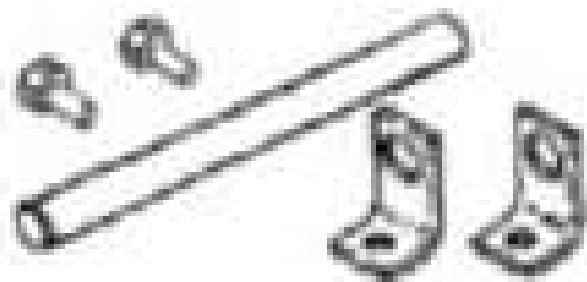


# DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

## CYLINDER HEAD

### SPECIAL TOOL(S) DESCRIPTION

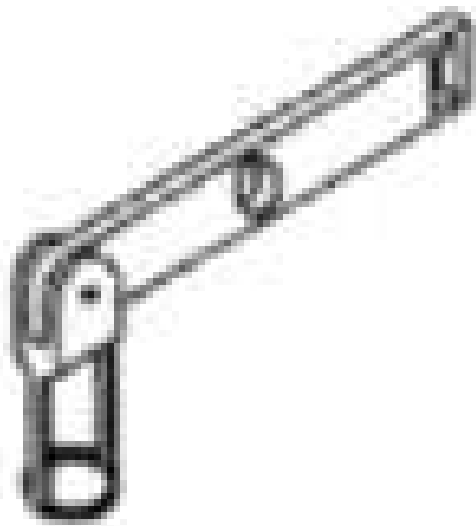


Compressor, Valve Spring  
**303-300T87C-6565-A**



Compressor, Valve Spring  
**303-350T89P-6565-A**

Compressor, Valve Spring  
**303-472T94P-6565-AH**



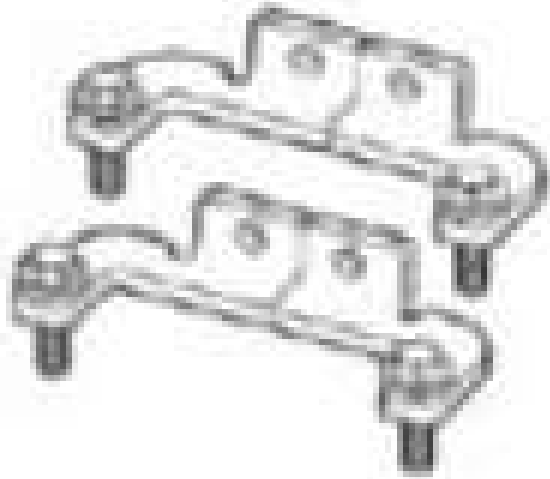
Installer, Valve Stem Oil Seal  
**303-470T94P-6510-CH**



Remover, Valve Stem Oil Seal  
**303-468T94P-6510-AH**



Slide Hammer  
**307-005T59L-100-B**

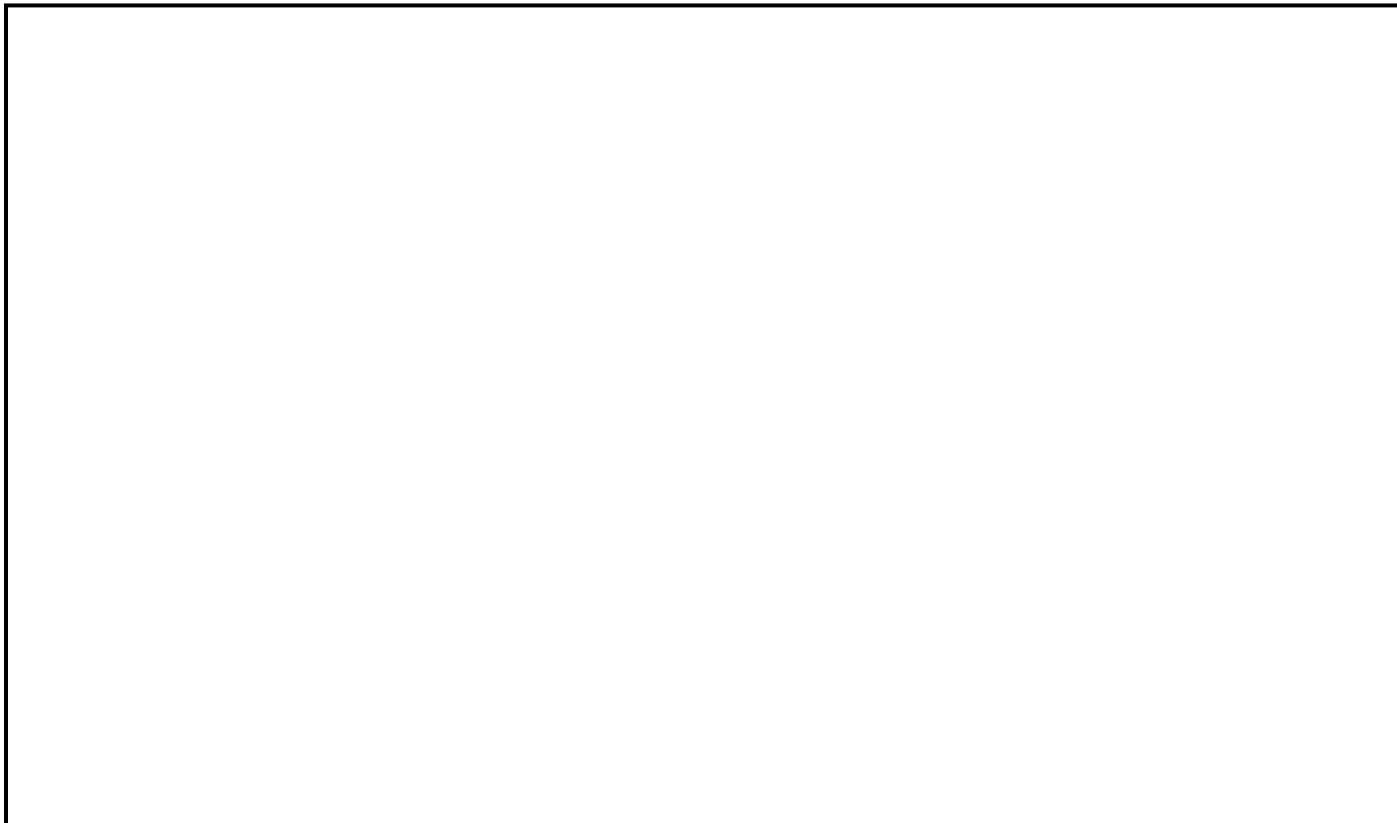


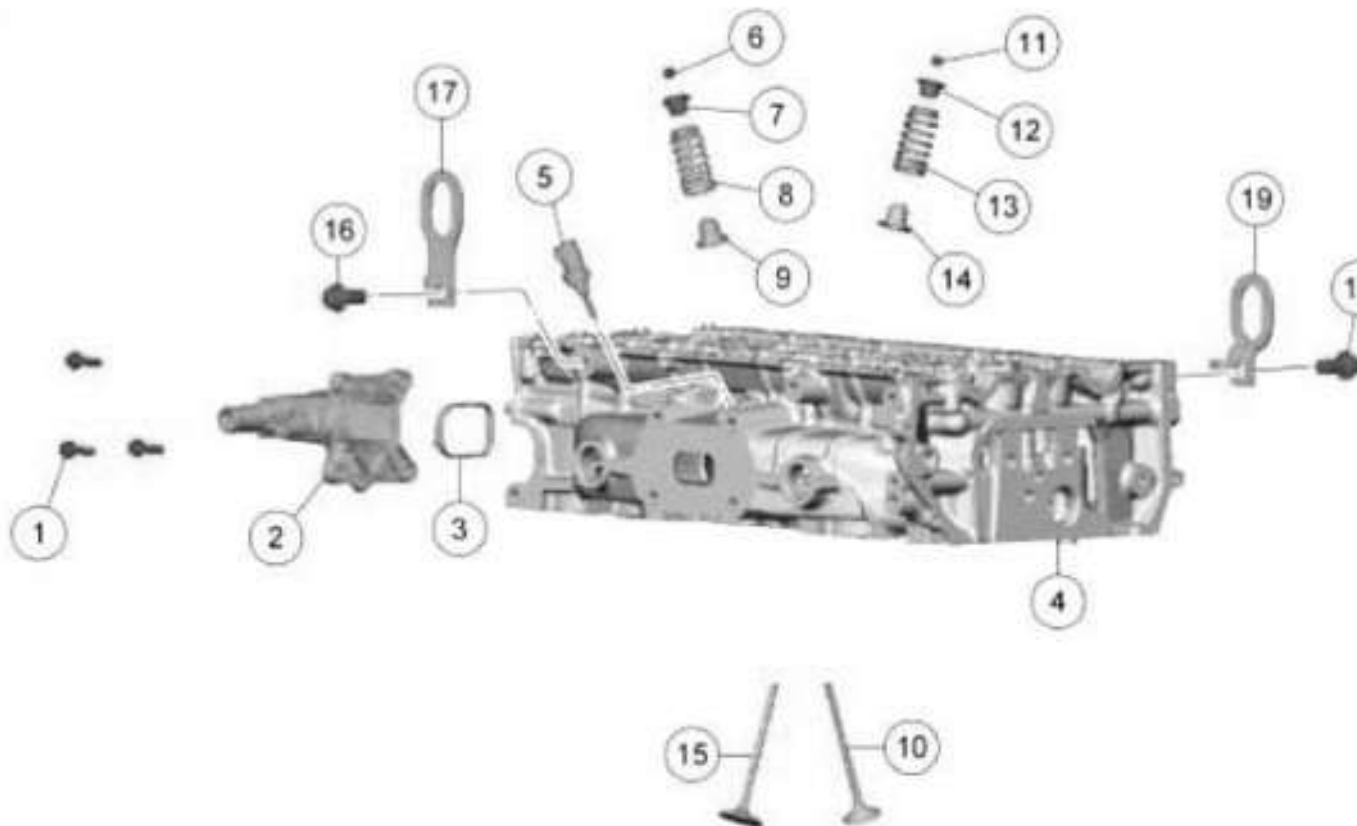
Valve Spring Compressor  
**303-1249**

### MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSS-M2C946-A
Motorcraft® Multi-Purpose Grease XL-5	ESB-M1C93-B

### Exploded View





N0136003

Item	Service Part Number	Description	Torque	Material Name	Notes
1	W500015	Coolant outlet bolt (3 required)	10 Nm (89 lb-in)	-	-
2	8K556	Coolant outlet	-	-	-
3	8255	Coolant outlet gasket	-	-	-
4	6049	Cylinder head	-	-	-
5	6G004	<b>CHT</b> sensor	11 Nm (97 lb-in)	-	-
6	6518	Exhaust valve collet (16 required)	-	-	-
7	6514	Exhaust valve spring retainer (8 required)	-	-	-
8	6513	Exhaust valve spring (8 required)	-	-	-
9	6A517	Exhaust valve seal (8 required)	-	-	-
10	6505	Exhaust valve (8 required)	-	-	-
11	6518	Intake valve collet (16 required)	-	-	-
12	6514	Intake valve spring retainer (8 required)	-	-	-
13	6513	Intake valve spring (8 required)	-	-	-
14	6A517	Intake valve seal (8 required)	-	-	-
15	6507	Intake valve (8 required)	-	-	-

16	W500033	Engine lift eye bolt	47 Nm (35 lb-ft)	-	-
17	17A084	LH engine lift eye	-	-	-
18	W500033	Engine lift eye bolt	47 Nm (35 lb-ft)	-	-
19	17K004	RH engine lift eye	-	-	-

