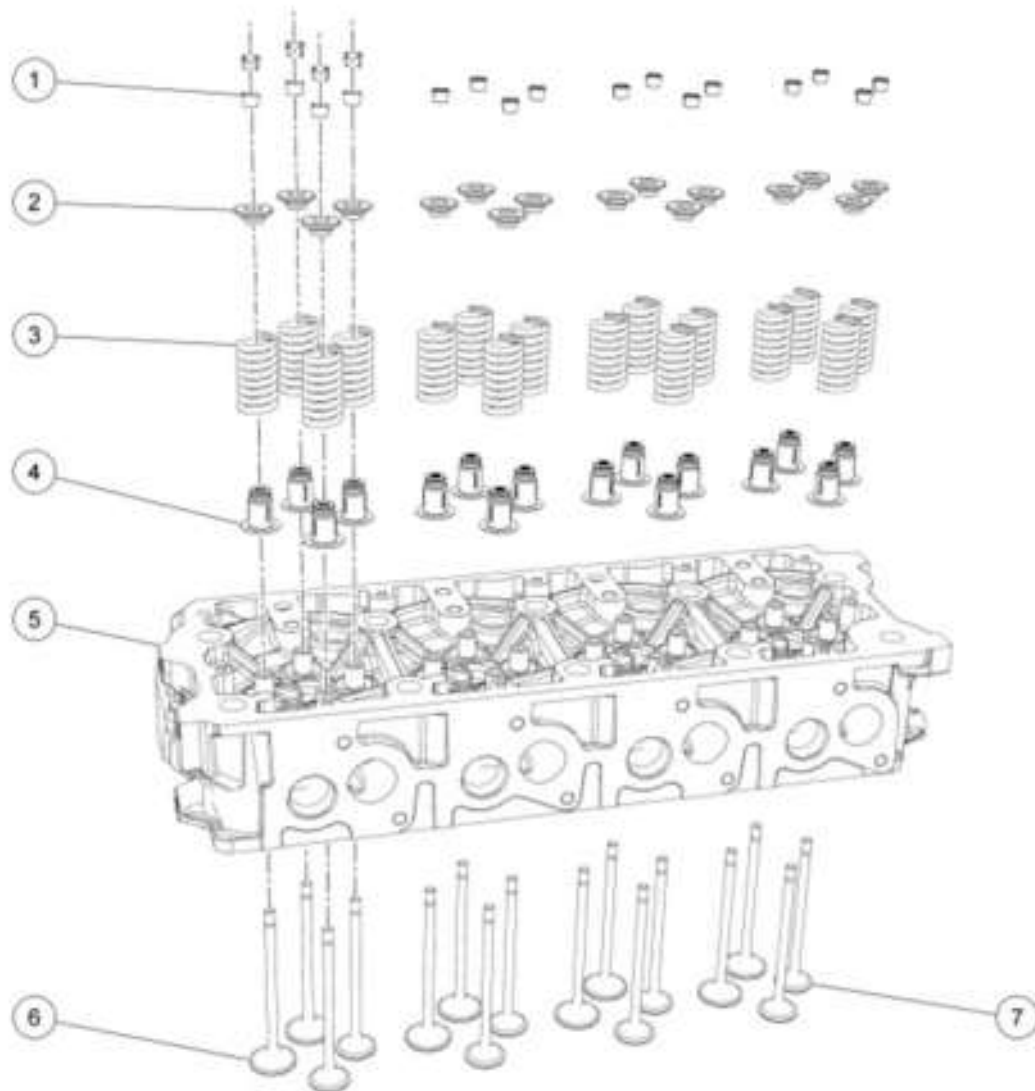
N0067194

**Fig. 1067: Identifying LH Cylinder Head**  
 Courtesy of FORD MOTOR CO.

**PART DESCRIPTION CHART**

Item	Part Number	Description
1	6518	Valve stem key (32 required)
2	6514	Valve spring retainer (16 required)
3	6513	Valve spring (16 required)
4	6571	Valve seal assembly (16 required)
5	6049	Cylinder head
6	6505	Exhaust valve (8 required)
7	6507	Intake valve (8 required)

