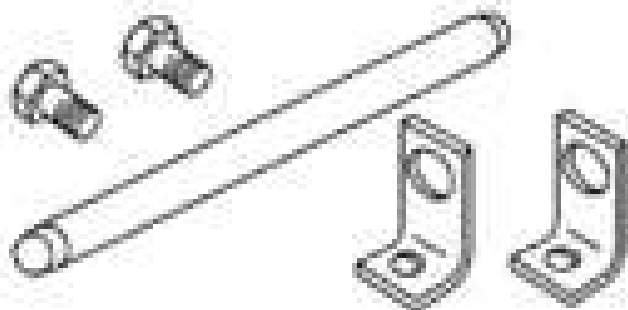


# DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

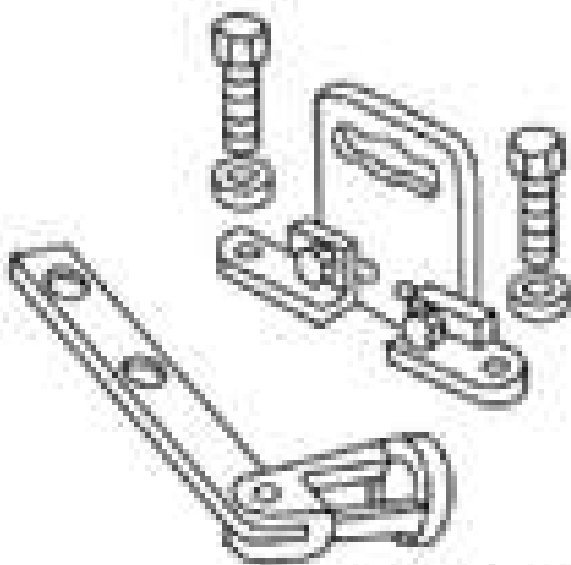
## CYLINDER HEAD

### SPECIAL TOOLS



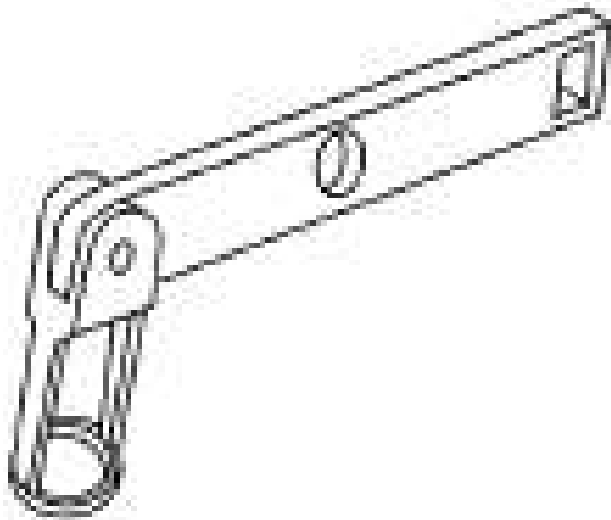
**ST1981-A**

Compressor, Valve Spring  
303-300 (T87C-6565-A)



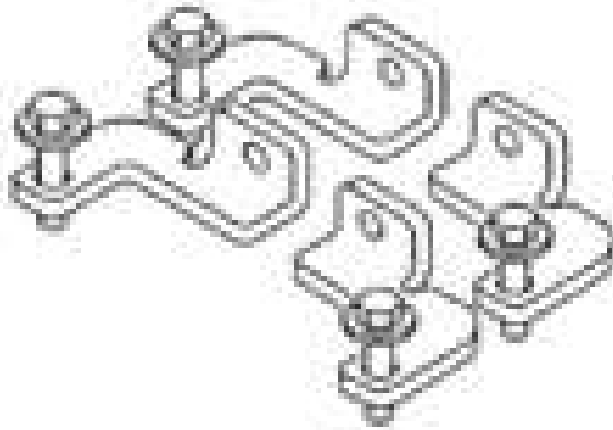
**ST1907-A**

Compressor, Valve Spring  
303-350 (T89P-6565-A)



**ST1902-A**

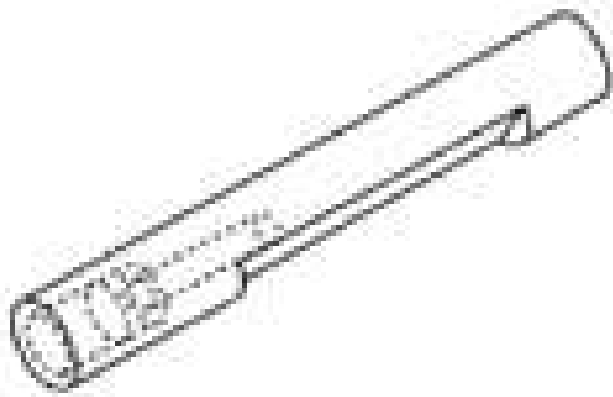
Compressor, Valve Spring  
303-472 (T94P-6565-AH)



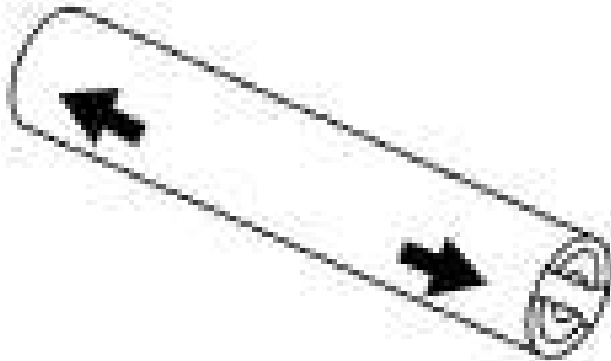
**ST3028-A**

Compressor, Valve Spring  
303-1249

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



**ST1906-A**



**ST1904-A**

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



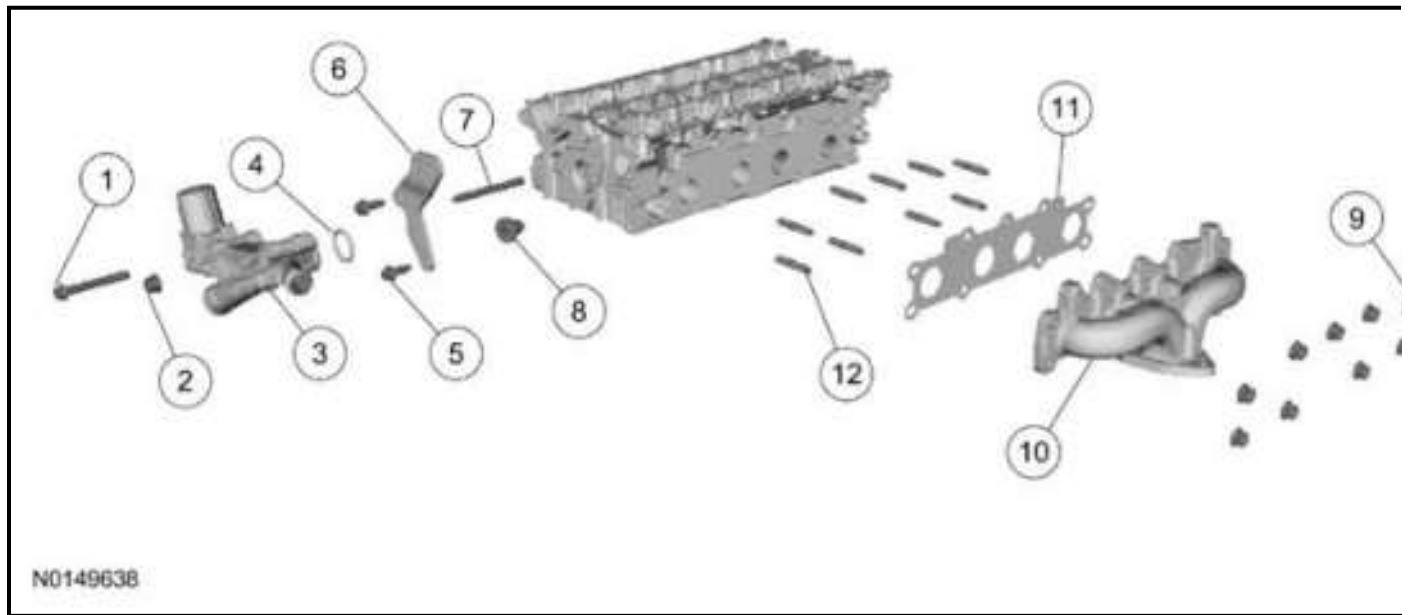
**ST1187-A**

Slide Hammer  
307-005 (T59L-100-B)

## MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) XO-5W20-QSP (US); CXO-5W20-LSP12 (Canada)	WSS-M2C945-A
Motorcraft® Multi-Purpose Grease XL-5	ESB-M1C93-B

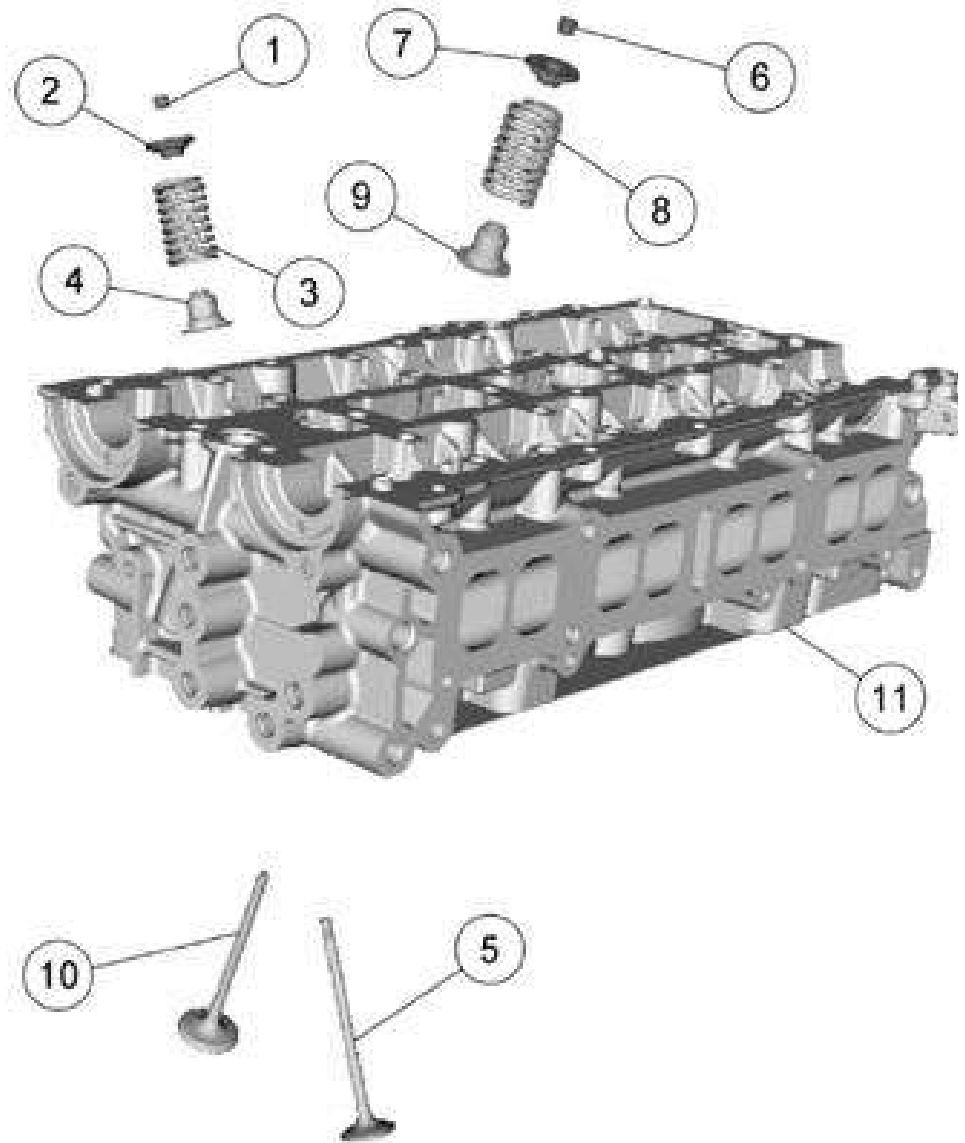
### Cylinder Head (View 1 of 2)



Item	Part Number	Description
1	W715400	Coolant outlet bolt - 18 Nm (159 lb-in)
2	W520202	Coolant outlet nut - 18 Nm (159 lb-in)
3	8K556	Coolant outlet
4	-	Coolant outlet O-ring seal (part of 8K556)
5	W500223	Engine lift eye bracket bolt (2 required) - 19 Nm (168 lb-in)
6	17K078	Engine lift eye bracket
7	W714754	Coolant outlet stud - 5 Nm (44 lb-in)
8	W715533	Oil gallery plug
9	-	Exhaust manifold nut (9 required) - refer to procedure
10	-	Exhaust manifold
11	-	Exhaust manifold gasket
12	W715309	Exhaust manifold stud (9 required) - 10 Nm (89 lb-in)