### Disassembly

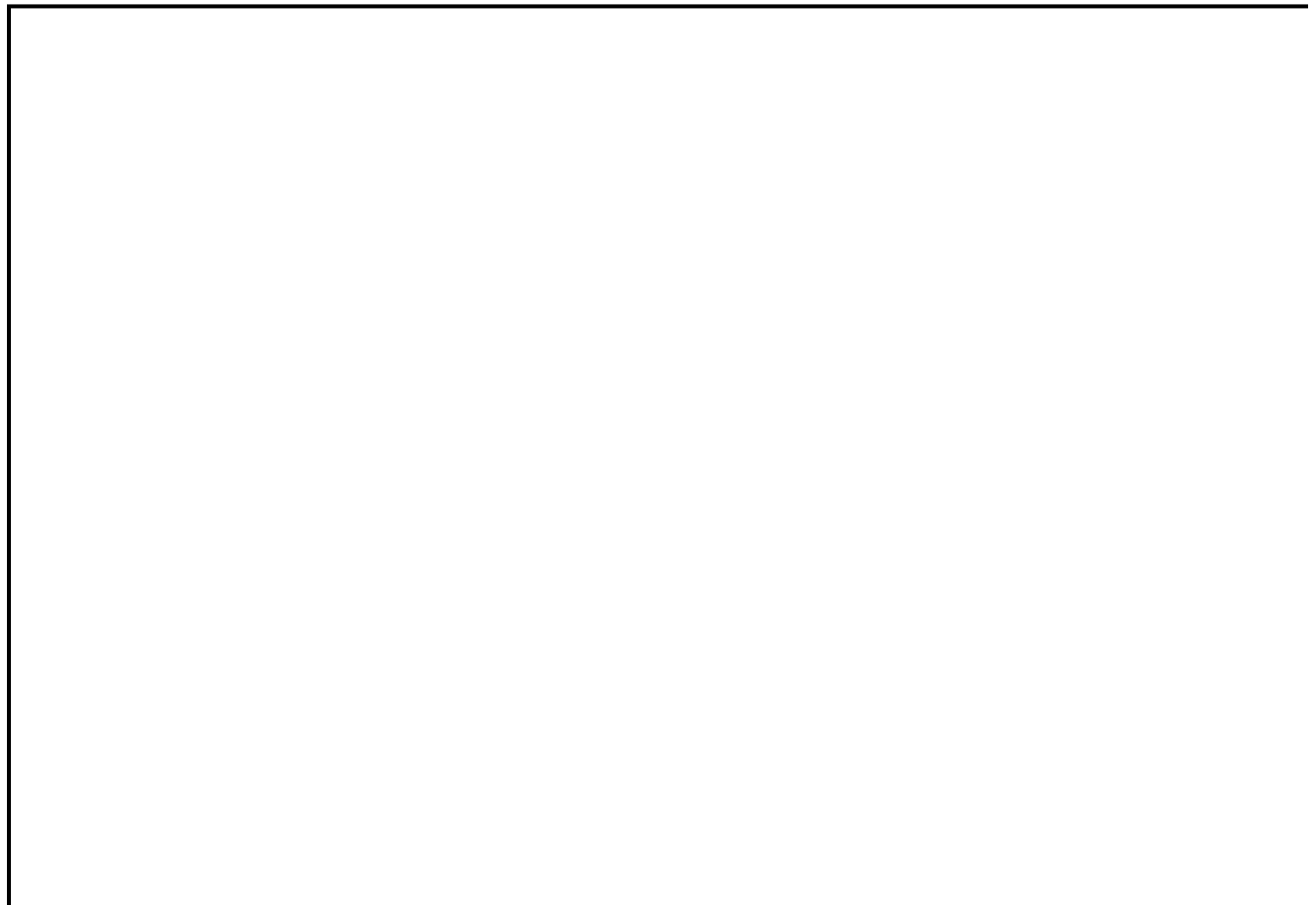
**NOTE:** During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan can cause engine failure.

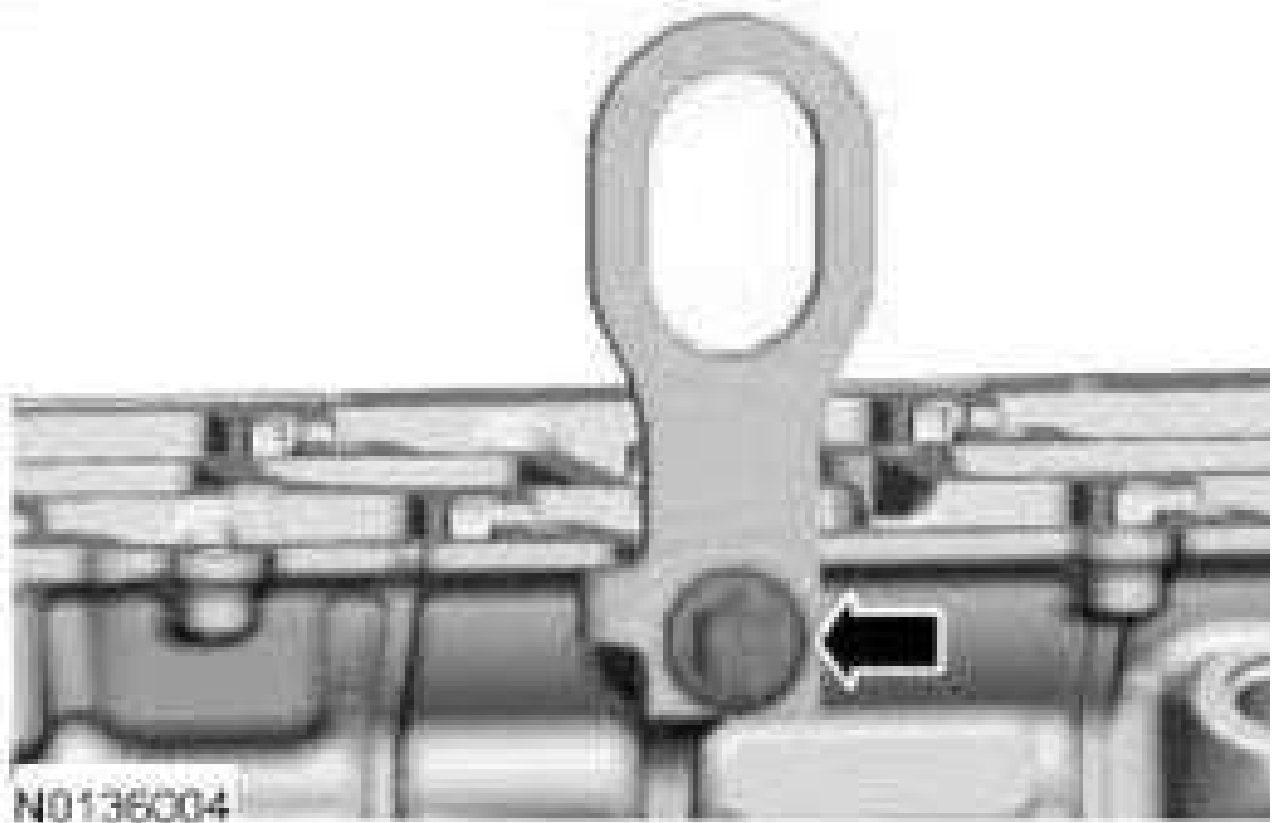
**NOTE:** Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.

**NOTE:** If the components are to be reinstalled, mark the location of the components removed, they must be installed in the same location.

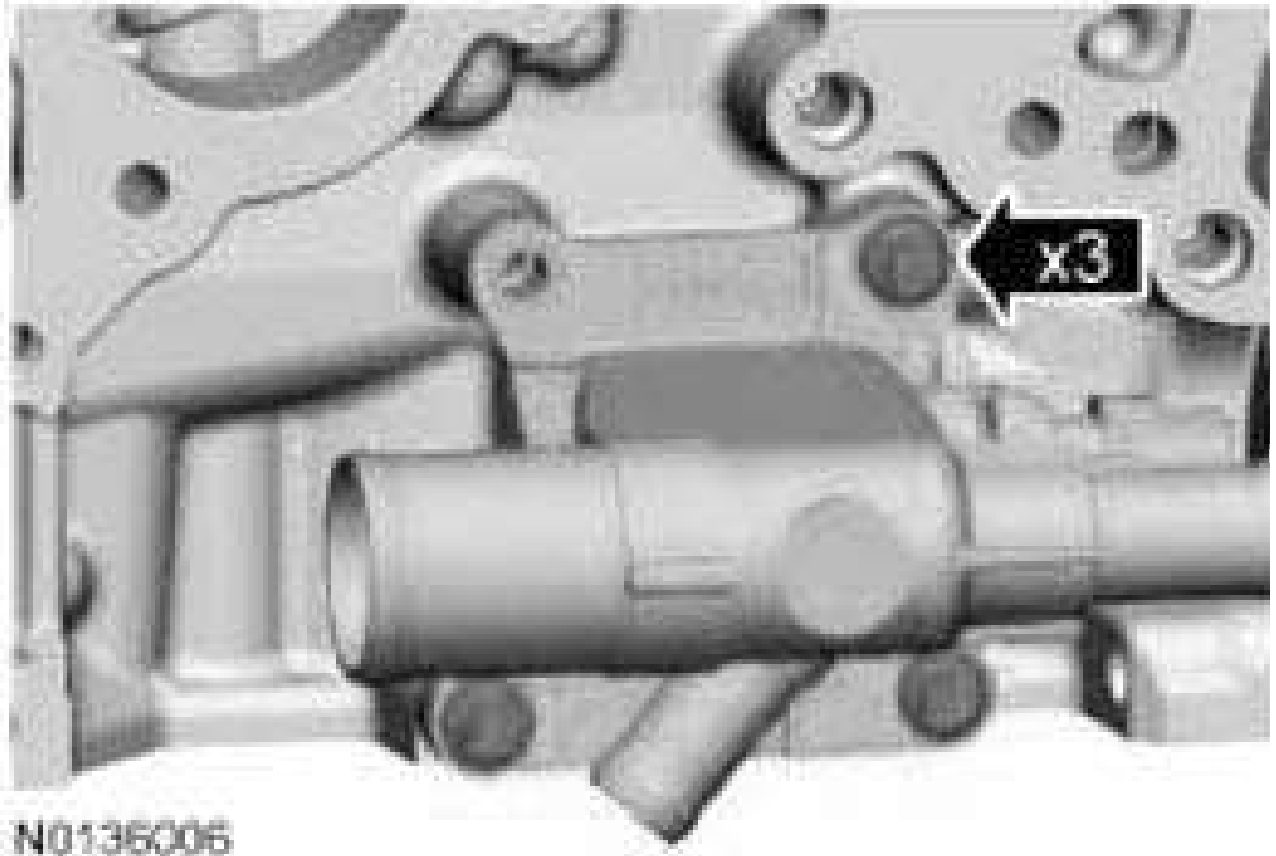
- NOTE:** RH shown in illustration, LH similar.

Remove the 2 bolts and the LH and RH engine lift eyes.





