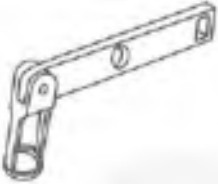
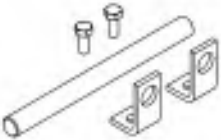


## Cylinder Head

Base Part Number: Base Part Number: 6051

### Special Tool(s) / General Equipment

|                                                                                               |                                                                                                                                 |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <br>E223048   | 303-1249<br>Valve Spring Compressor<br>TKIT-2006UF-FLM<br>TKIT-2006UF-ROW                                                       |
|              | 303-1418<br>Compressor, Valve Spring<br>TKIT-2008ET-FLM<br>TKIT-2008ET-ROW                                                      |
| <br>E222987 | 303-1567<br>Sizer, Teflon Seal<br>TKIT-2010C-FLM                                                                                |
| <br>E134677 | 303-300 (T87C-6565-A)<br>Set, Valve Spring Compressor<br>T88C-1000-ST<br>TKIT-1988-FESTIVA<br>TKIT-1988-TRACER<br>TKIT-2009TC-F |
| <br>E134678 | 303-350 (T89P-6565-A)<br>Compressor, Valve Spring<br>TKIT-1989-F<br>TKIT-1989-FLM<br>TKIT-1989-FM<br>TKIT-1990-LMH              |

|                                                                                              |                                                                     |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <br>E222982  | 307-005 (T59L-100-B)<br>Slide Hammer                                |
| <br>E223046  | 310-205<br>Fuel Injector Brush                                      |
| <br>E168032  | 310-206<br>Remover, Fuel Injector<br>TKIT-2009A-FLM                 |
| <br>E223047 | 310-207<br>Installer, Fuel Injector Seal Assembly<br>TKIT-2009A-FLM |

## Materials

| Name                                                           | Specification |
|----------------------------------------------------------------|---------------|
| Motorcraft® SAE 5W-20 Synthetic Blend Motor Oil<br>XO-5W20-QSP | WSS-M2C945-A  |
| Motorcraft® Orange Concentrated Antifreeze/Coolant<br>VC-3-B   | WSS-M97B44-D  |