### Cylinder Head (View 2 of 2)





N0138730

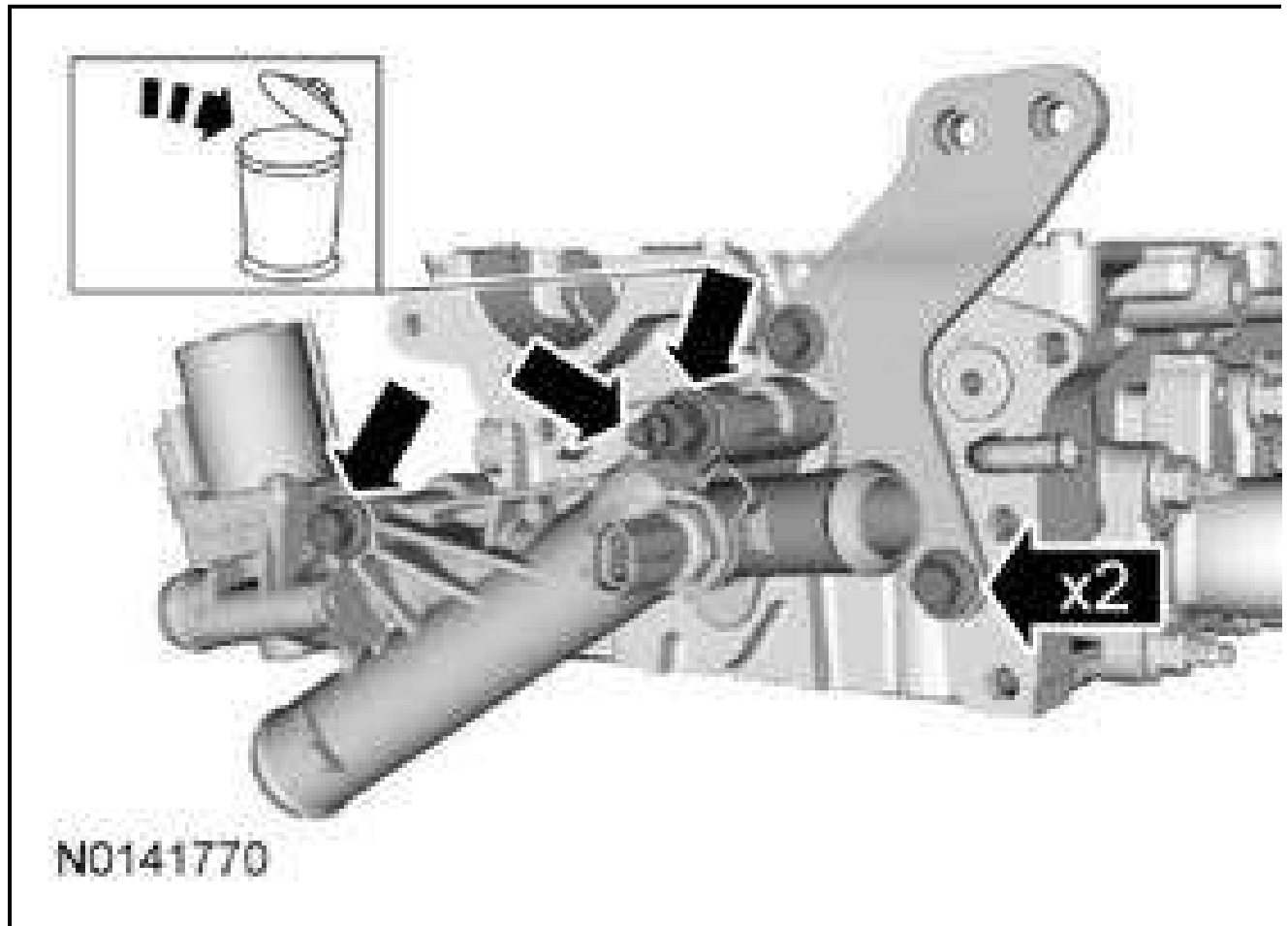
Item	Part Number	Description
1	6518	Exhaust valve collet (16 required)
2	6514	Exhaust valve spring retainer (8 required)
3	6513	Exhaust valve spring (8 required)
4	6571	Exhaust valve seal (8 required)
5	6507	Exhaust valve (8 required)
6	6518	Intake valve collet (16 required)
7	6514	Intake valve spring retainer (8 required)
8	6513	Intake valve spring (8 required)
9	6571	Intake valve seal (8 required)
10	6505	Intake valve (8 required)
11	6049	Cylinder head

## 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.

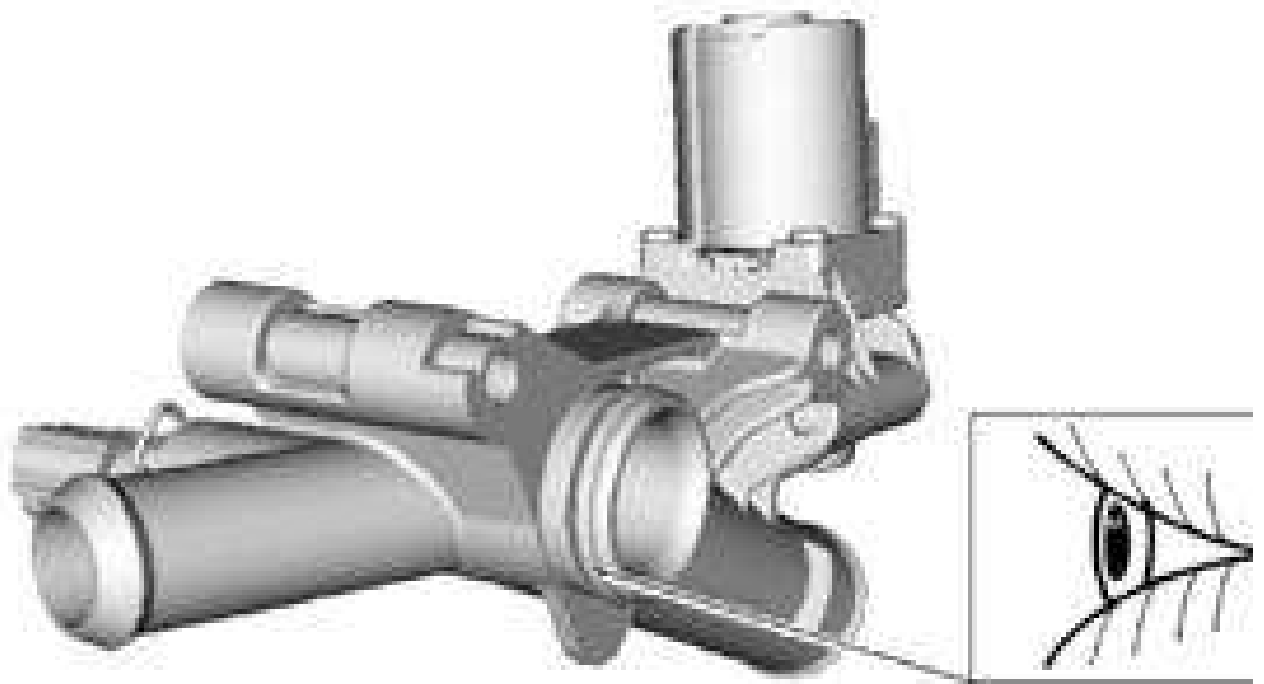
**NOTE:** If the components are to be reinstalled, mark the location of the components removed, they must be installed in the same location.

1. Discard the specified component. Follow local disposal regulations.



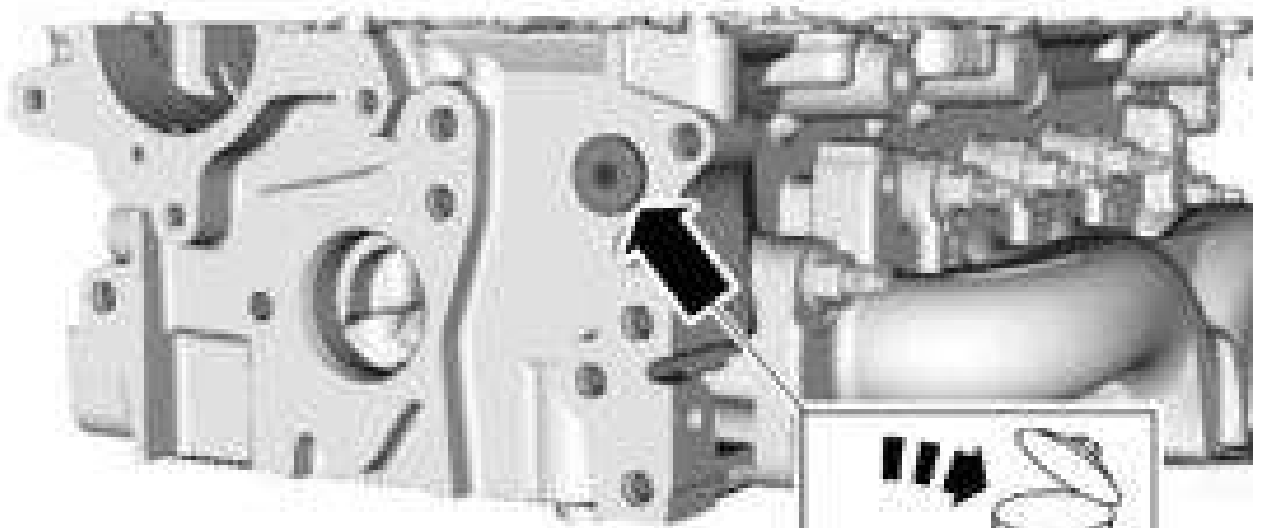
2. Visual check.





**N0138732**

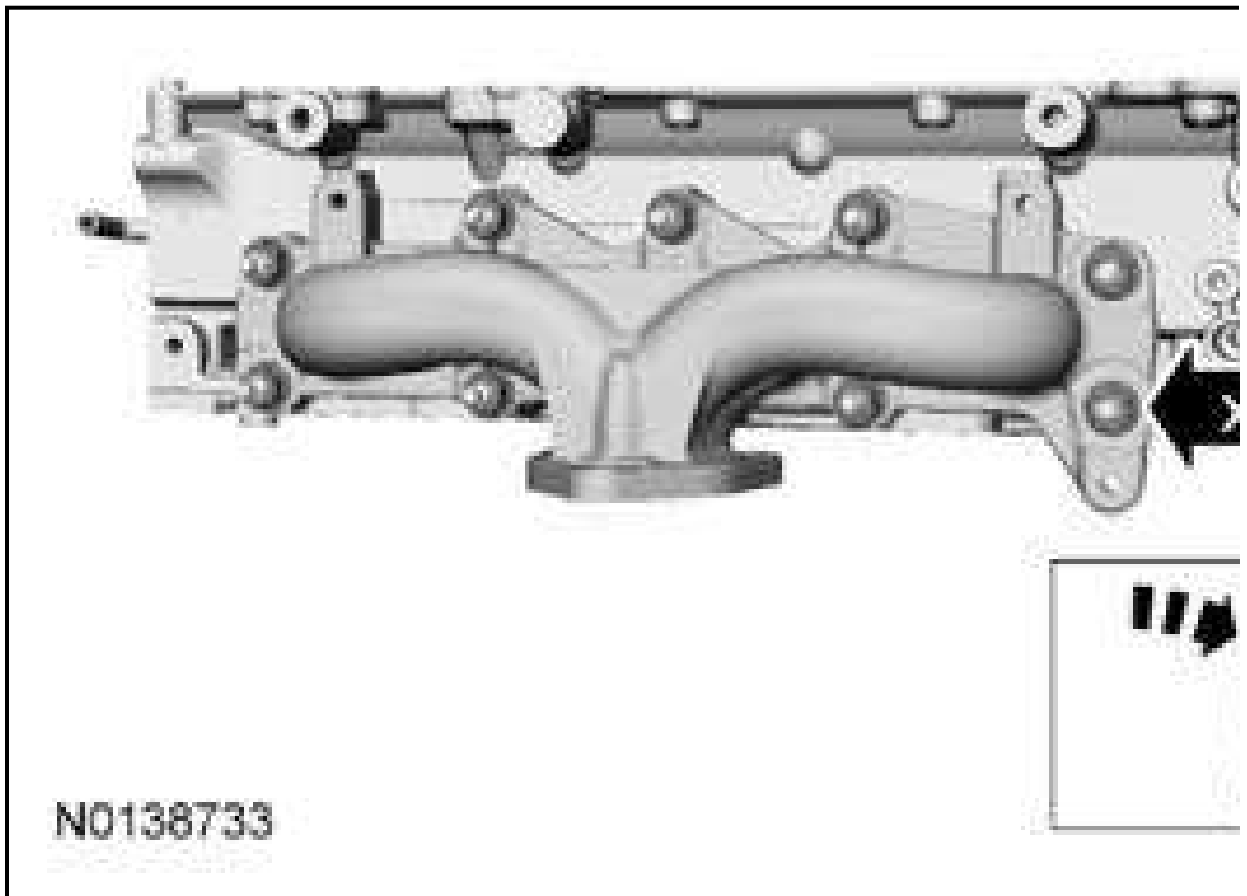
3. Discard the specified component. Follow local disposal regulations.