2. Remove the 3 bolts and the coolant outlet and gasket.

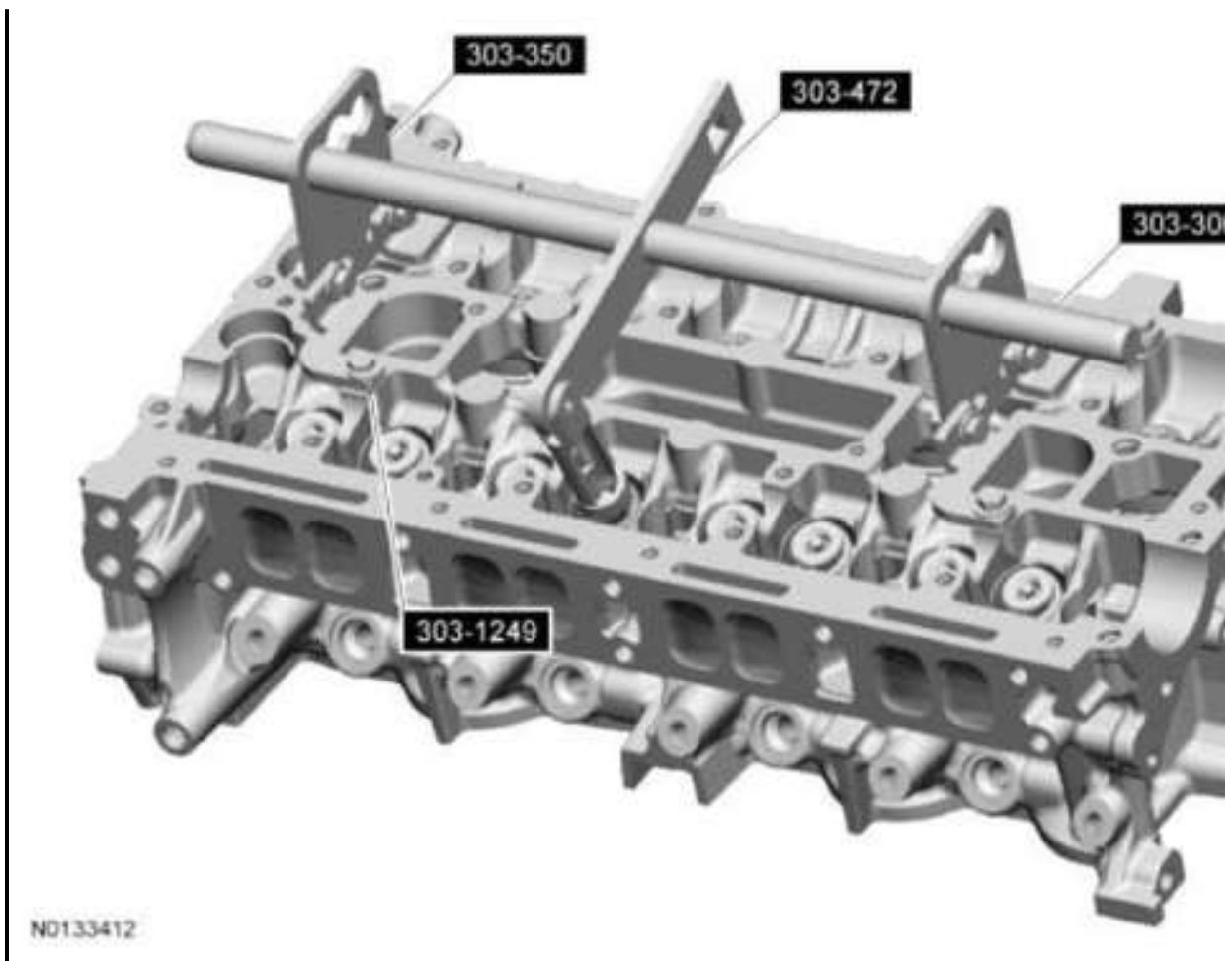


3. Remove and discard the **CHT** sensor.



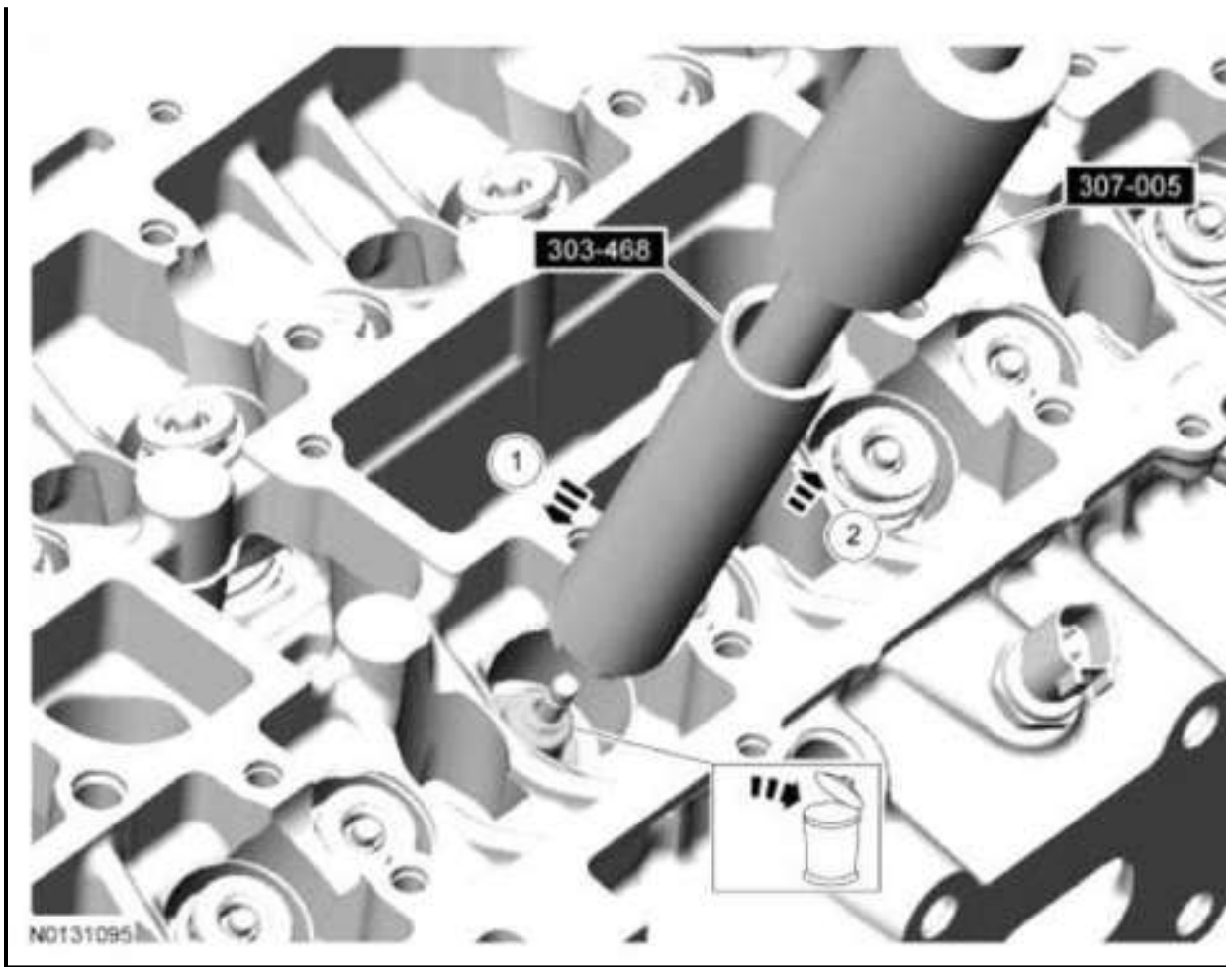
4. Using the 303-300 T87C-6565-A, the 303-350 T89P-6565-A, the 303-472 T94P-6565-AH and the 303-1249 compress the valve spring and remove the valve collet, using some multi-purpose grease and a small screwdriver.
  - Remove the valve spring retainer and the valve spring.
  - Inspect the valve springs.





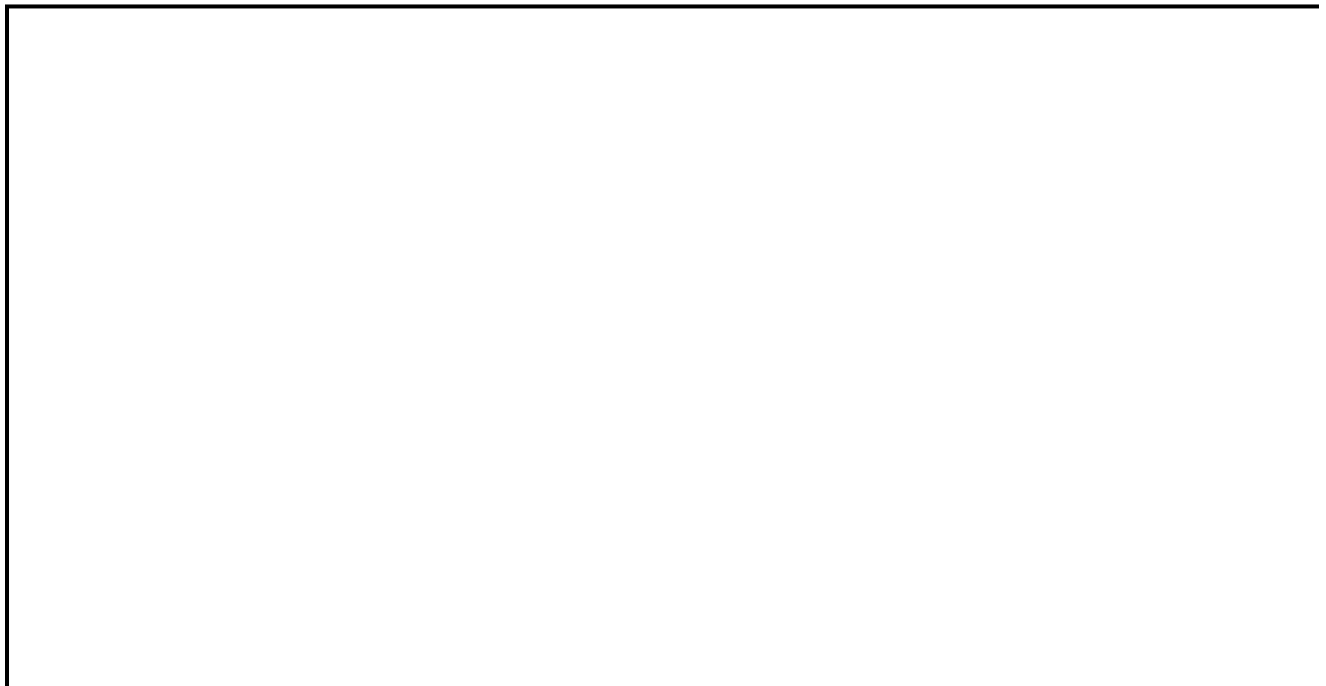
5. Remove and discard the valve seal.