**RH Cylinder Head**



N0067195

**Fig. 1068: Identifying RH Cylinder Head**  
 Courtesy of FORD MOTOR CO.

**PART DESCRIPTION CHART**

Item	Part Number	Description
1	6518	Valve stem key (32 required)
2	6514	Valve spring retainer (16 required)
3	6513	Valve spring (16 required)
4	6571	Valve seal assembly (16 required)
5	6049	Cylinder head
6	6507	Intake valve (8 required)
7	6505	Exhaust valve (8 required)

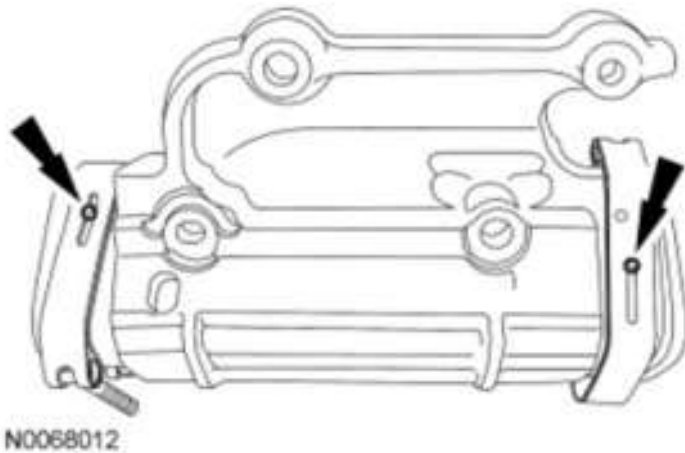
**Disassembly**

**Both cylinder heads**

1. Remove the Cylinder Head Lifting Bracket from the cylinder head(s).

### **LH cylinder head**

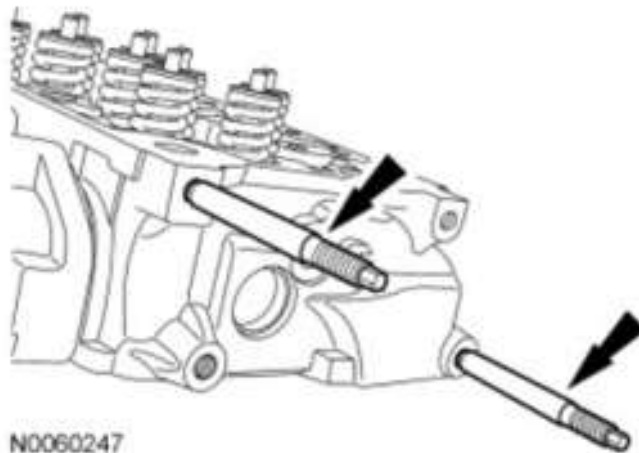
2. Remove the 2 nuts and separate the EGR cooler clamps. Remove the horizontal EGR cooler.
  - Discard the nuts.
3. Remove the 8 bolts, EGR cooler bracket, exhaust manifold and exhaust manifold gasket.
  - Discard the bolts and exhaust manifold gasket.
4. Remove the 2 pins from the back of the horizontal EGR cooler bracket. Remove and discard the EGR cooler clamps.



**Fig. 1069: Locating EGR Cooler Clamps Pins**  
Courtesy of FORD MOTOR CO.

### **RH cylinder head**

5. Remove the Front End Accessory Drive (FEAD) studs.



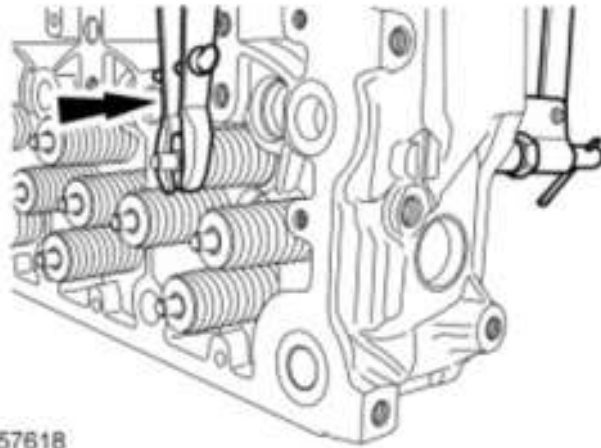
**Fig. 1070: Locating Front End Accessory Drive Studs**  
Courtesy of FORD MOTOR CO.

6. Remove the 3 bolts, nut and heat shield.

7. Remove the 3 spacers.
8. Remove the 4 stud bolts, 4 bolts, exhaust manifold and exhaust manifold gasket.
  - Discard the stud bolts, bolts and exhaust manifold gasket.