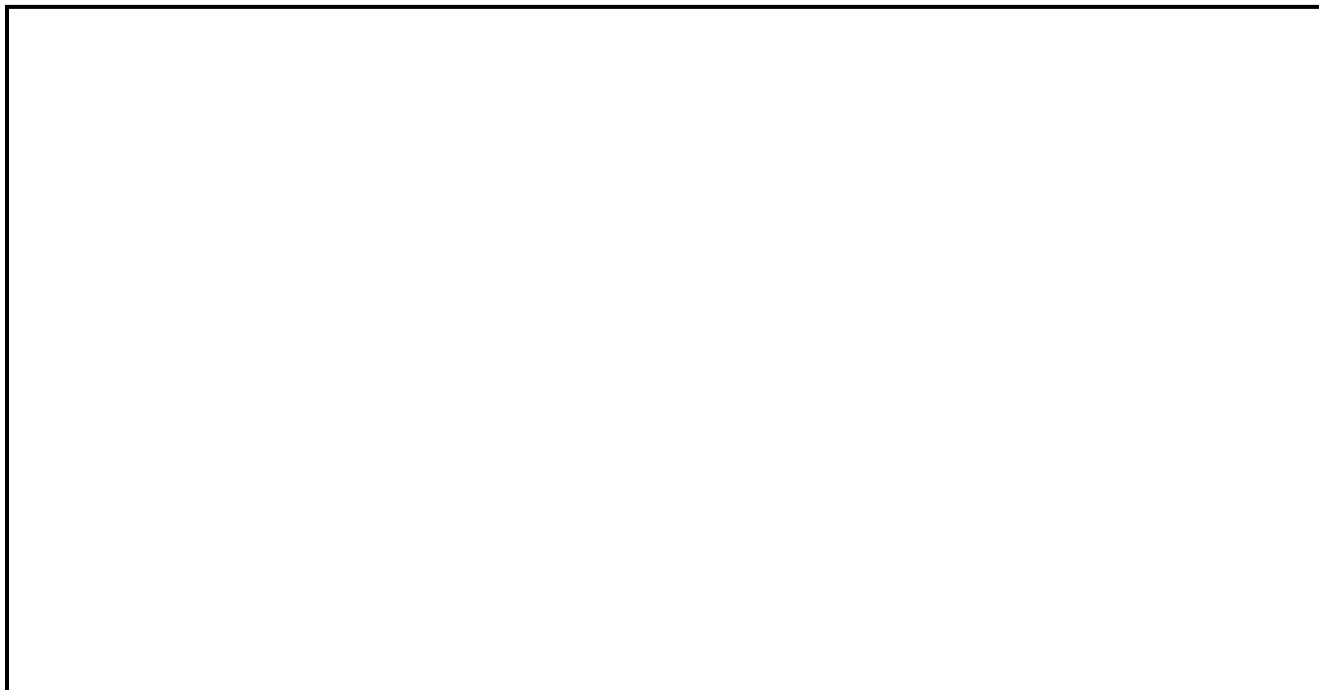
**N0149639**

4. Discard the specified component. Follow local disposal regulations.

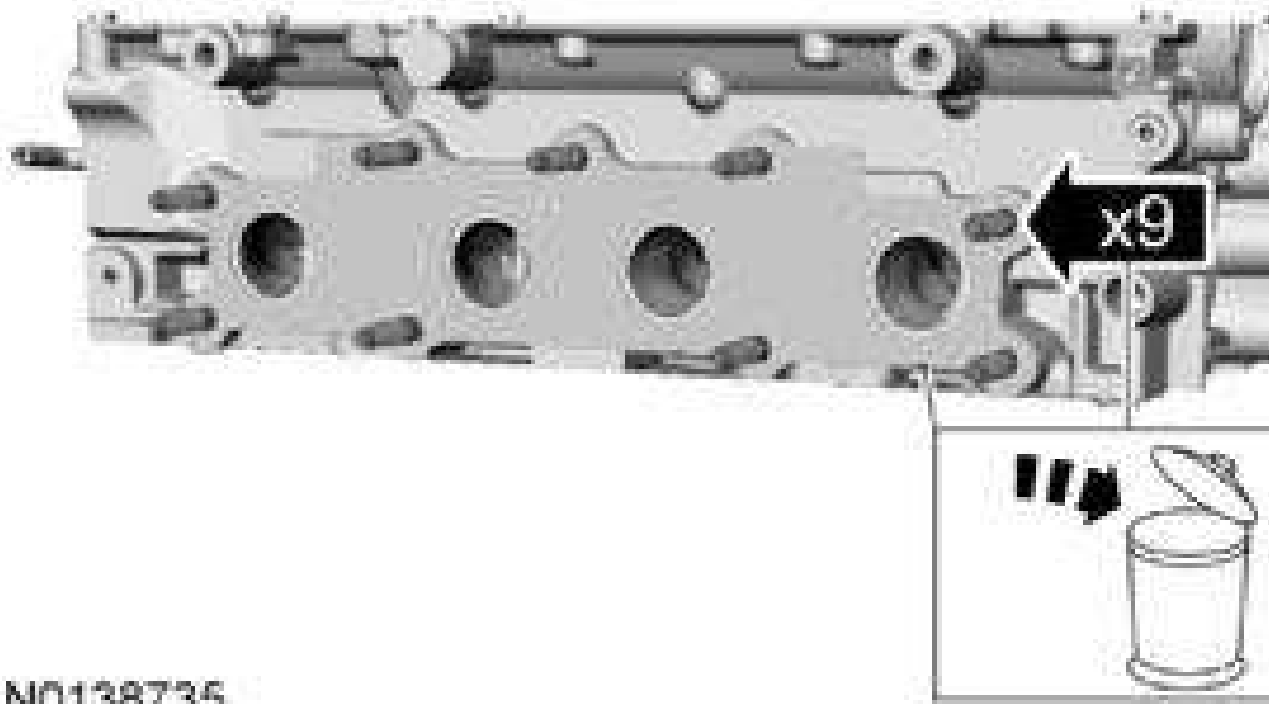
- Clean and inspect the exhaust manifold flange. Refer to **ENGINE SYSTEM - GENERAL INFORMATION** .



5. Discard the specified component. Follow local disposal regulations.

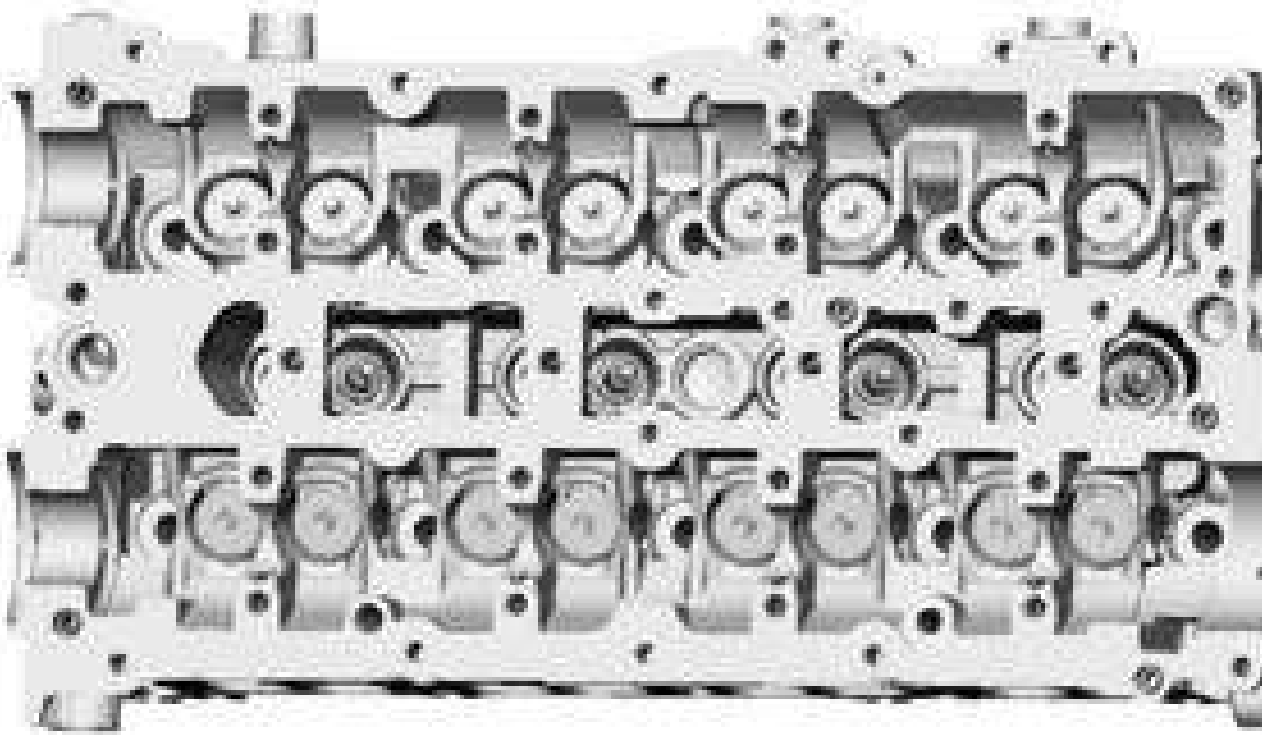






N0138735

6. **NOTE:** Only use hand tools when removing or installing the spark plugs, or damage can occur to the cylinder head or spark plug.
- NOTE:** Use compressed air to remove any foreign material in the spark plug well before removing the spark plugs.



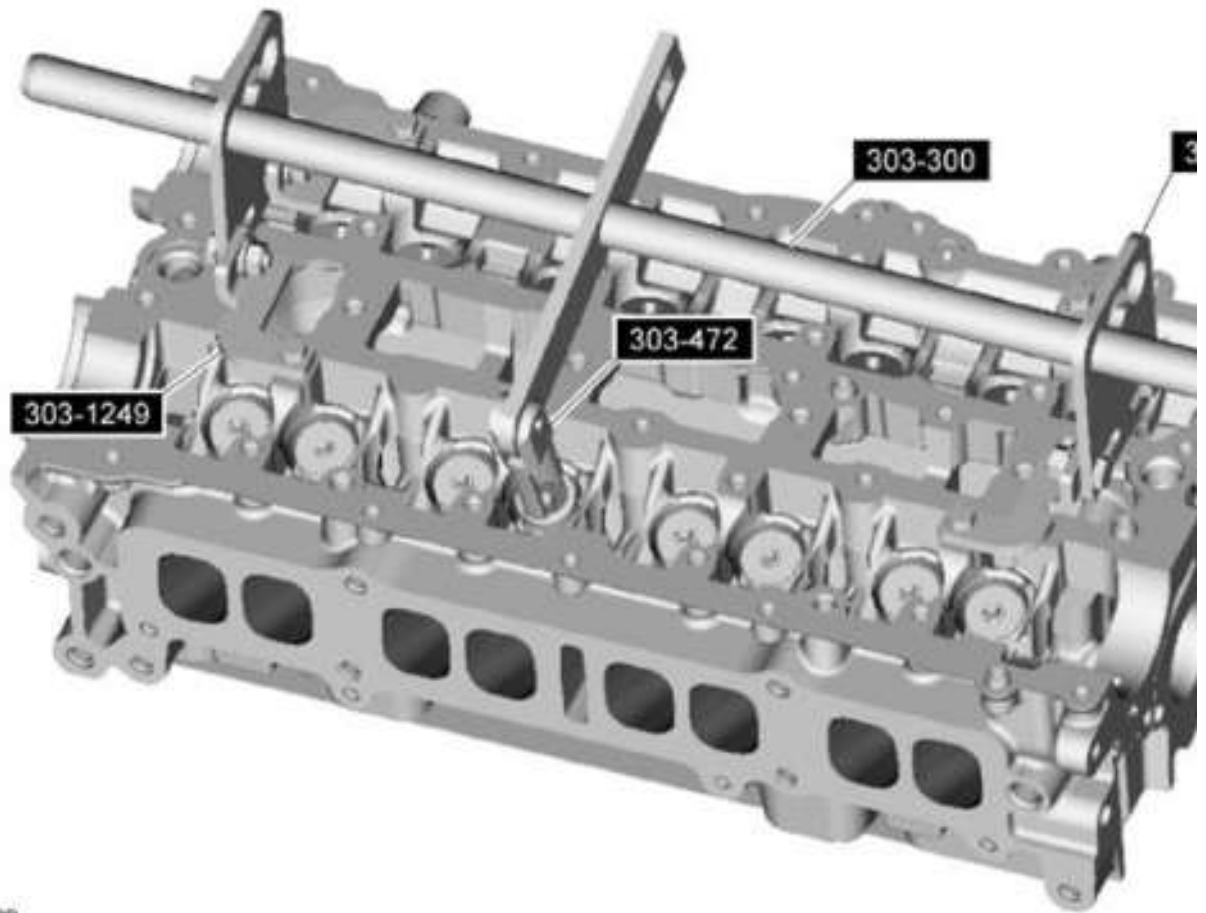
N0136326

7. **NOTE: Use a small screwdriver and multi-purpose grease to remove the valve collets.**

Remove the valve collets, valve spring retainers and the valve springs.

Special Tool(s): Compressors, Valve Spring 303-300 (T87C-6565-A), Compressors, Valve Spring 303-350 (T89P-6565-A), Compressors, Valve Spring 303-472 (T94P-6565-AH) and Compressors, Valve Spring 303-1249.

Material: Multi-Purpose Grease.