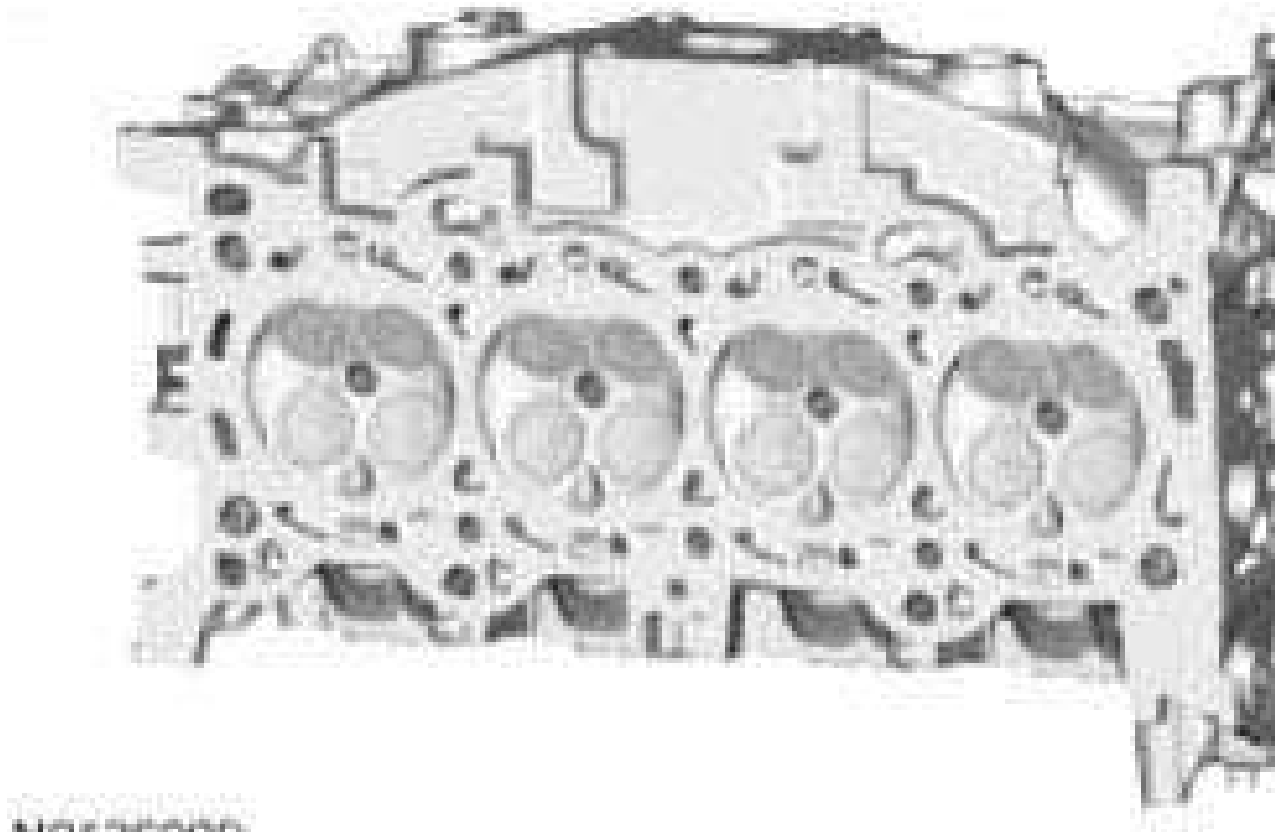
1. Position the 303-468 T94P-6510-AH and 307-005 T59L-100-B over the seal.
2. Pull up on the 307-005 T59L-100-B and 303-468 T94P-6510-AH and remove the seal.



6. **NOTE:** Mark each valve location if the original valves are to be used.

Remove the valves.

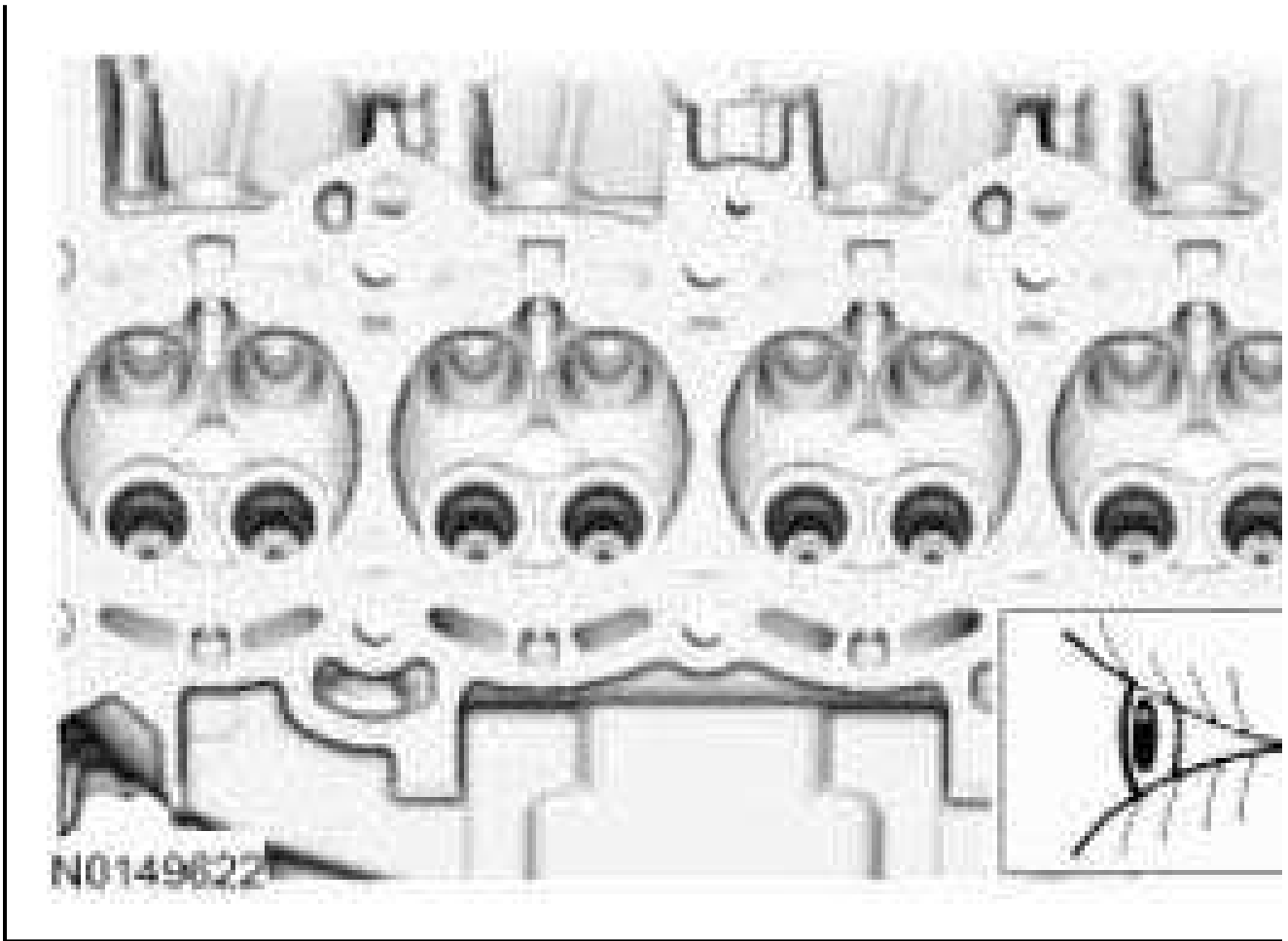




N0136009

7. Inspect the valve seats and guides.

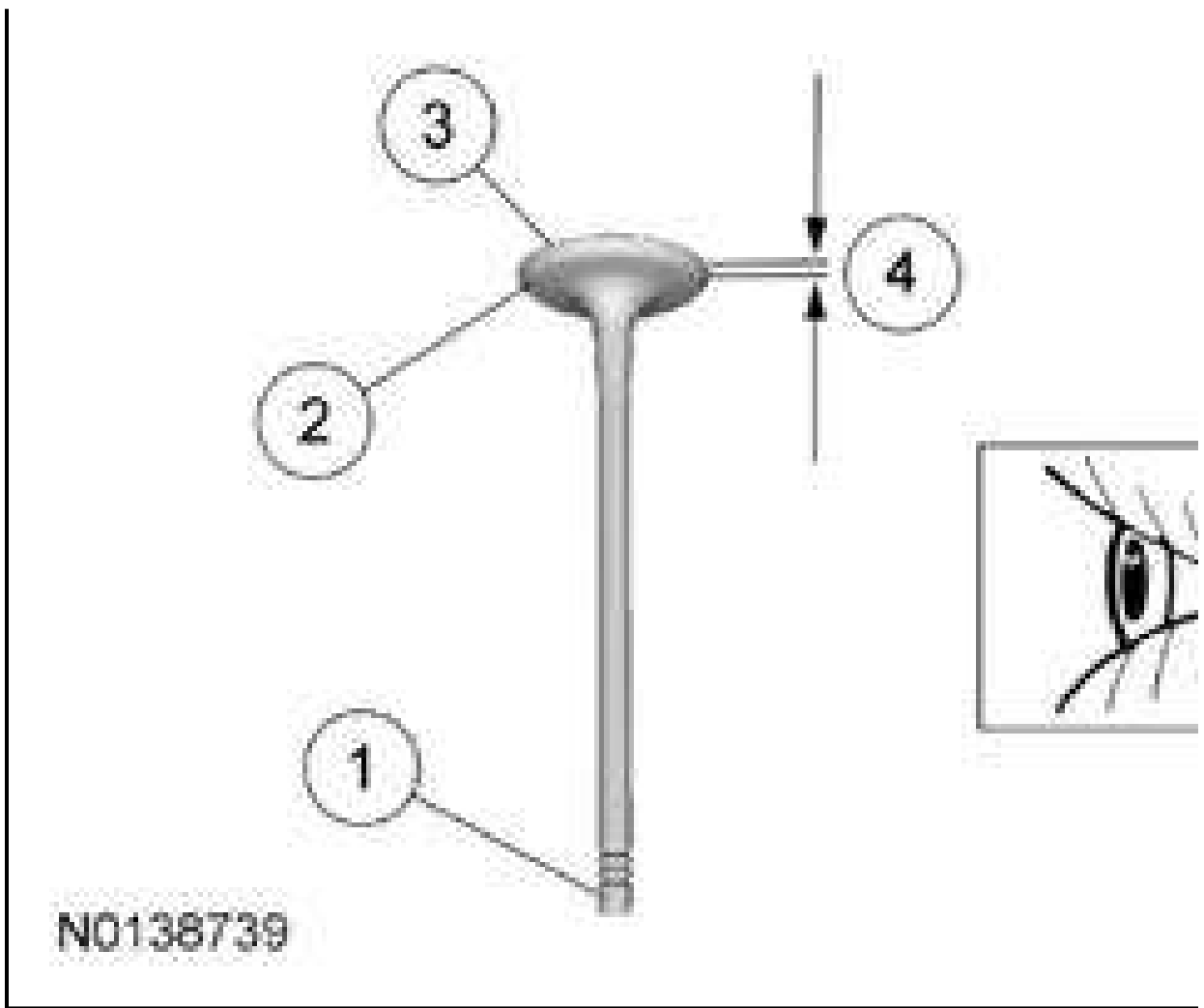
A large empty rectangular box with a black border, intended for a student to write their inspection findings or observations.



8.

1. The end of the stem for grooves or scoring.
2. The valve face and edge for pits, grooves or scores.
3. The valve head for signs of burning, erosion, warpage and cracking
4. The valve margin for wear.



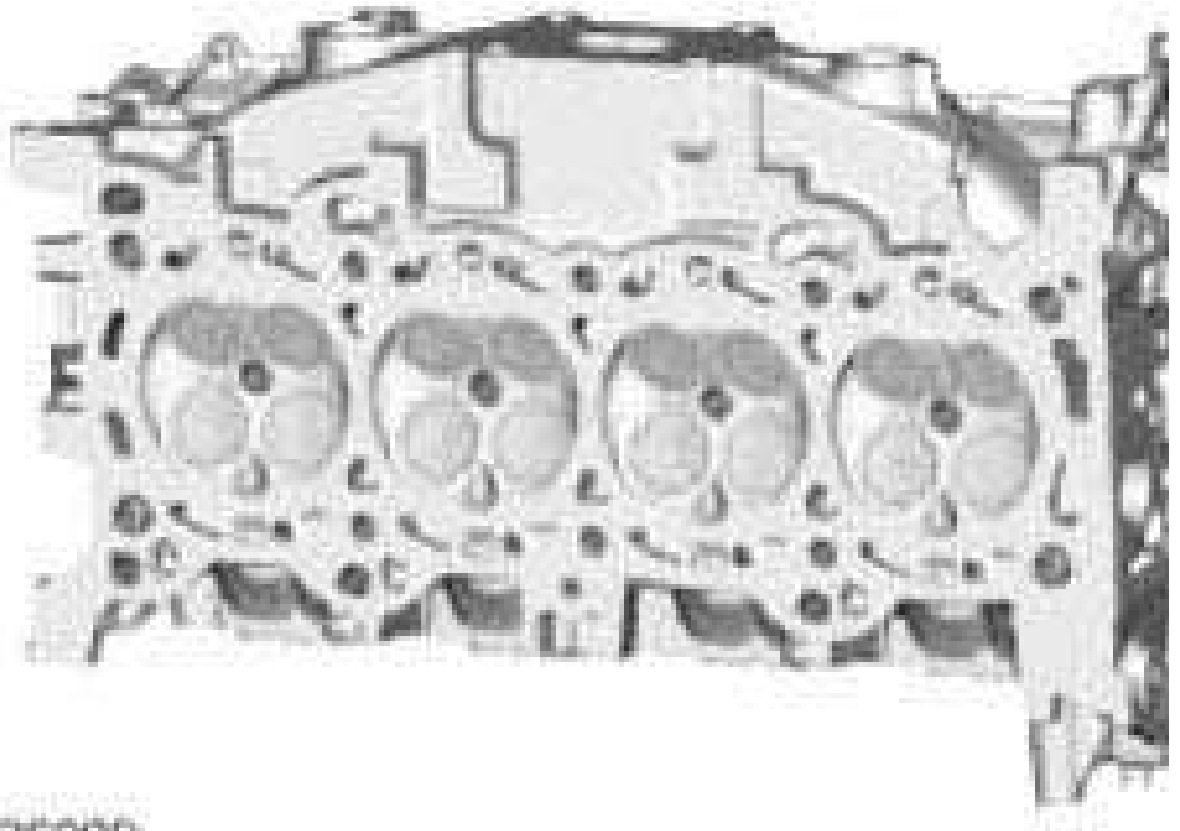


**Assembly**

- NOTE:** If installing the original valves, make sure the valves are installed in the same position from which they were removed.
- 1.