### **Both cylinder heads**

9. Install the valve spring compressor.



**Fig. 1071: Installing Valve Spring Compressor**  
Courtesy of FORD MOTOR CO.

10. Remove the valve stem keys.
11. Remove the valve spring compressor.
12. Remove the valve spring retainer.
13. Remove the valve spring.

**NOTE:** It may be necessary to file the tip of the valve to aid in removal of the valve from the cylinder head.

14. Remove the valve.
15. Remove the valve seal assembly.
16. Clean and inspect the valves, valve guides and valve seats. Replace components that are damaged or out of specification.

### **Assembly**

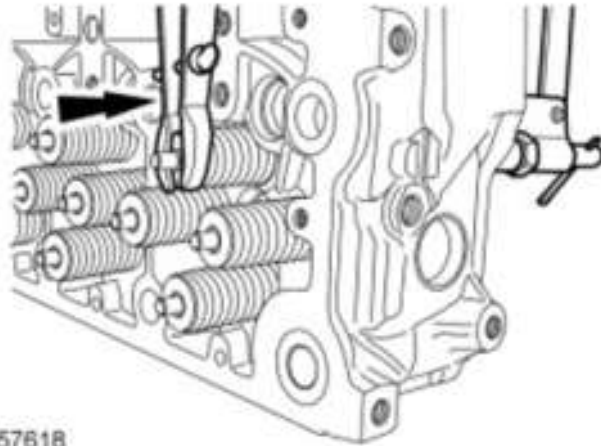
#### **Both cylinder heads**

**NOTE:** Lubricate the valve stem seal with clean engine oil prior to installing.

**NOTE:** The valve stem seal will not seat completely by hand. The valve spring compressor will seat the valve stem seal when installing the retaining keys.

1. Install the valve seal assembly.
2. Install the valve.
3. Install the valve spring.
4. Install the valve spring retainer.
5. Install the valve spring compressor.
6. Install the valve stem keys.

**NOTE:** Verify that the valve spring retaining keys are correctly seated after removal of the valve spring compressor or engine damage may occur.



**Fig. 1072: Installing Valve Spring Compressor**  
Courtesy of FORD MOTOR CO.

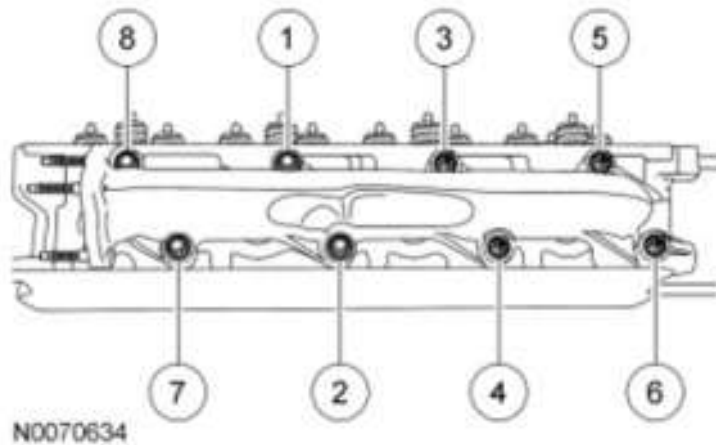
7. Remove the valve spring compressor.

#### **RH cylinder head**

**NOTE:** Do not use anti-seize on the exhaust manifold fasteners.

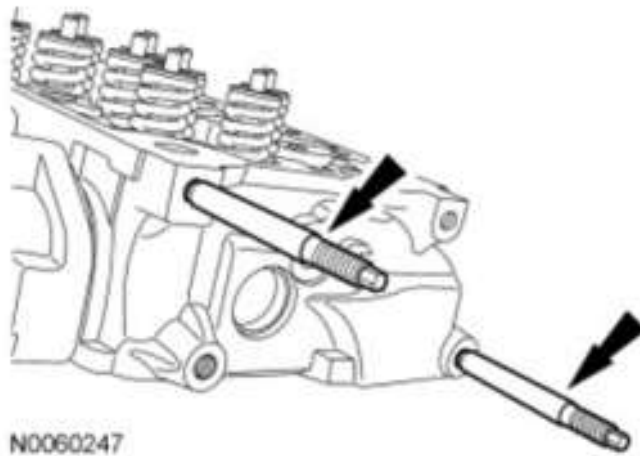
8. Position a new exhaust manifold gasket and the exhaust manifold. Install the 4 new bolts and 4 new stud bolts. Tighten the fasteners in the sequence shown in the illustration.
  - Tighten to 25 Nm (18 lb-ft).
  - Using the same torque, repeat the tightening sequence on all exhaust manifold fasteners.