N0136329

8. Visual check.
  - Install new parts, as necessary.

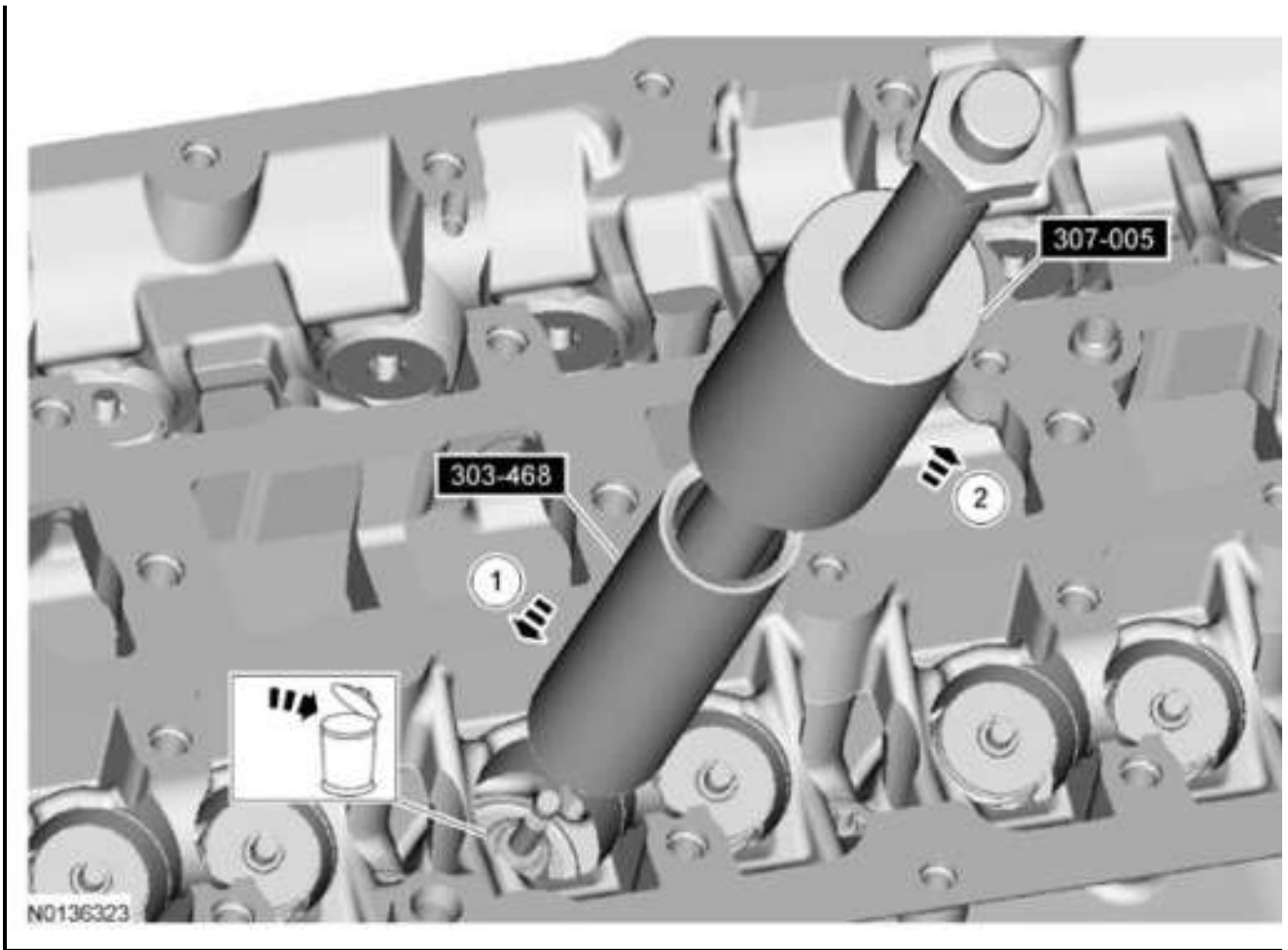




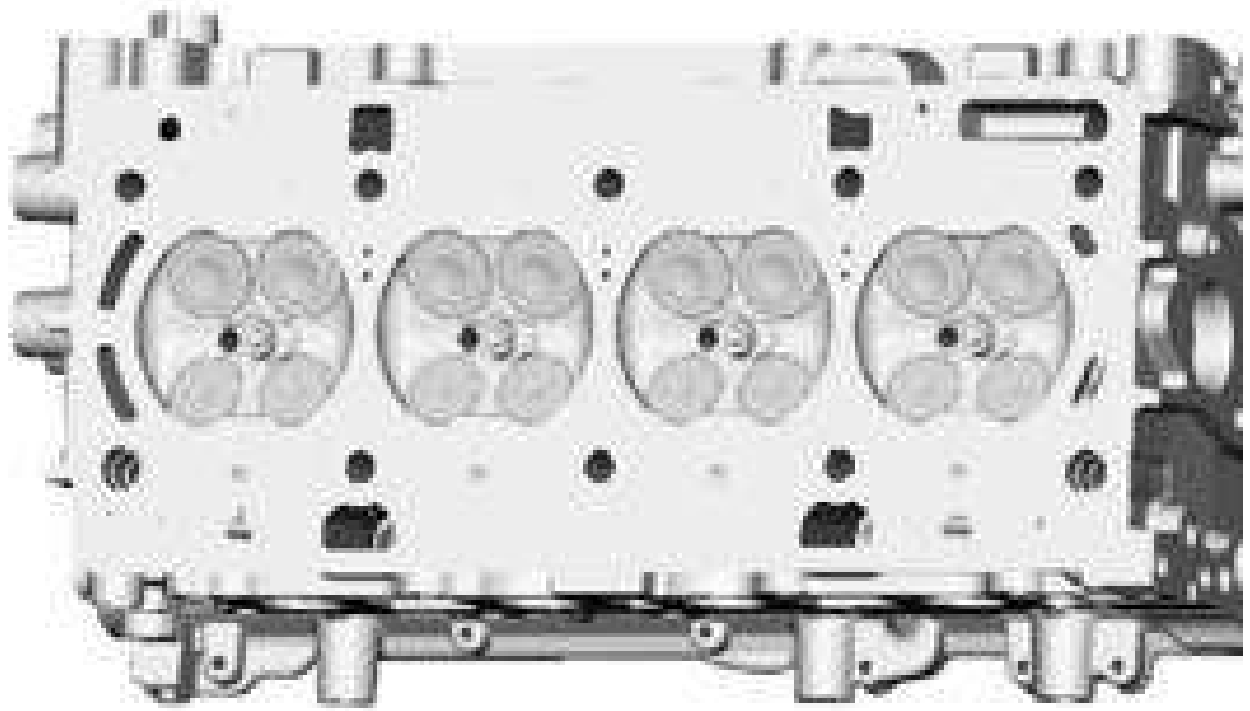
**N0136333**

9. Special Tool(s): Remover, Valve Stem Oil Seal 303-468 (T94P-6510-AH) and Slide Hammer 307-005 (T59L-100-B).

Discard the specified component. Follow local disposal regulations.



10. **NOTE:** Note the location of the valves if they are to be reused.

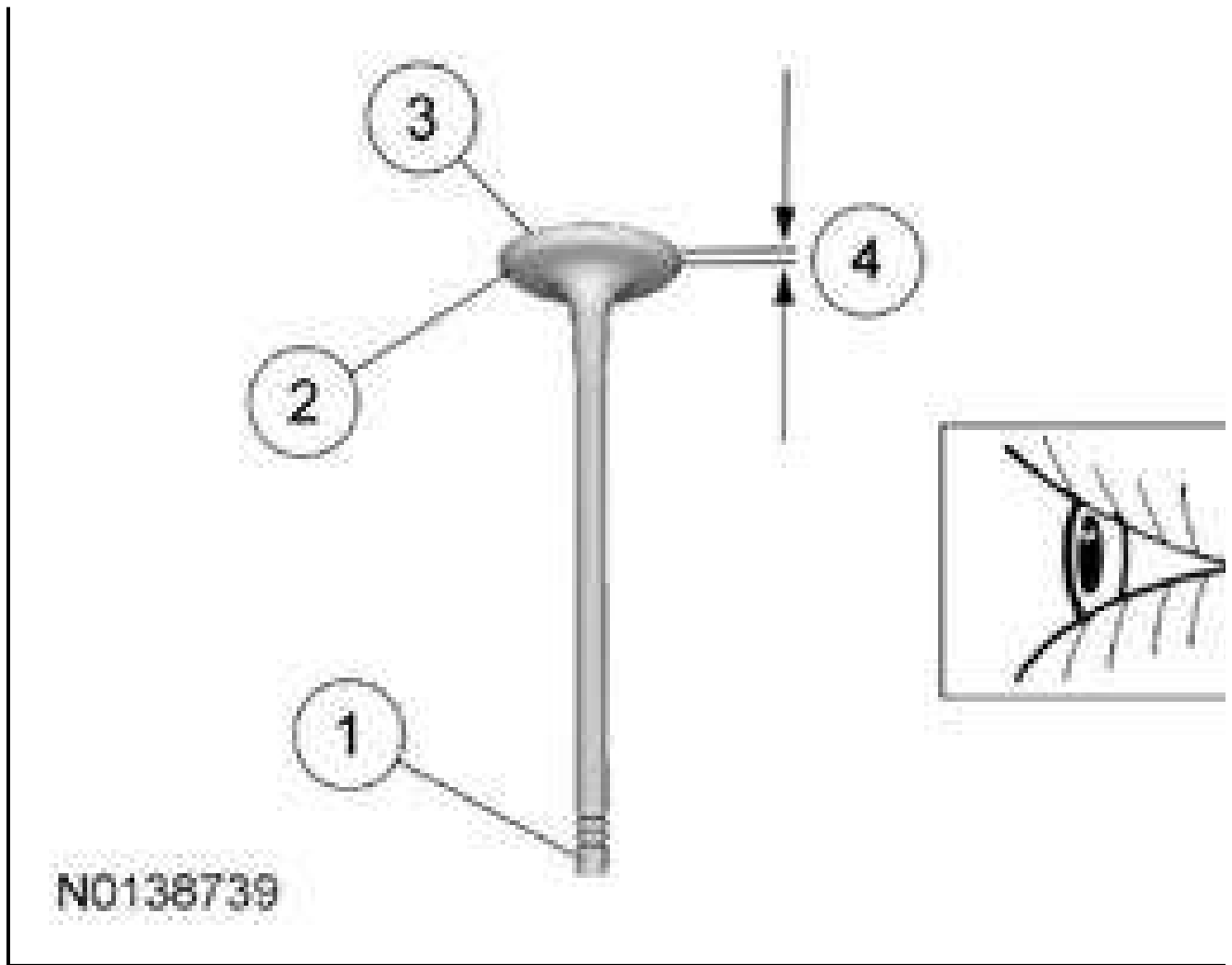


N0136334

11. Visual check.

Inspect the following valve areas:

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



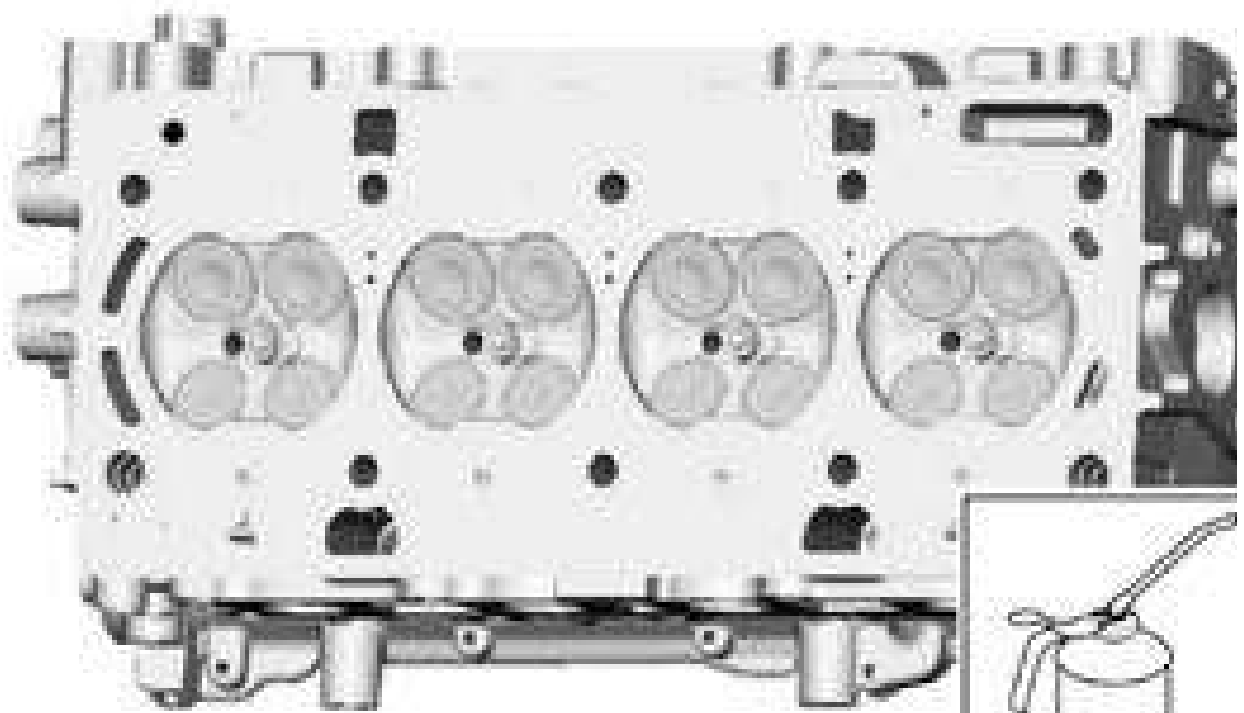
### Assembly

**NOTE:** If installing the original valves, make sure the valves are installed in the same position from which they were removed. Coat the valve stems with clean engine oil.

1.

Apply the specified lubricant to the specified component.

Material: Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil.