Coat the valve stems with clean engine oil and install the valves.

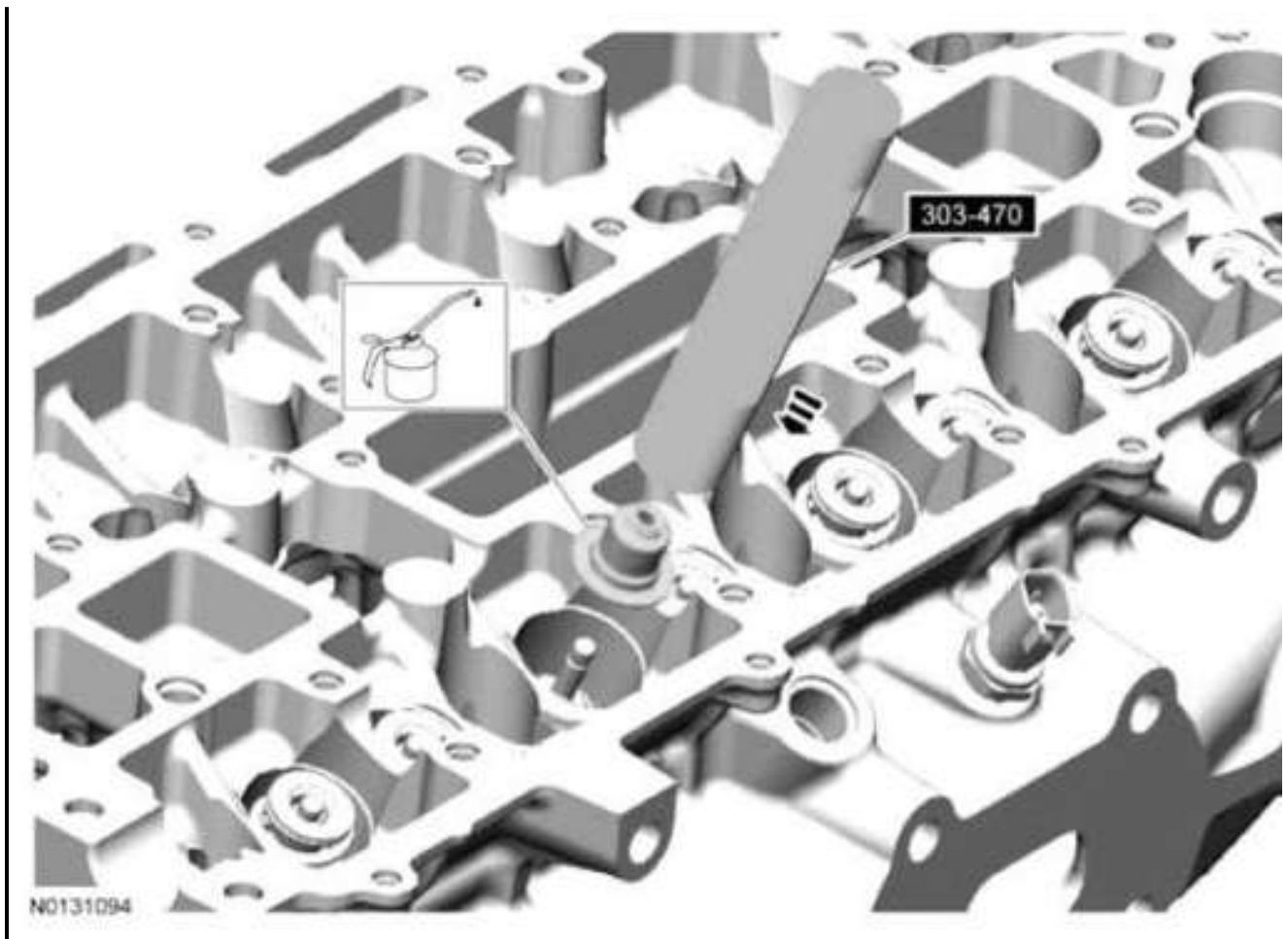




N0136009

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

Using the 303-470 T94P-6510-CH, install the valve seal.

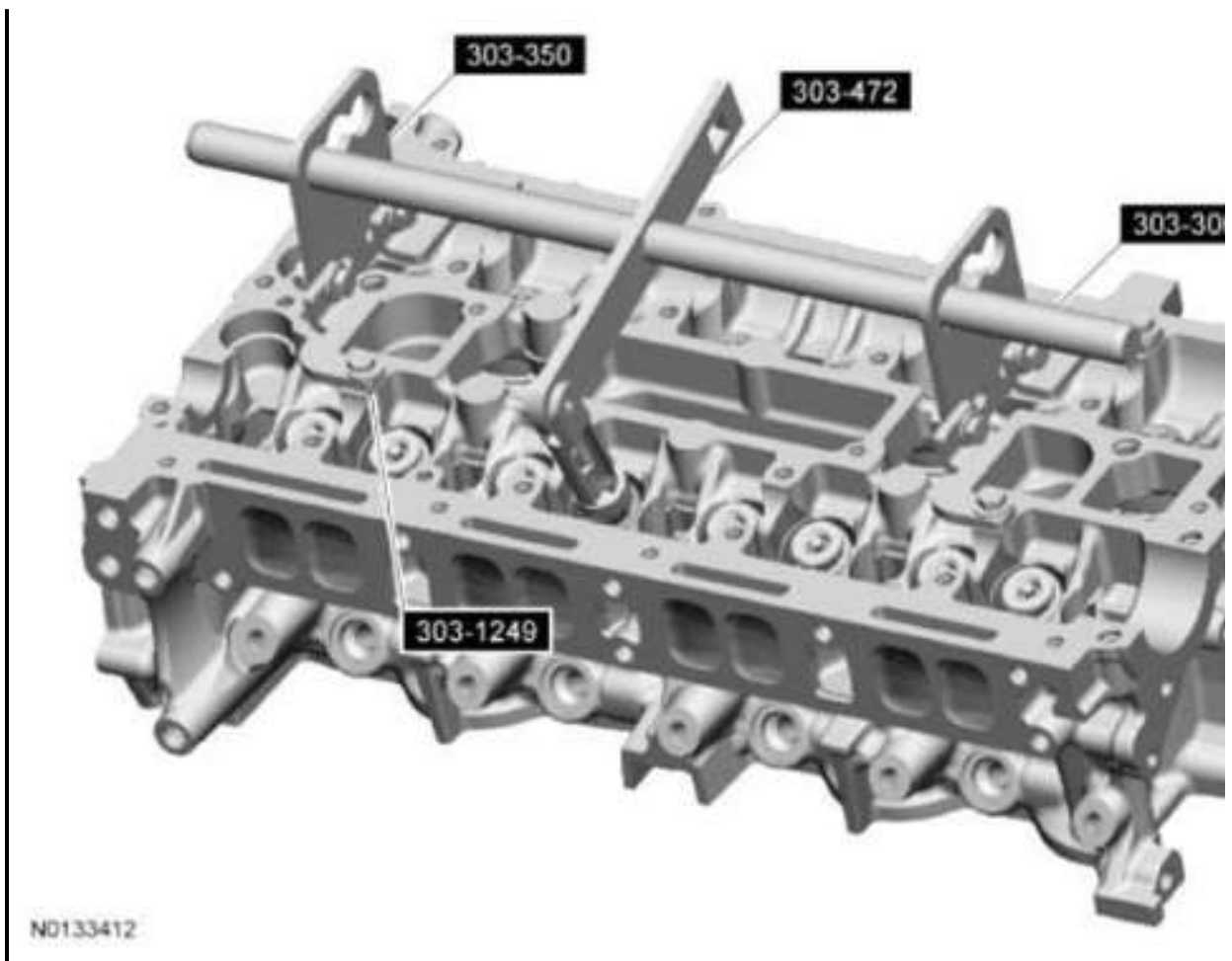


3. **NOTE: Check the seating of the valve collet.**

Install the valve spring and the valve spring retainer.

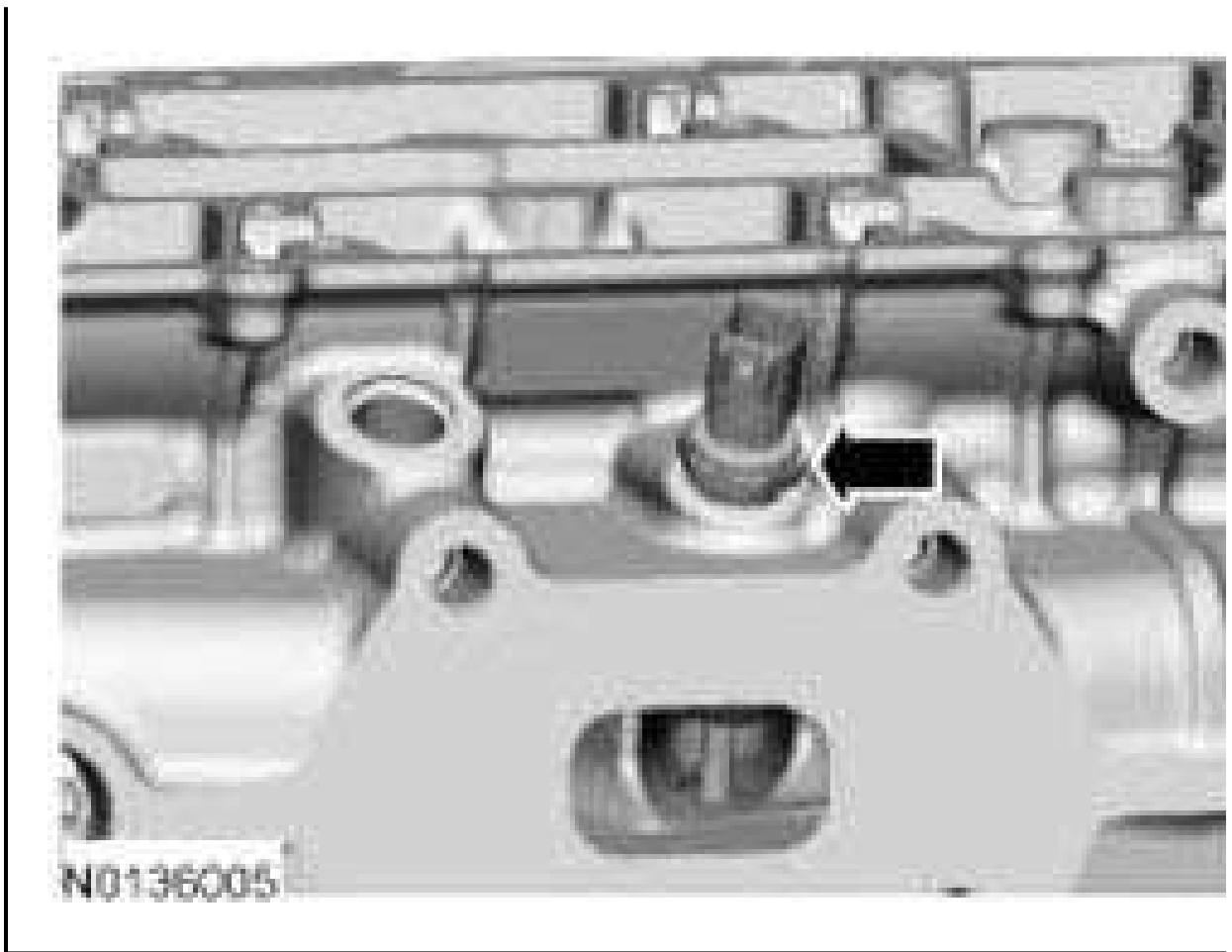
- Using the 303-300 T87C-6565-A, the 303-350 T89P-6565-A, the 303-472 T94P-6565-AH and the 303-1249 compress the valve spring and install the valve collet using some grease and a small screwdriver.