**Fig. 1073: Identifying Exhaust Manifold Fasteners Tightening Sequence**  
 Courtesy of FORD MOTOR CO.

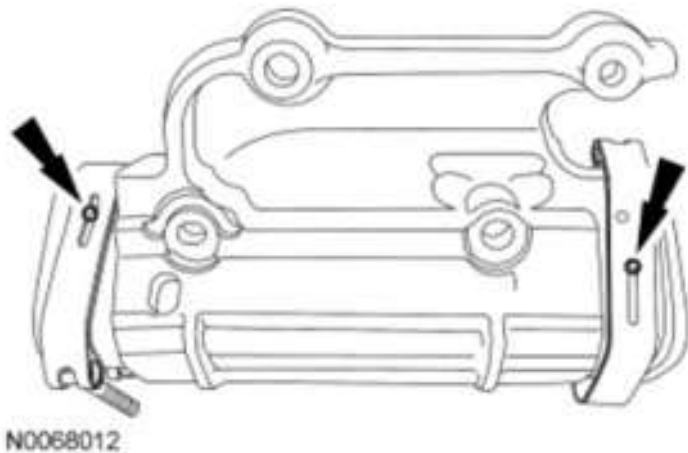
9. Install the 3 spacers.
  - Tighten to 19 Nm (168 lb-in).
10. Install the heat shield, 3 bolts and nut.
  - Tighten to 19 Nm (168 lb-in).
11. Install the **FEAD** studs.
  - Tighten to 9 Nm (80 lb-in).



**Fig. 1074: Locating Front End Accessory Drive Studs**  
 Courtesy of FORD MOTOR CO.

### LH cylinder head

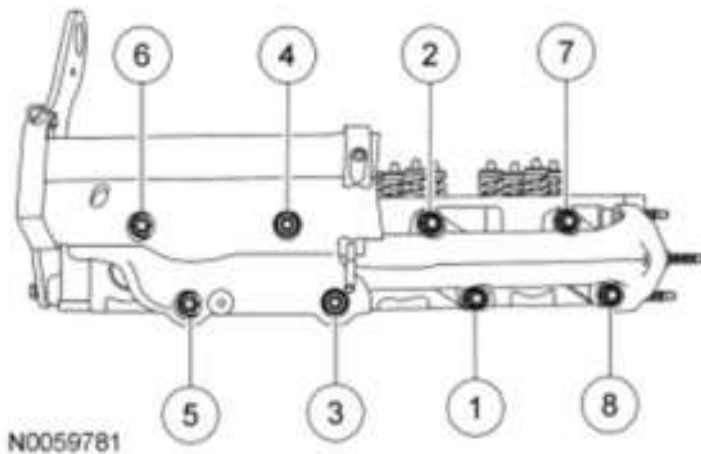
12. Position the new horizontal EGR cooler clamps and install the 2 pins.



**Fig. 1075: Locating EGR Cooler Clamps Pins**  
 Courtesy of FORD MOTOR CO.

**NOTE: Do not use anti-seize on the exhaust manifold fasteners.**

13. Position a new exhaust manifold gasket and the exhaust manifold. Install the EGR cooler bracket and 8 new bolts. Tighten the bolts in the sequence shown in the illustration.
  - Tighten to 25 Nm (18 lb-ft).
  - Using the same torque, repeat the tightening sequence on all exhaust manifold bolts.



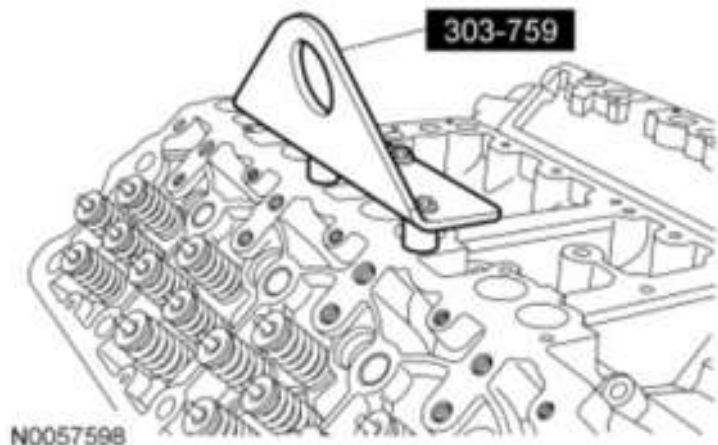
**Fig. 1076: Identifying Exhaust Manifold Bolts Tightening Sequence**  
 Courtesy of FORD MOTOR CO.