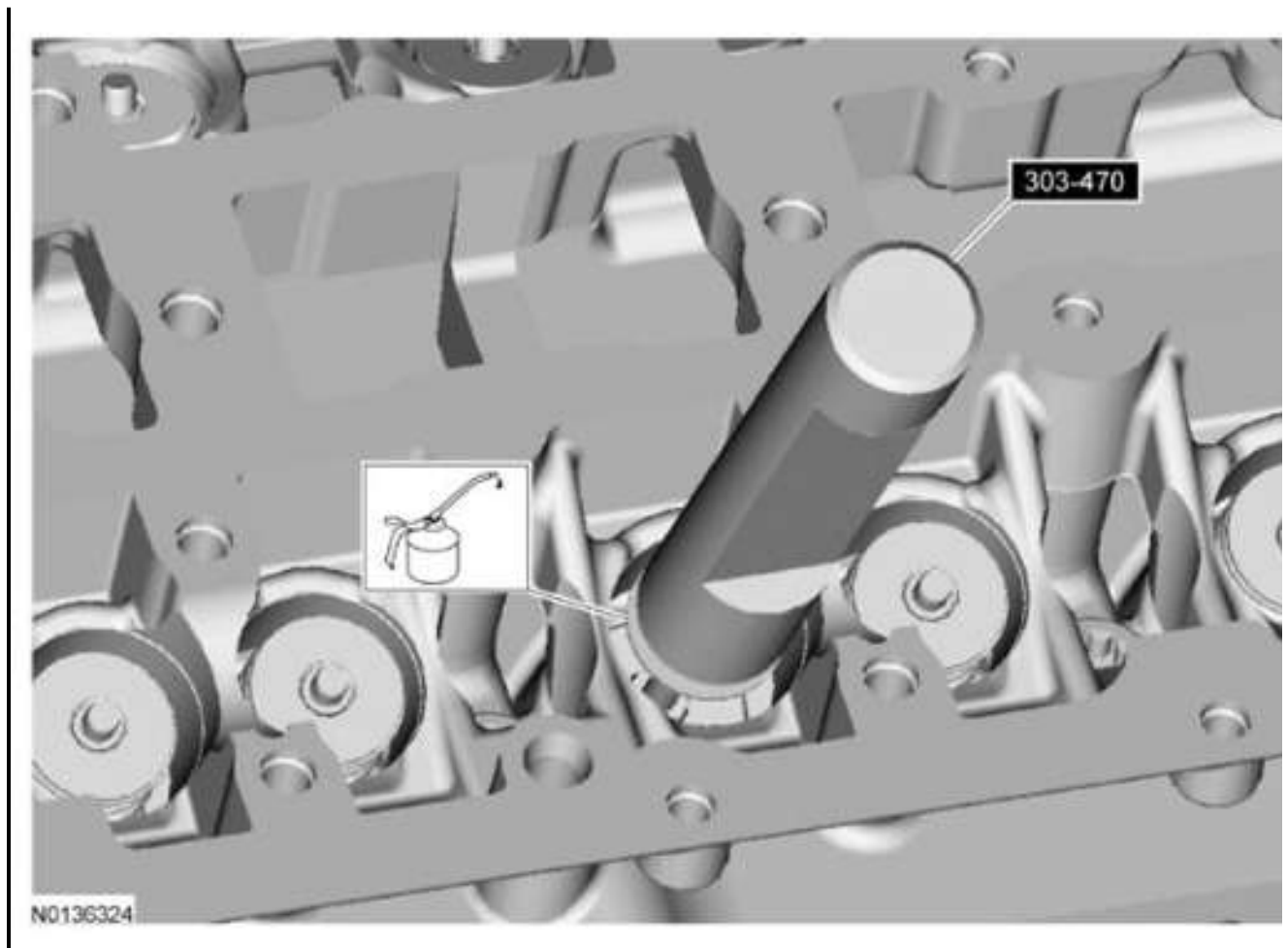
N0136345

2. Apply the specified lubricant to the specified component.

Material: Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil.

Special Tool(s): Installer, Valve Stem Oil Seal 303-470 (T94P-6510-CH).



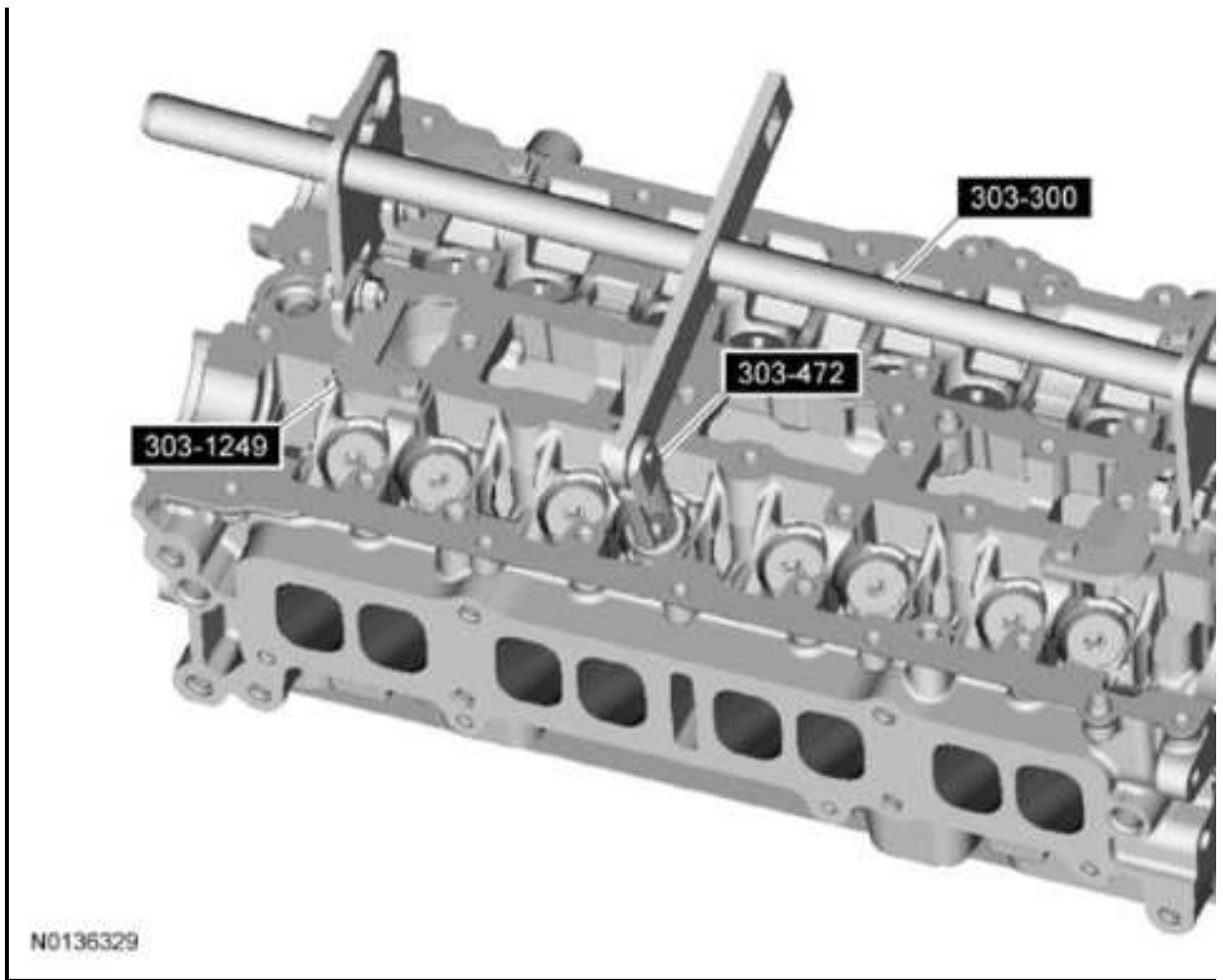


3. Install the valve springs, valve spring retainers and the valve collets.

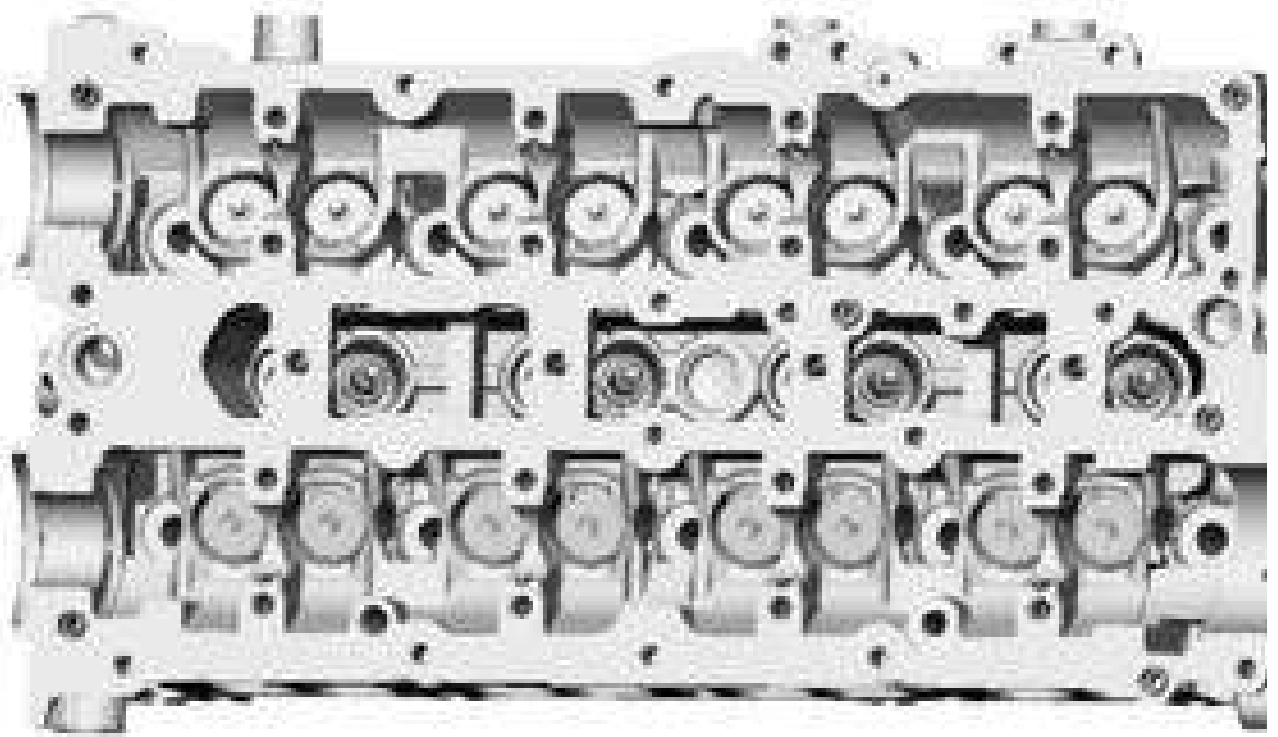
Special Tool(s): Compressors, Valve Spring 303-300 (T87C-6565-A), Compressors, Valve Spring 303-350 (T89P-6565-A), Compressors, Valve Spring 303-472 (T94P-6565-AH) and Compressors, Valve Spring 303-1249.

- Compress the valve spring and install the valve collet using some multi-purpose grease and a small screwdriver.
- Check the seating of the valve collet.





- NOTE:** Only use hand tools when removing or installing the spark plugs, or damage can occur to the cylinder head or spark plug.
4. Tighten to 12 Nm (106 lb-in).



N0136326

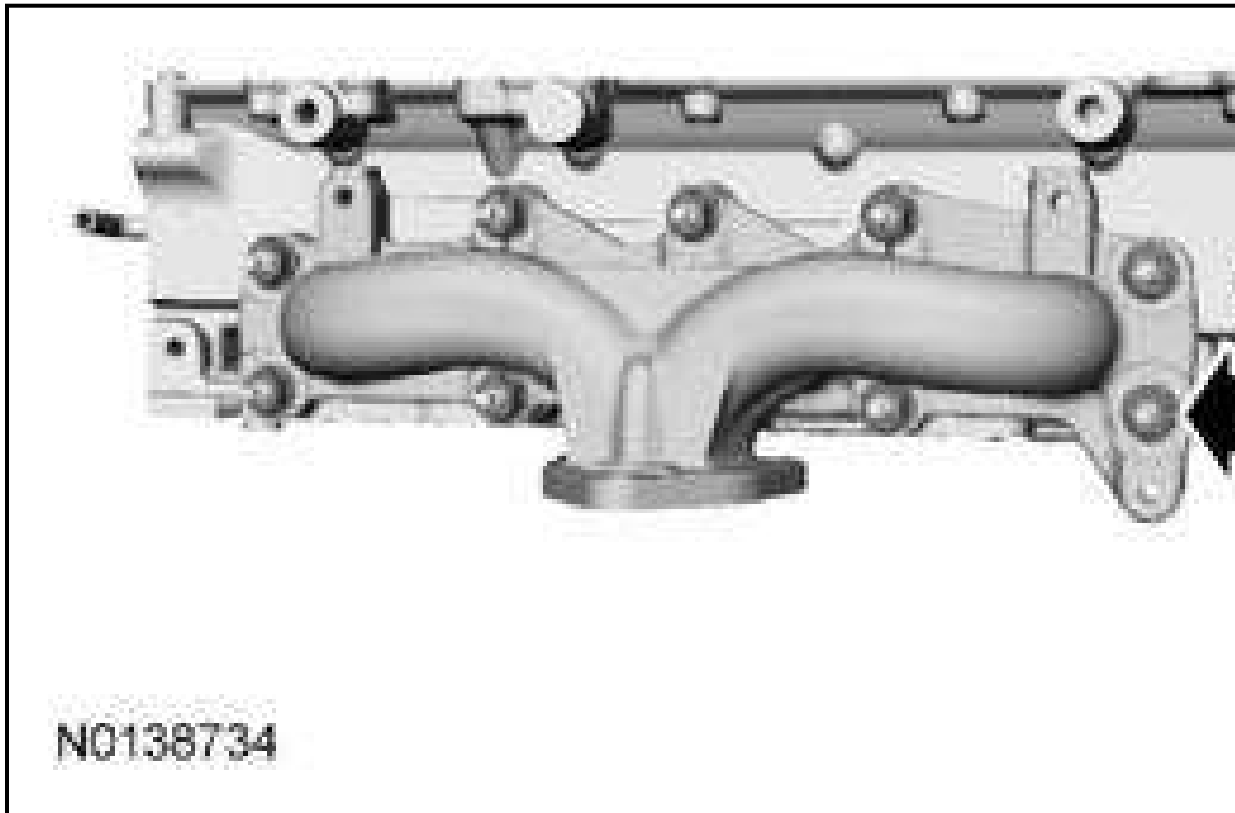
5. Tighten to 10 Nm (89 lb-in).