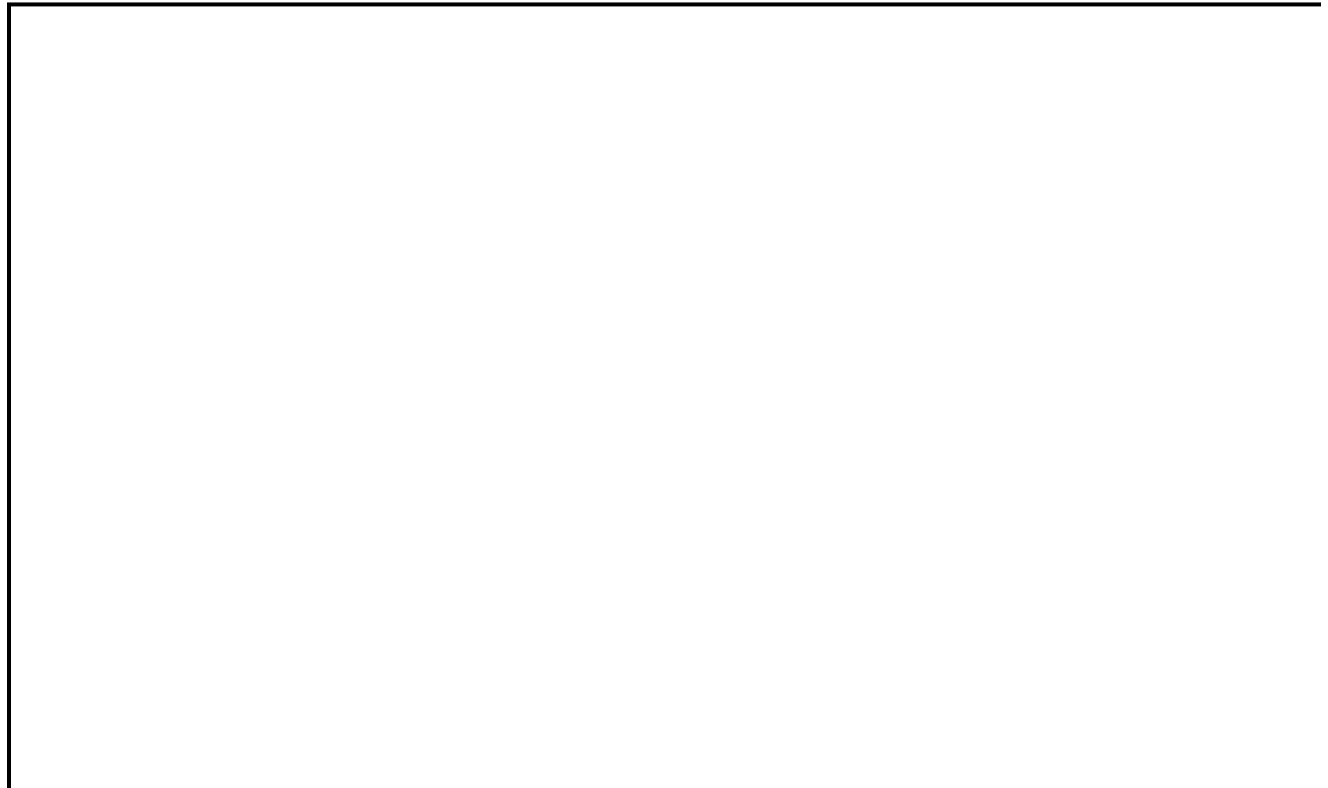


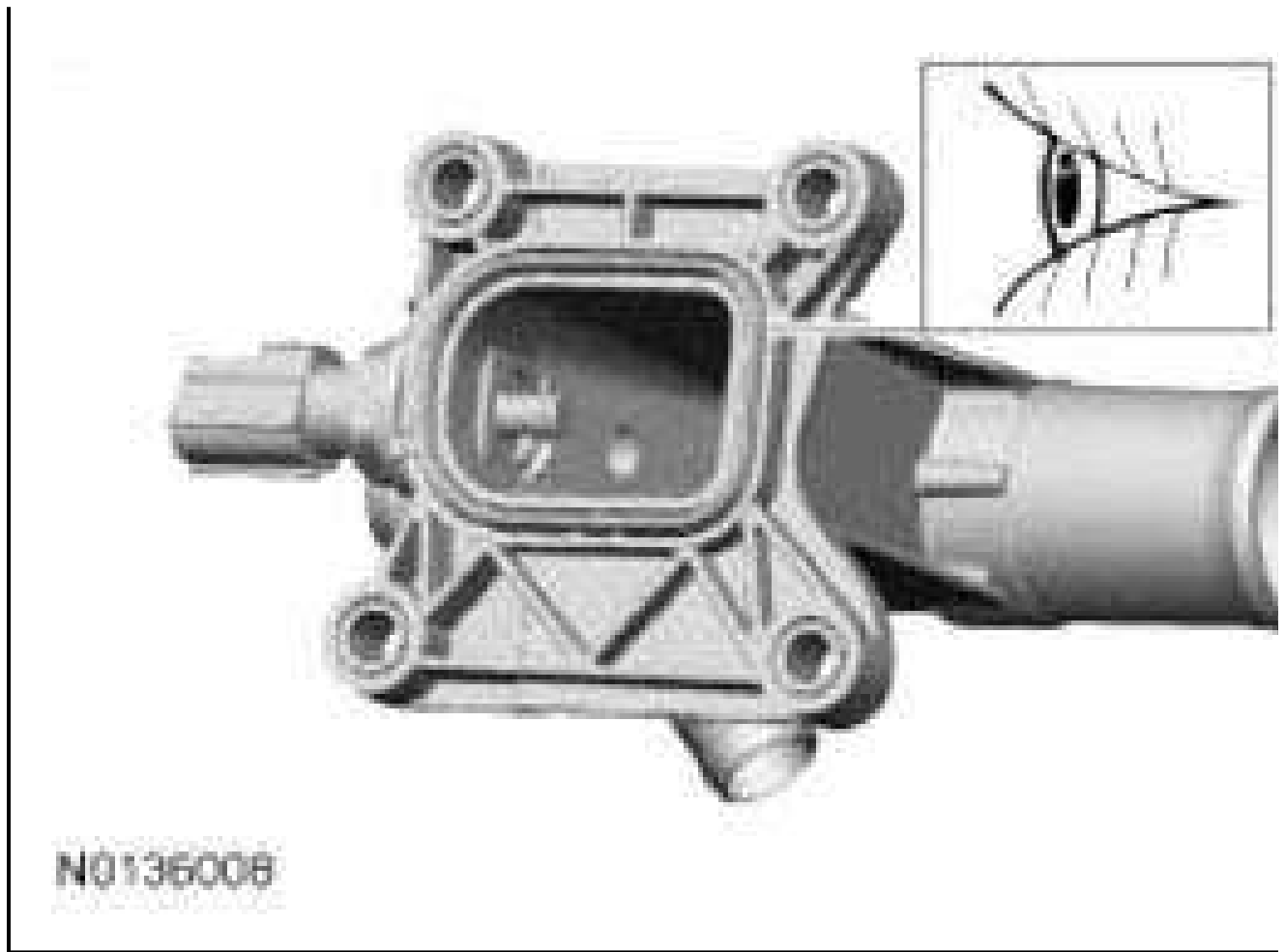
4. Install a new **CHT** sensor.
  - Tighten to 11 Nm (97 lb-in).