**NOTE: Do not tighten the clamps at this time.**

14. Position the EGR cooler locating pin into the slot in the EGR cooler bracket and loosely install the 2 new clamp nuts.

**Both cylinder heads**

15. Install the Cylinder Head Lifting Bracket on the cylinder head(s).



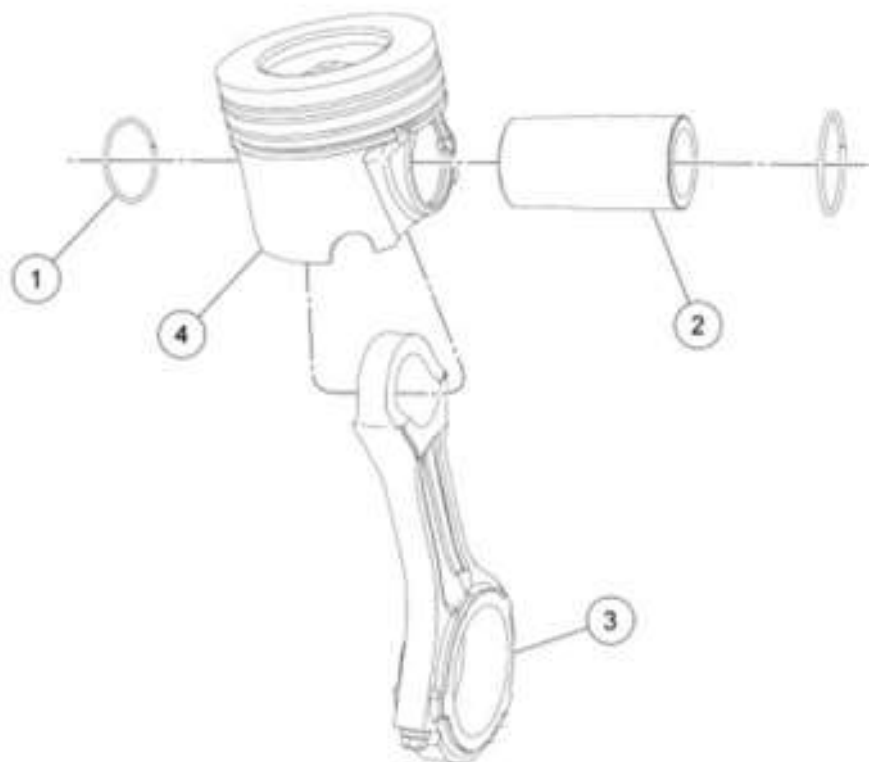
**Fig. 1077: Locating Cylinder Head Lifting Bracket**  
 Courtesy of FORD MOTOR CO.

**PISTON**

**Material**

**MATERIAL SPECIFICATIONS**

Item	Specification
Motorcraft® SAE 15W-40 Super Duty Diesel Motor Oil XO-15W40-QSD (US); CXO-15W40-LSD12 (Canada); or equivalent	WSS-M2C171-E



N0067192

**Fig. 1078: Identifying Piston Components**

Courtesy of FORD MOTOR CO.

### PART DESCRIPTION CHART

Item	Part Number	Description
1	6140	Piston pin retainer (2 required)
2	6135	Piston pin
3	6200	Connecting rod
4	-	Piston

### Disassembly and Assembly

**NOTE:** Mark the connecting rod and piston to make sure correct orientation on reassembly.

1. Remove the 2 piston pin retainers.

**NOTE:** The piston pins are a floating type piston pin and should not require a press to remove or install them.

2. Remove the connecting rod.
  - Remove the piston pin.
  - Remove the connecting rod.
3. To assemble, reverse the disassembly procedure.
  - Lubricate the connecting rod piston pin bore, piston pin bore and piston pin with clean engine oil prior to assembly.