N0138736

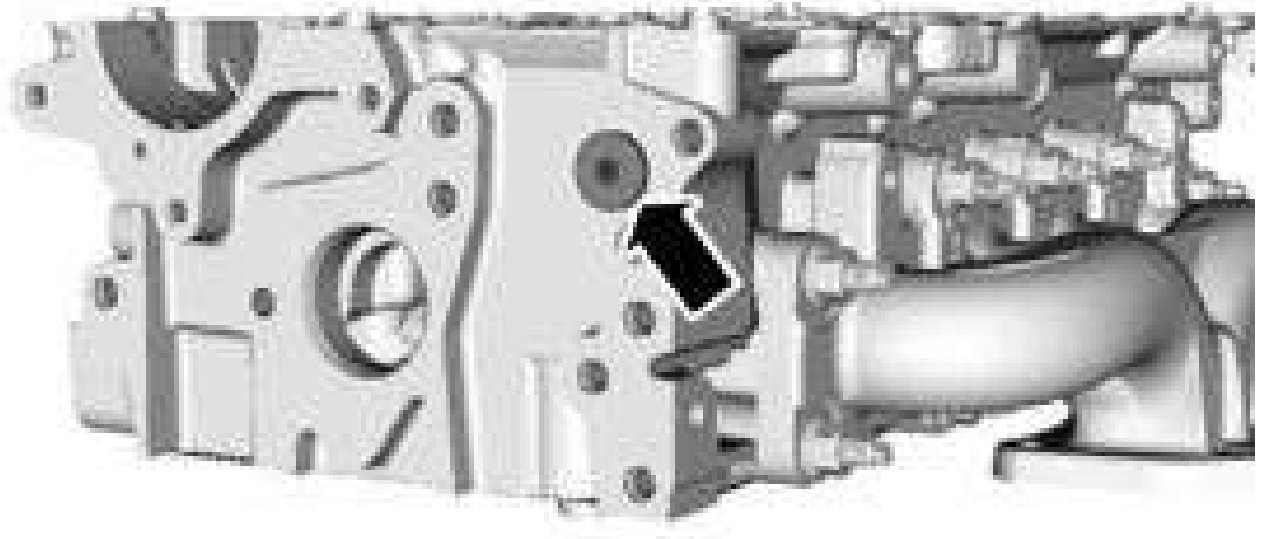
6. Tighten to:

- Stage 1: Tighten to 21 Nm (15 lb-ft).
- Stage 2: Retighten to 21 Nm (15 lb-ft).



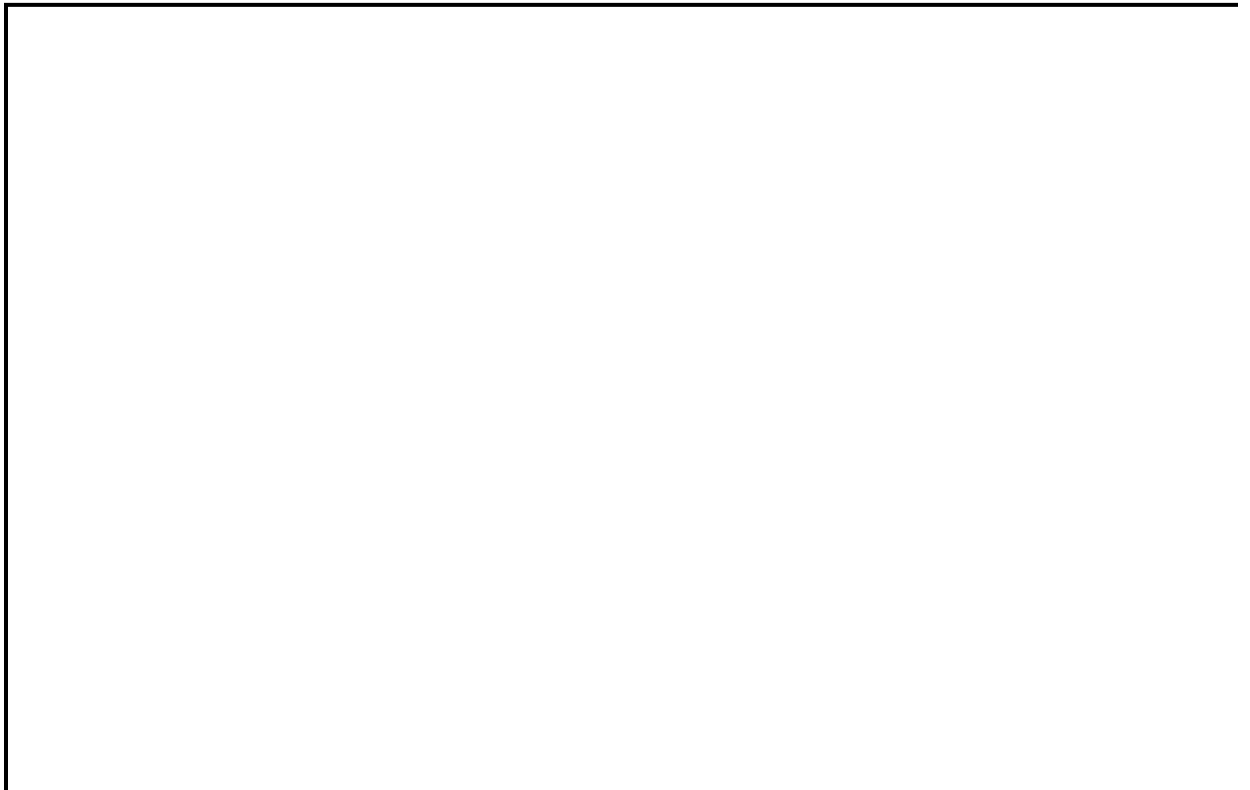
7. Tighten to 29 Nm (21 lb-ft).

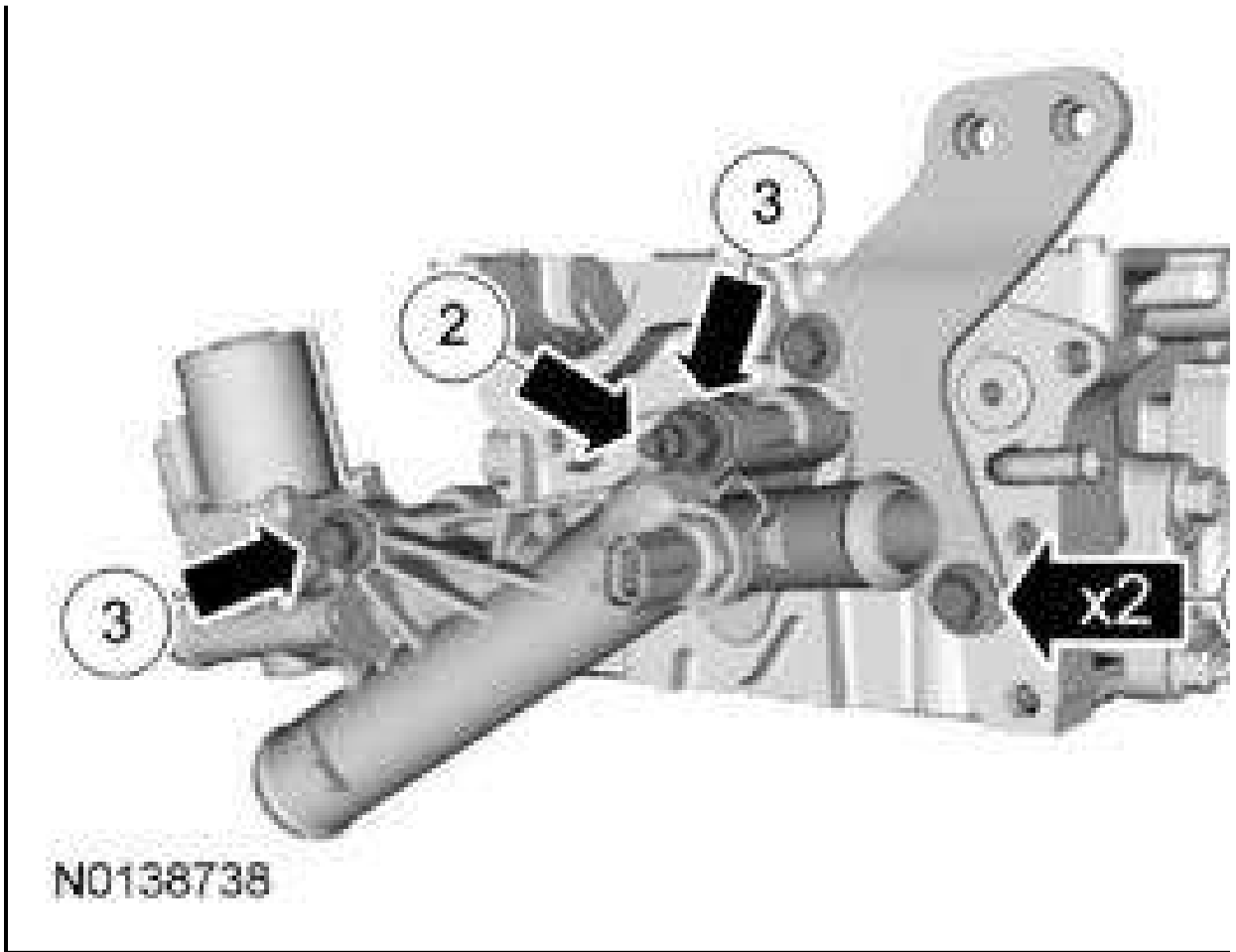




**N0149640**

8.
  1. Tighten to 19 Nm (168 lb-in).
  2. Tighten stud to 5 Nm (44 lb-in).
  3. Tighten to 18 Nm (159 lb-in).

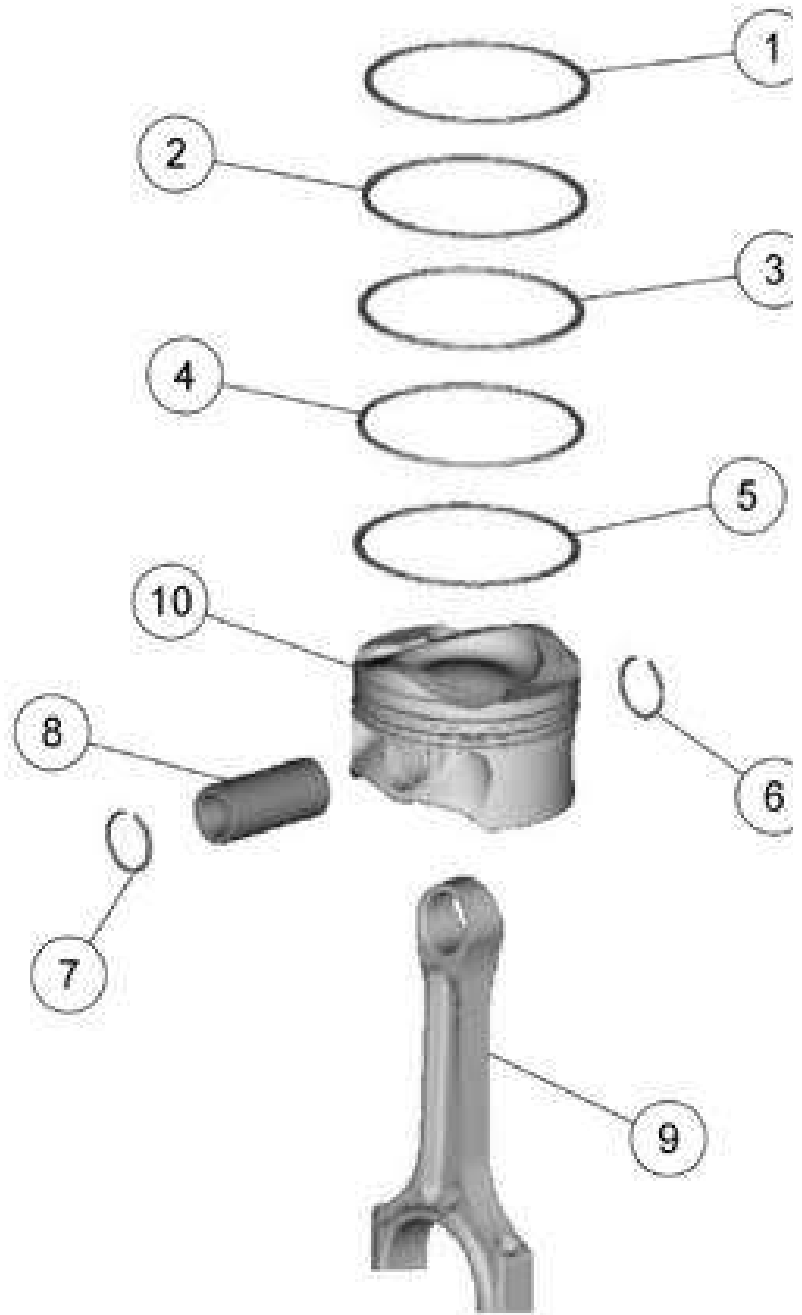




**PISTON**

**MATERIAL SPECIFICATIONS**

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) XO-5W20-QSP (US); CXO-5W20-LSP12 (Canada)	WSS-M2C945-A