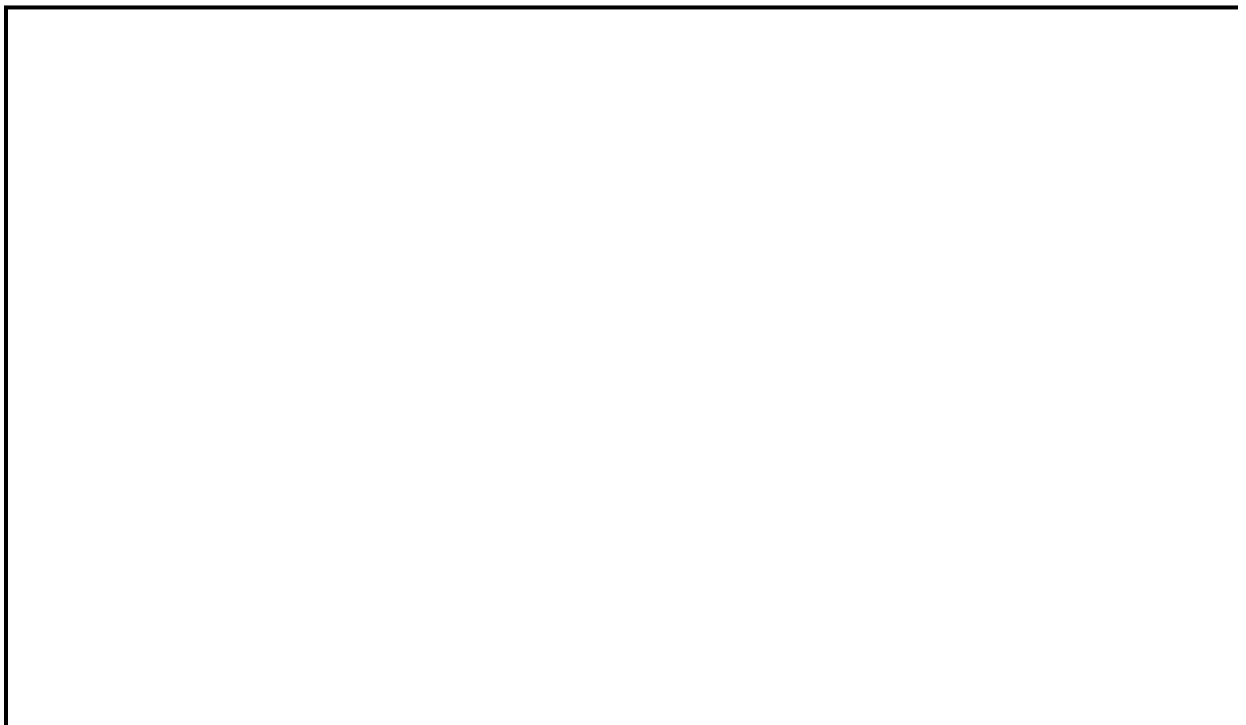


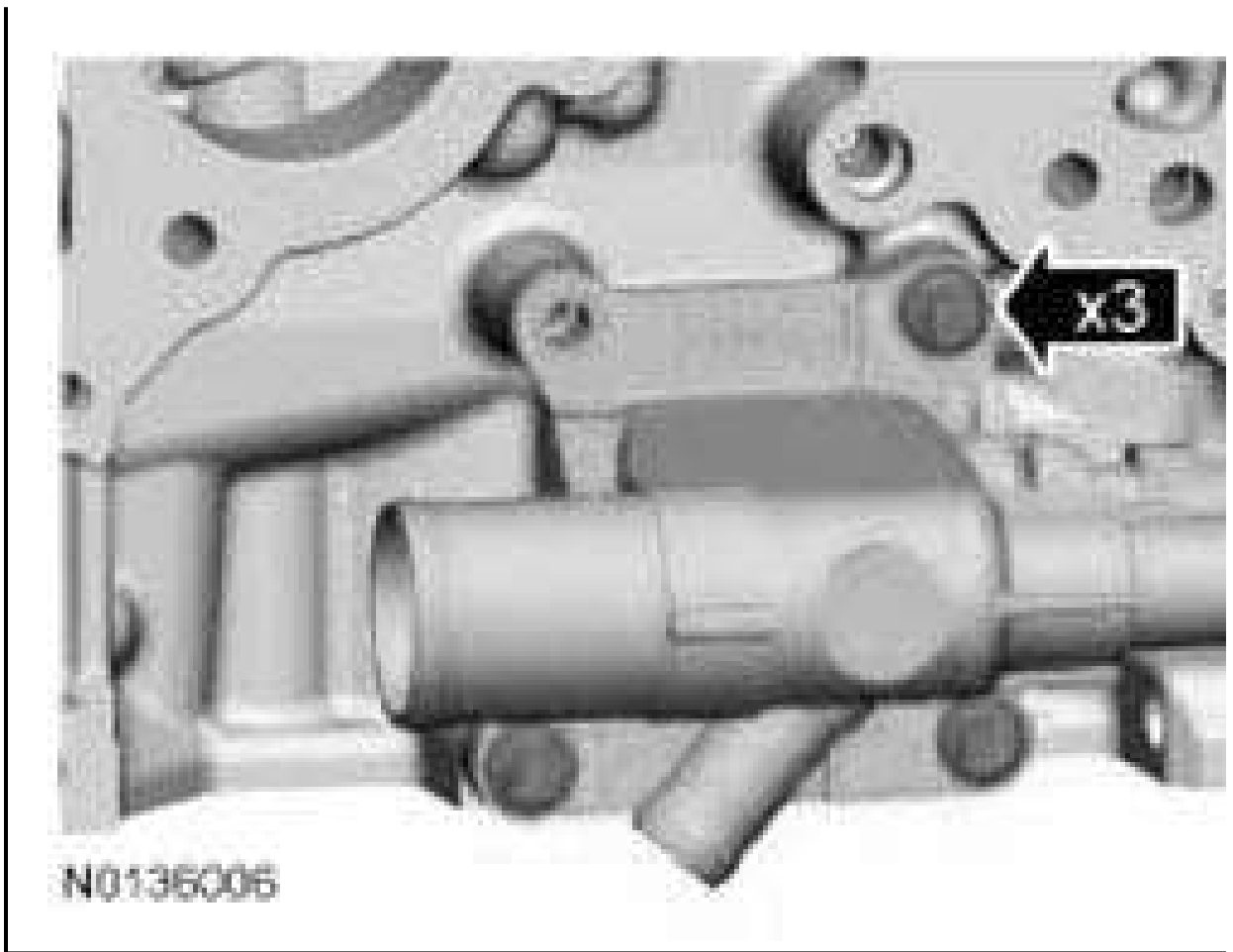
5. Inspect the gasket and replace if necessary.





6. Install the gasket, coolant outlet and the 3 bolts.
  - Tighten to 10 Nm (89 lb-in).

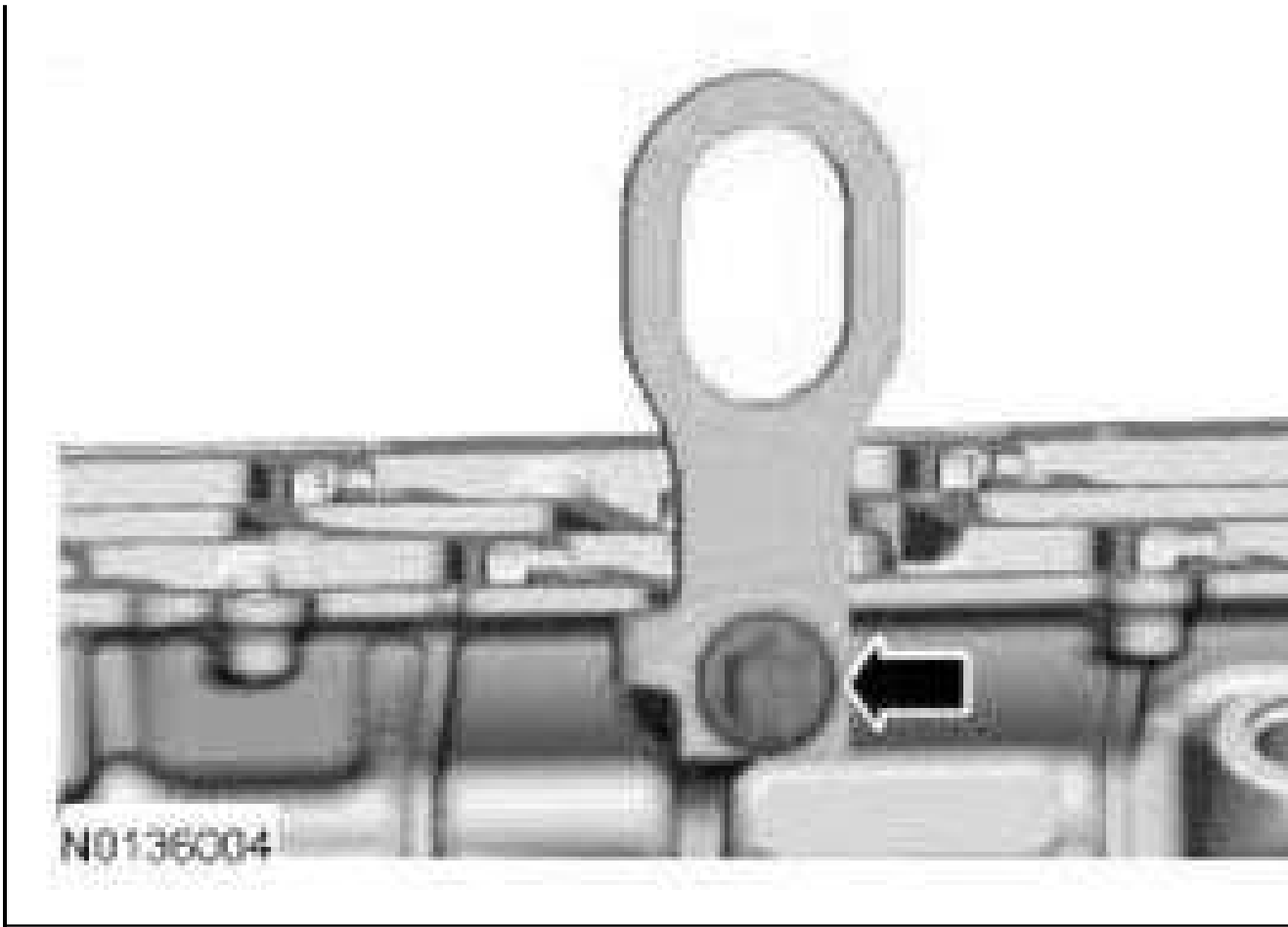




7. **NOTE:**        **RH shown in illustration, LH similar.**

Install the LH and RH engine lift eyes and the 2 bolts.

- Tighten to 47 Nm (35 lb-ft).



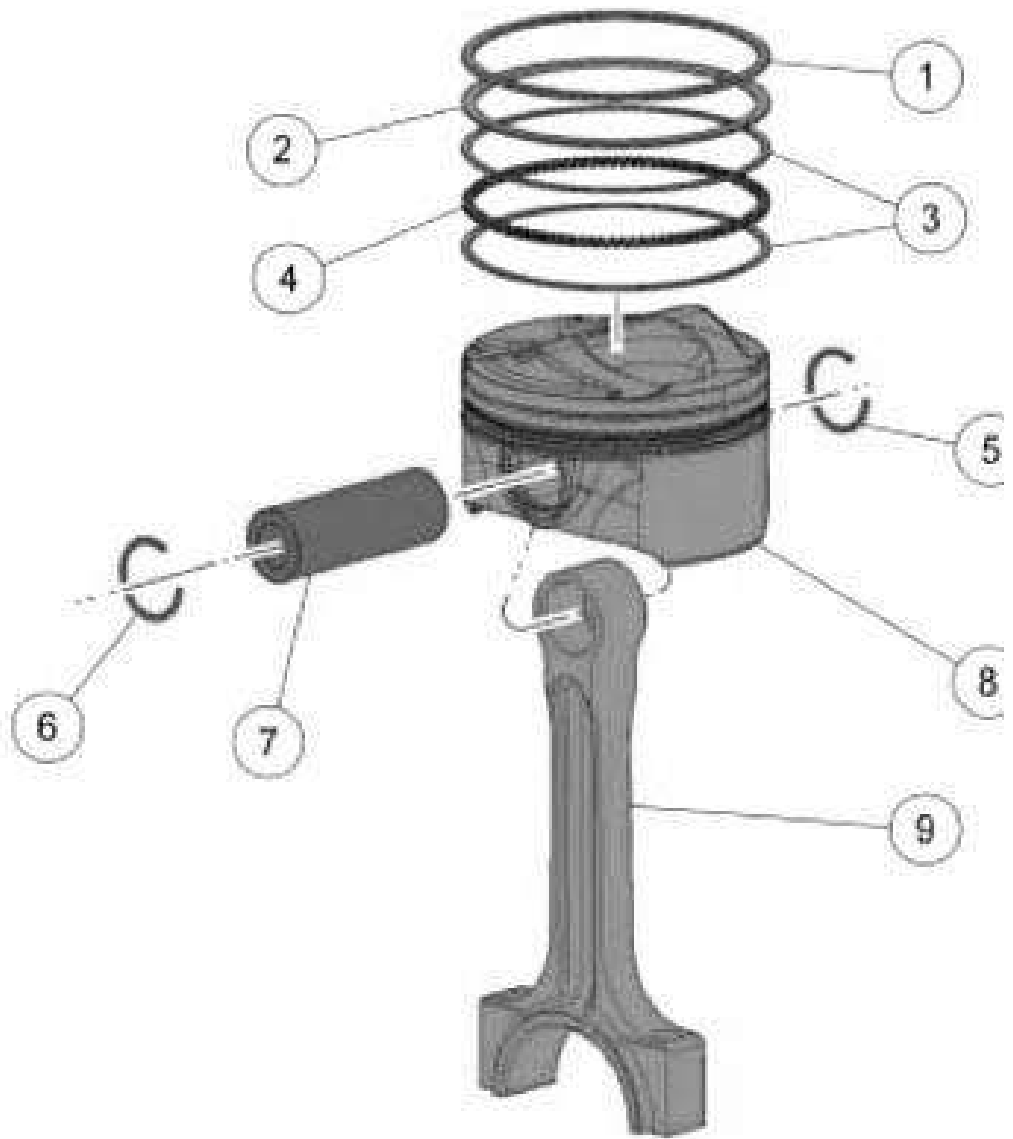
**PISTON**

**MATERIAL SPECIFICATIONS**

Item	Specification
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSS-M2C946-A