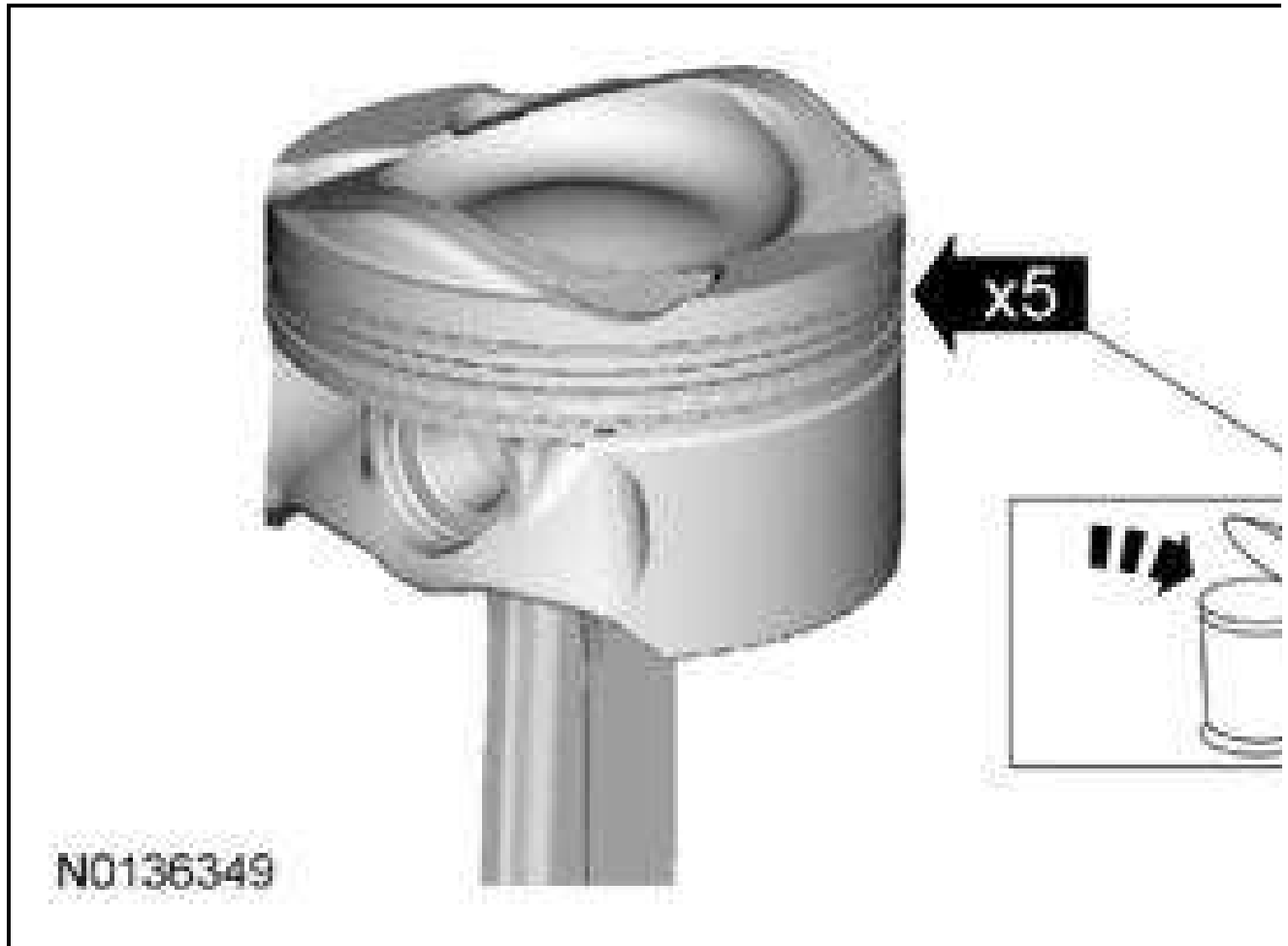


N0136348

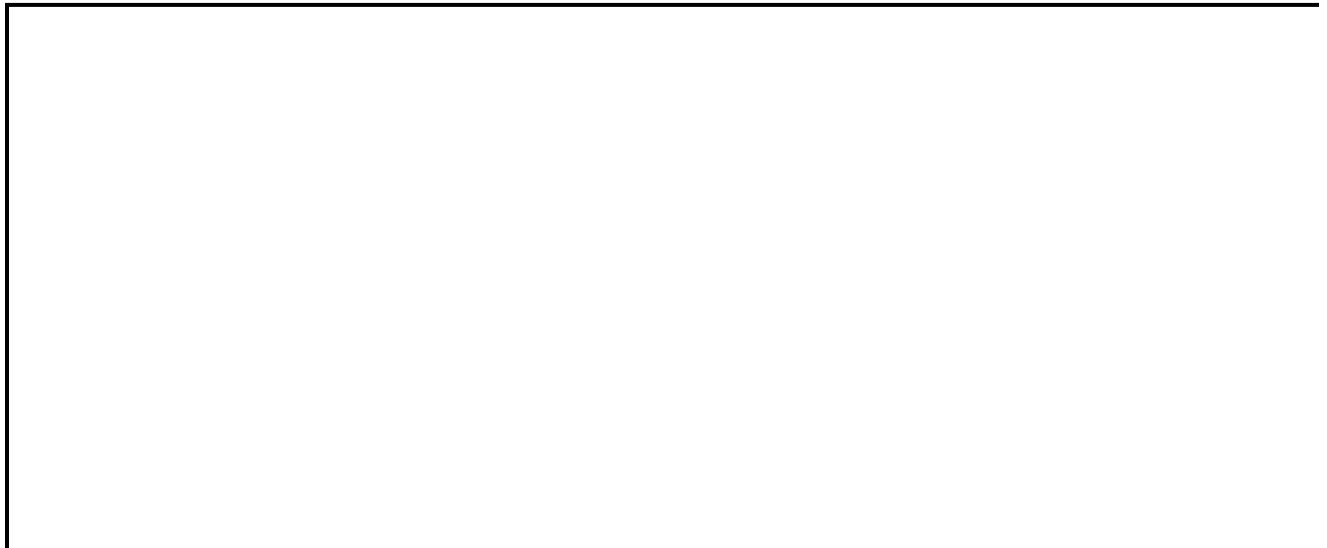
Item	Part Number	Description
1	-	Piston compression upper ring (part of 6148)
2	-	Piston compression lower ring (part of 6148)
3	-	Piston oil control upper segment ring (part of 6148)
4	-	Piston oil control spacer (part of 6148)
5	-	Piston oil control lower segment ring (part of 6148)
6	6140	Piston pin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

**Disassembly**

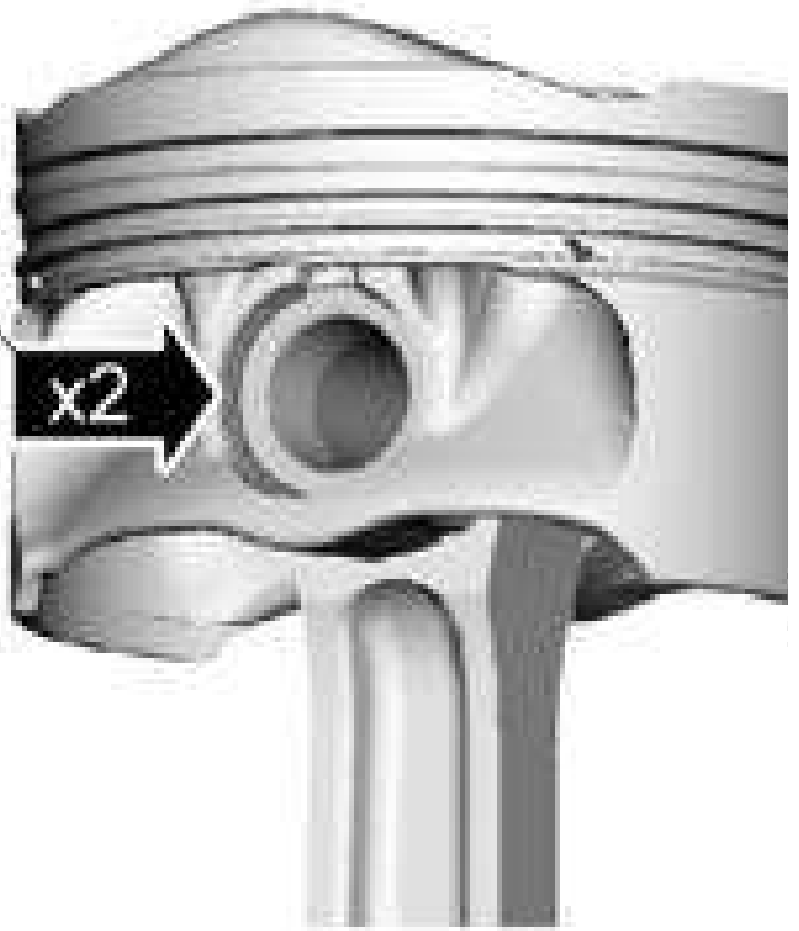
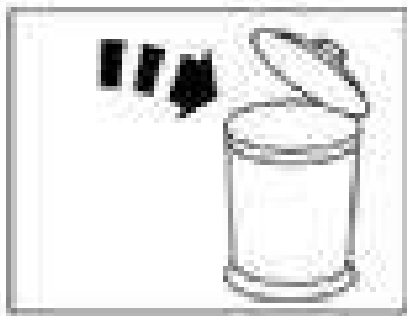
1. Discard the specified component. Follow local disposal regulations.



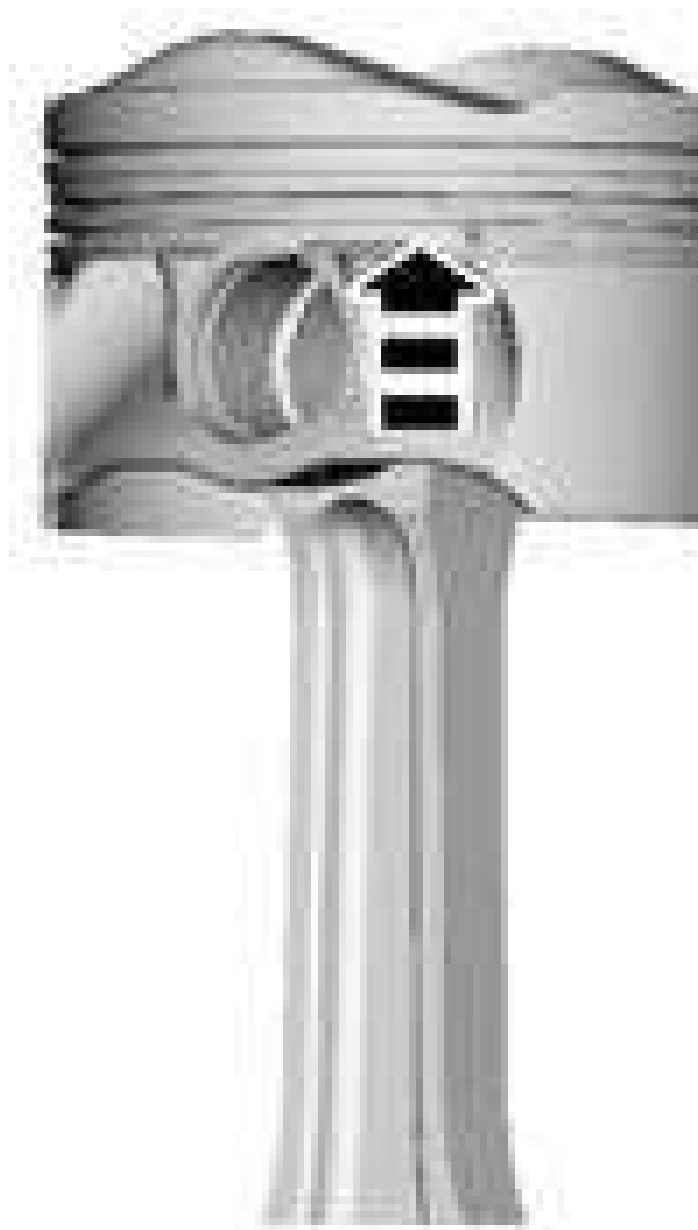
2. Discard the specified component. Follow local disposal regulations.







N0136351



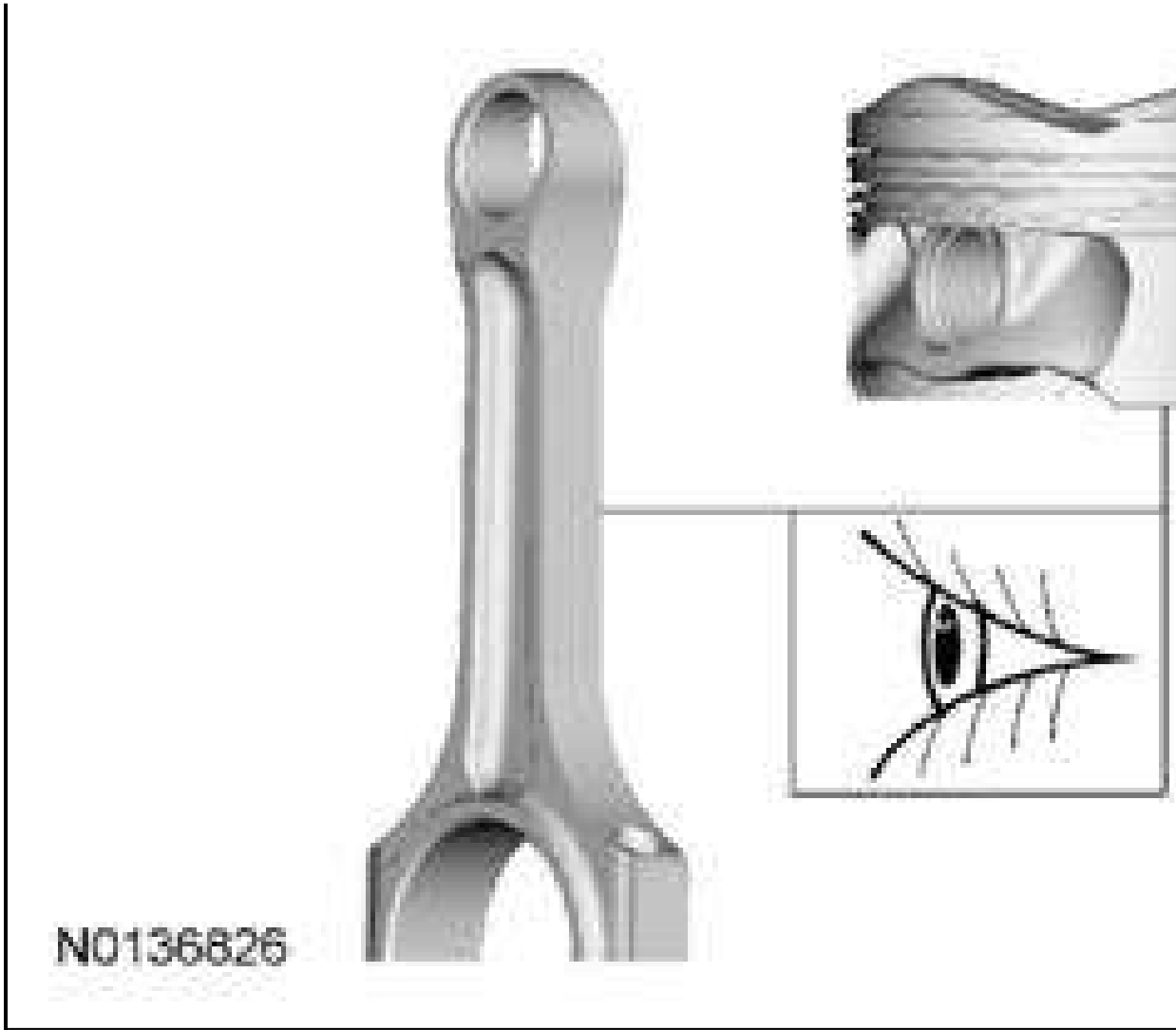
NO136825

3.

4. Visual check.

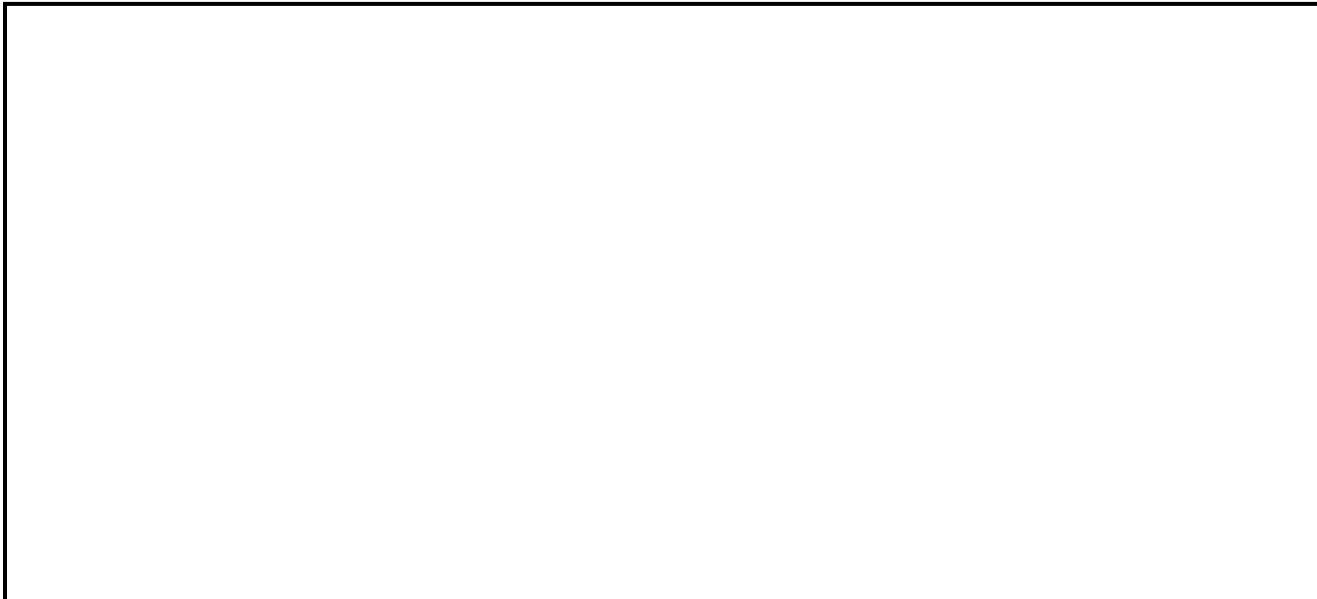
- Inspect and clean the piston. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION** .

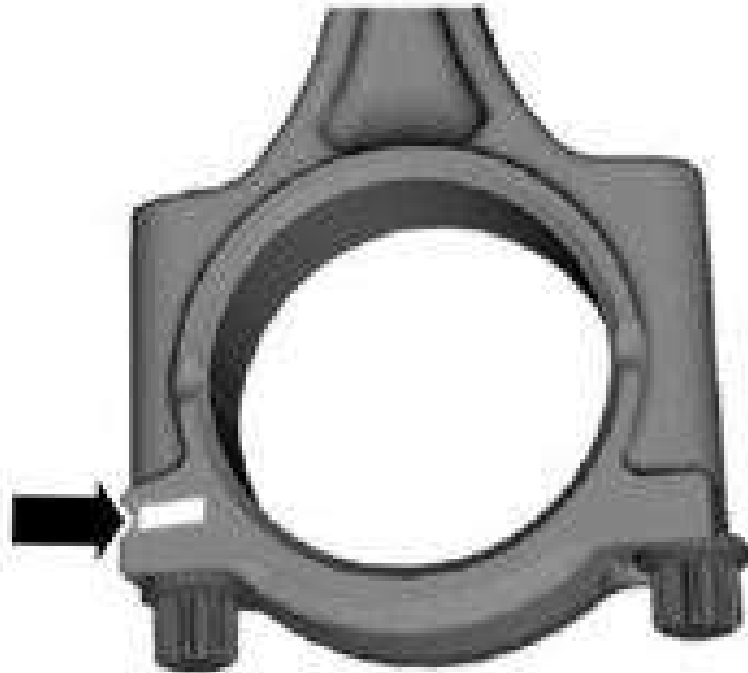
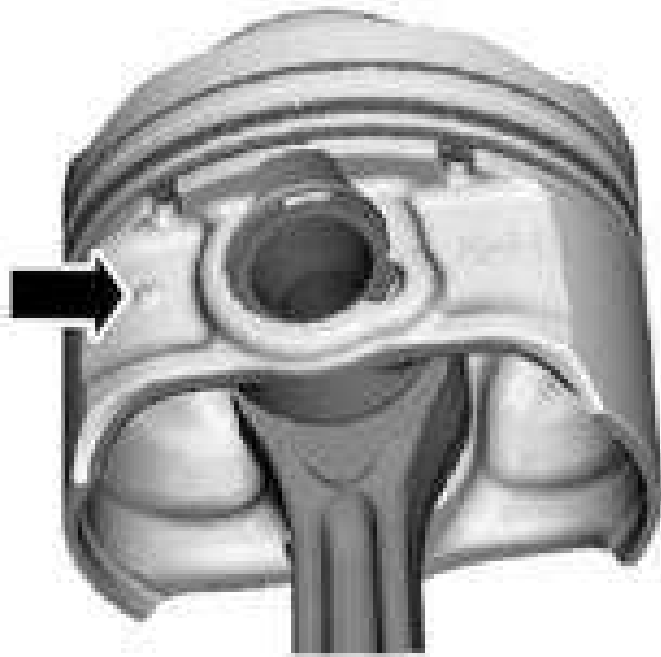




**Assembly**

1. Indicates front of engine.





N0136827



**NO136828**

- 2.
3. Apply the specified lubricant to the specified component.

Material: Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil.



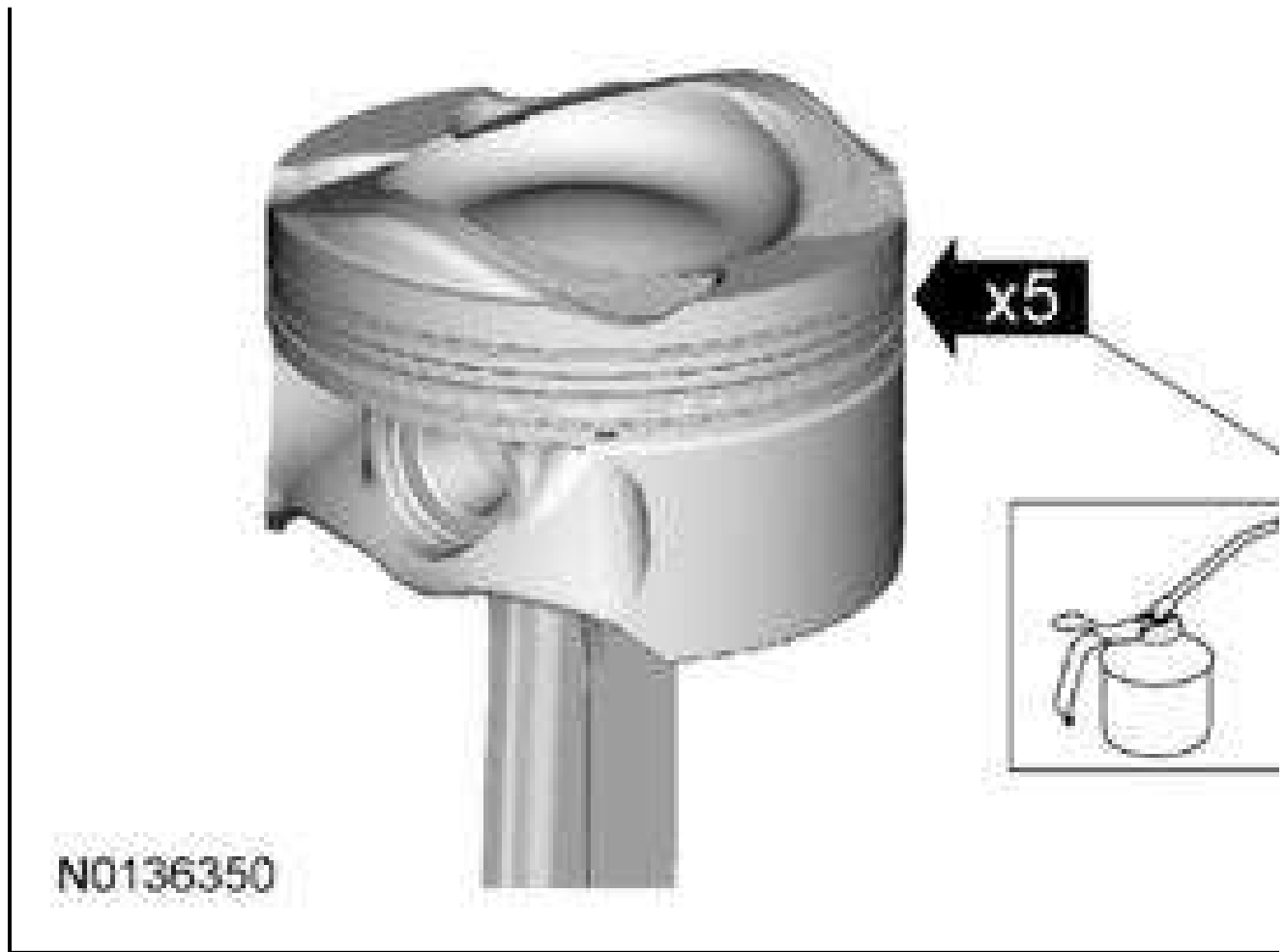


N0136829



**N0136830**

- 4.
5. Material: Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil.



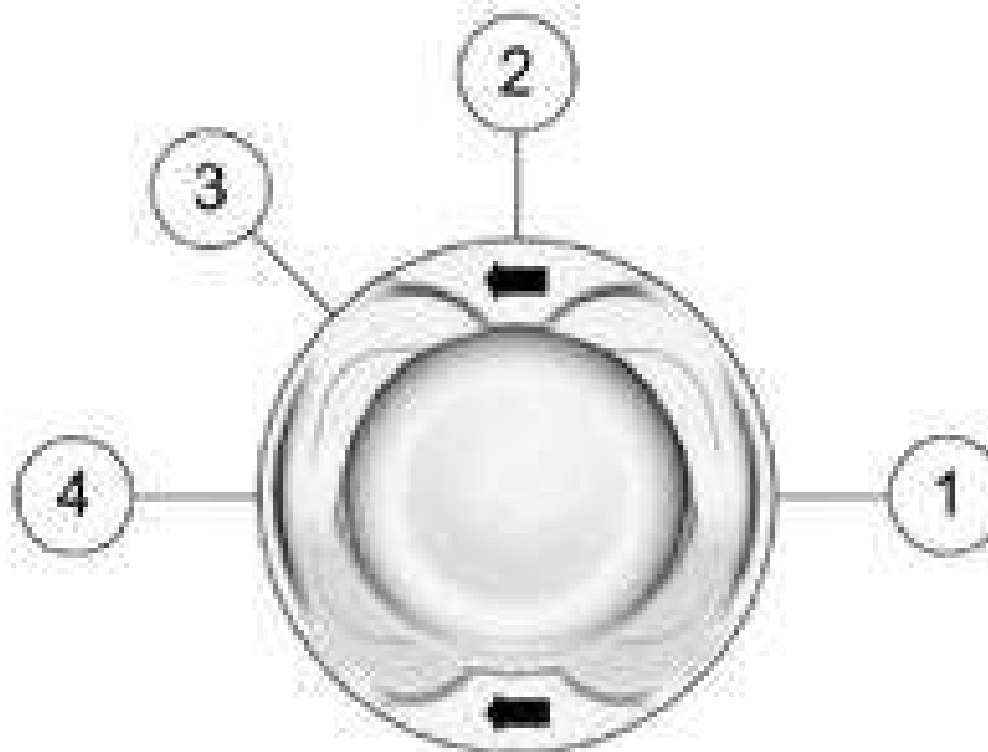
6. **NOTE:** The lower compression ring is to be fitted with the identification marks on the upper side.

**NOTE:** Arrows faces the front of the engine.

Align the piston rings on the piston.

1. Upper compression ring gap location.
2. Lower compression ring gap location.
3. Upper oil control segment ring gap location.
4. Expander ring gap location.
5. Lower oil control segment ring gap location.





N0144492