**Exploded View**





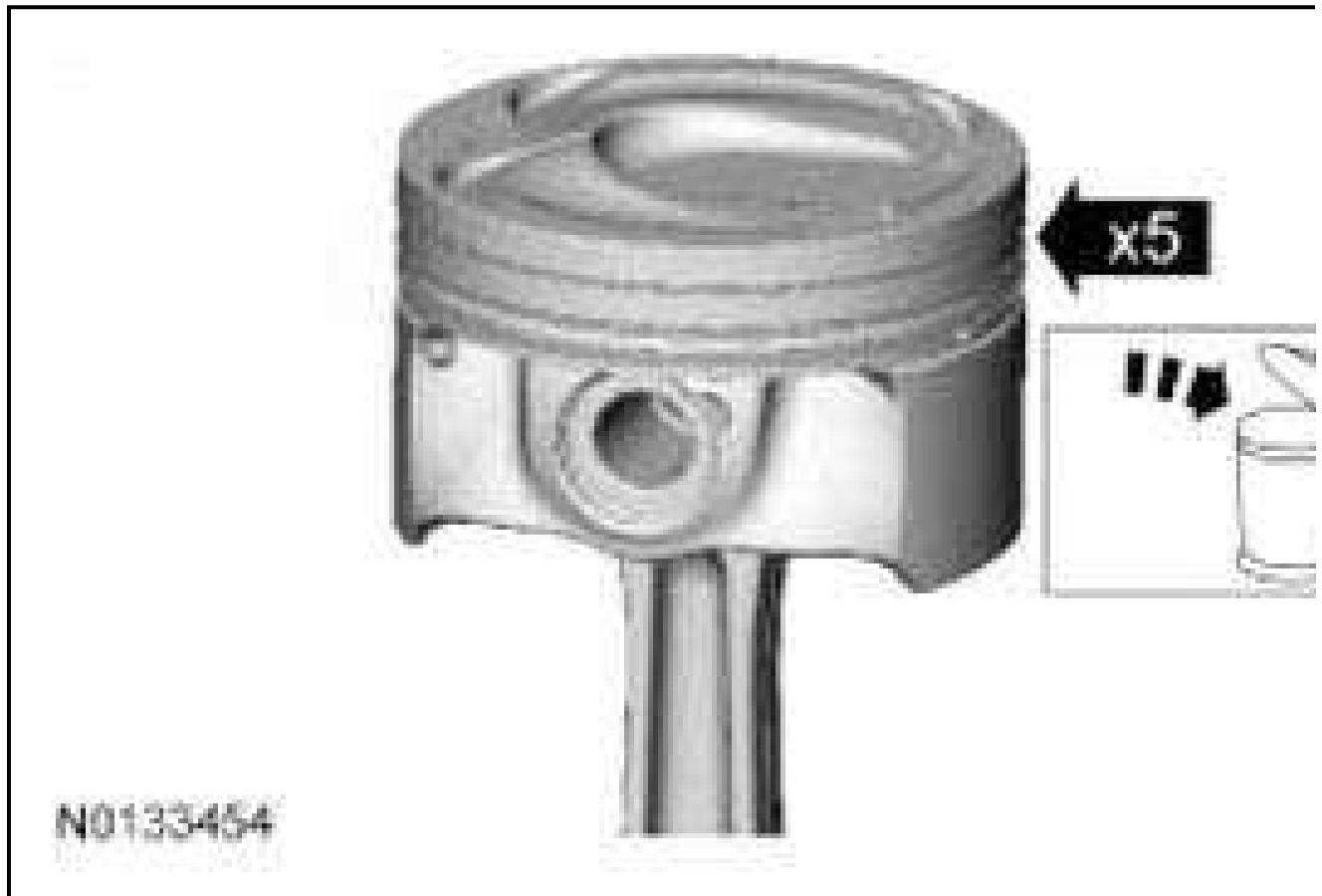
N0133403

Item	Part Number	Description
1	-	Piston compression upper ring (part of 6148)
2	-	Piston compression lower ring (part of 6148)
3	-	Piston oil control segment ring (part of 6148) (2 required)
4	-	Piston oil control spacer (part of 6148)
5	6140	Piston pin retainer
6	6140	Piston pin retainer
7	6135	Piston pin
8	6110	Piston
9	6200	Connecting rod

### Disassembly

**NOTE:** If the piston and connecting rod are to be reinstalled, they must be assembled in the same orientation. Mark the piston orientation to the connecting rod reassembly.

1. Remove and discard the piston rings.



2. Remove and discard the 2 piston pin retainers.





3. Separate the piston from the connecting rod.

- Clean and inspect the piston and connecting rod. REFER to **CONNECTING ROD CLEANING** .





### Assembly

1. Align the piston-to-connecting rod orientation marks and position the piston on the connecting rod.



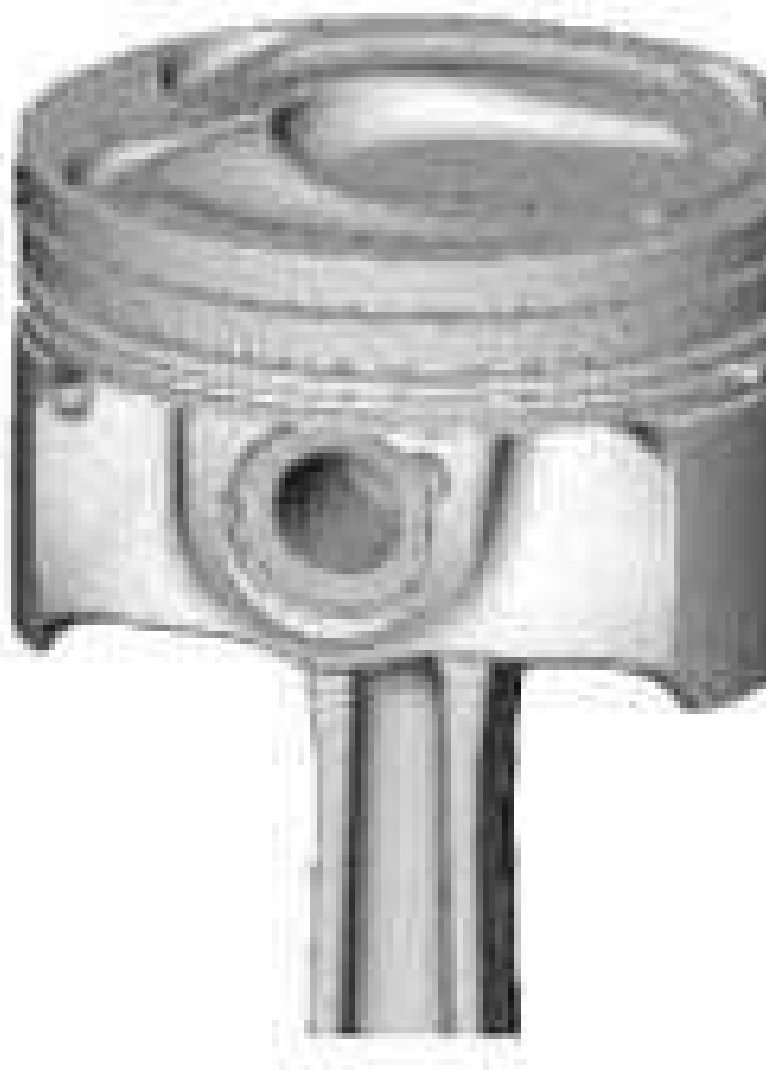


NO133457



2. **NOTE:**      **Lubricate the piston pin and pin bore with clean engine oil.**

Install the piston pin in the piston and connecting rod assembly.



**N0133459**

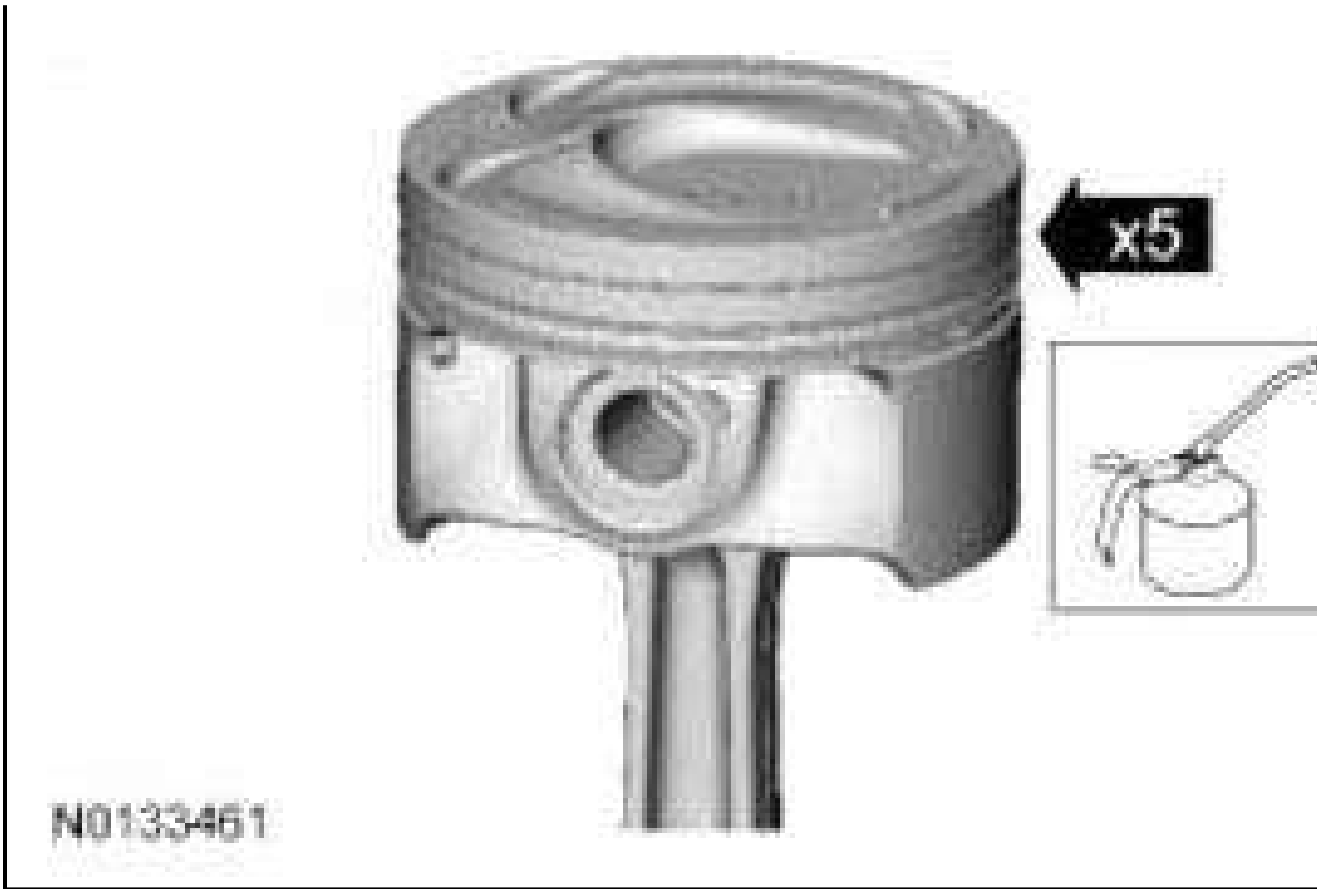
3. Install the 2 new piston pin retainers in the piston.



NO133460

4. **NOTE:** Lubricate the piston and the new piston rings with clean engine oil.

Install the piston rings on the piston.



5. Align the piston rings on the piston.
  1. Upper oil control segment ring gap location
  2. Oil control spacer gap location
  3. Lower oil control segment ring gap location