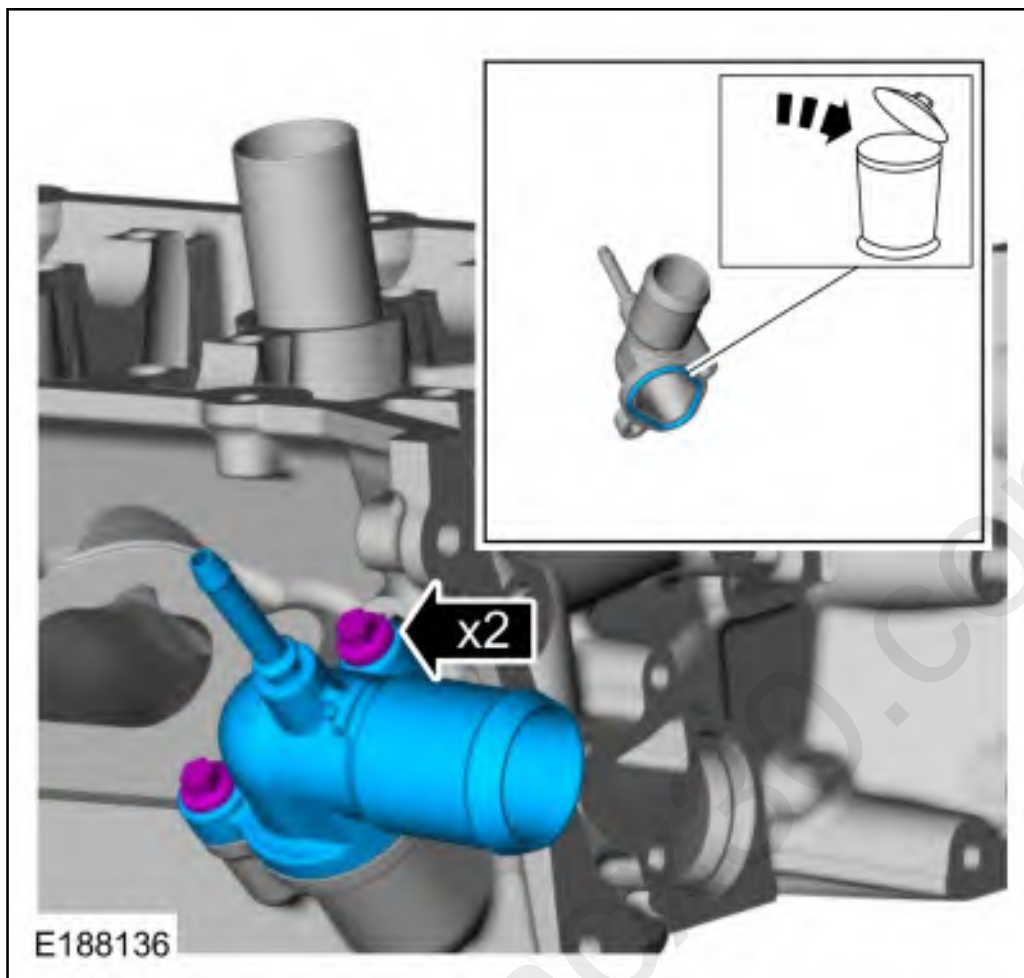
## DISASSEMBLY

**NOTICE:** 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, they must be installed in their original locations. Mark the components for installation into their original locations.

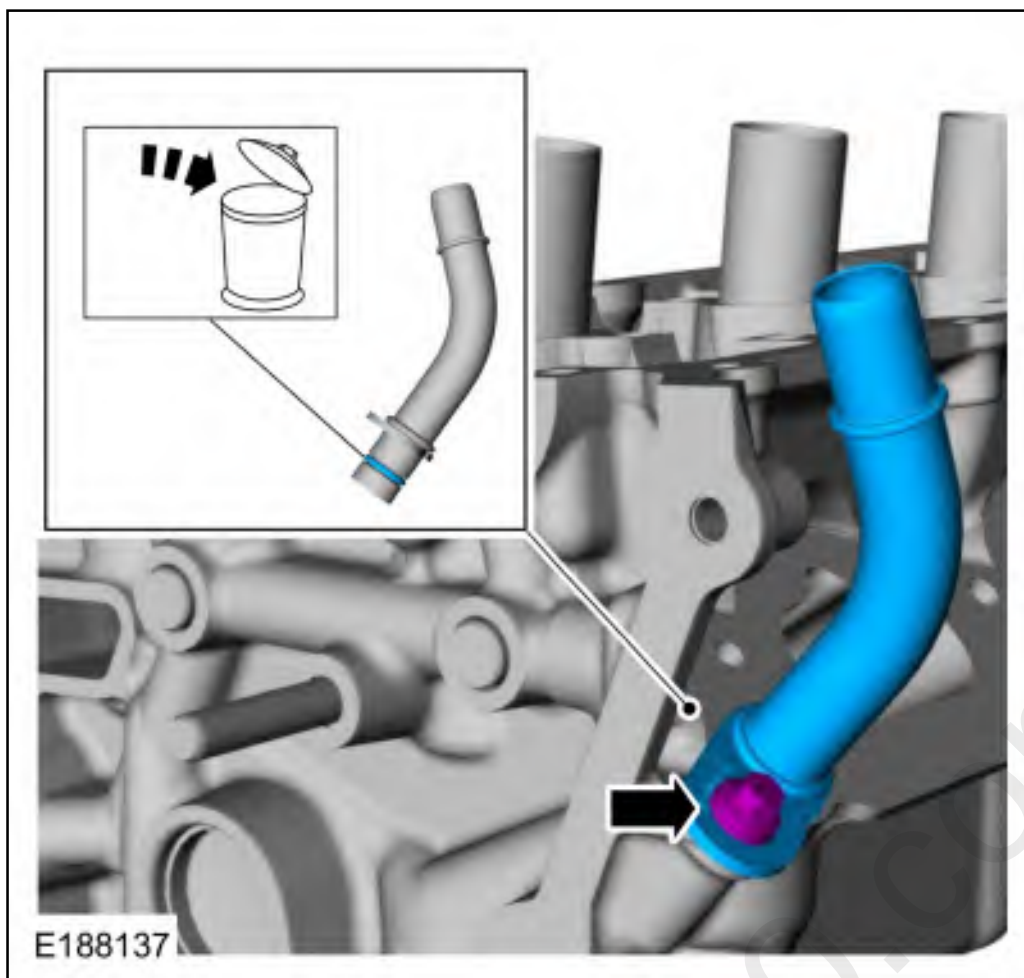
## LH cylinder heads

1. Remove the bolts and the coolant outlet.
  - Discard the gasket.

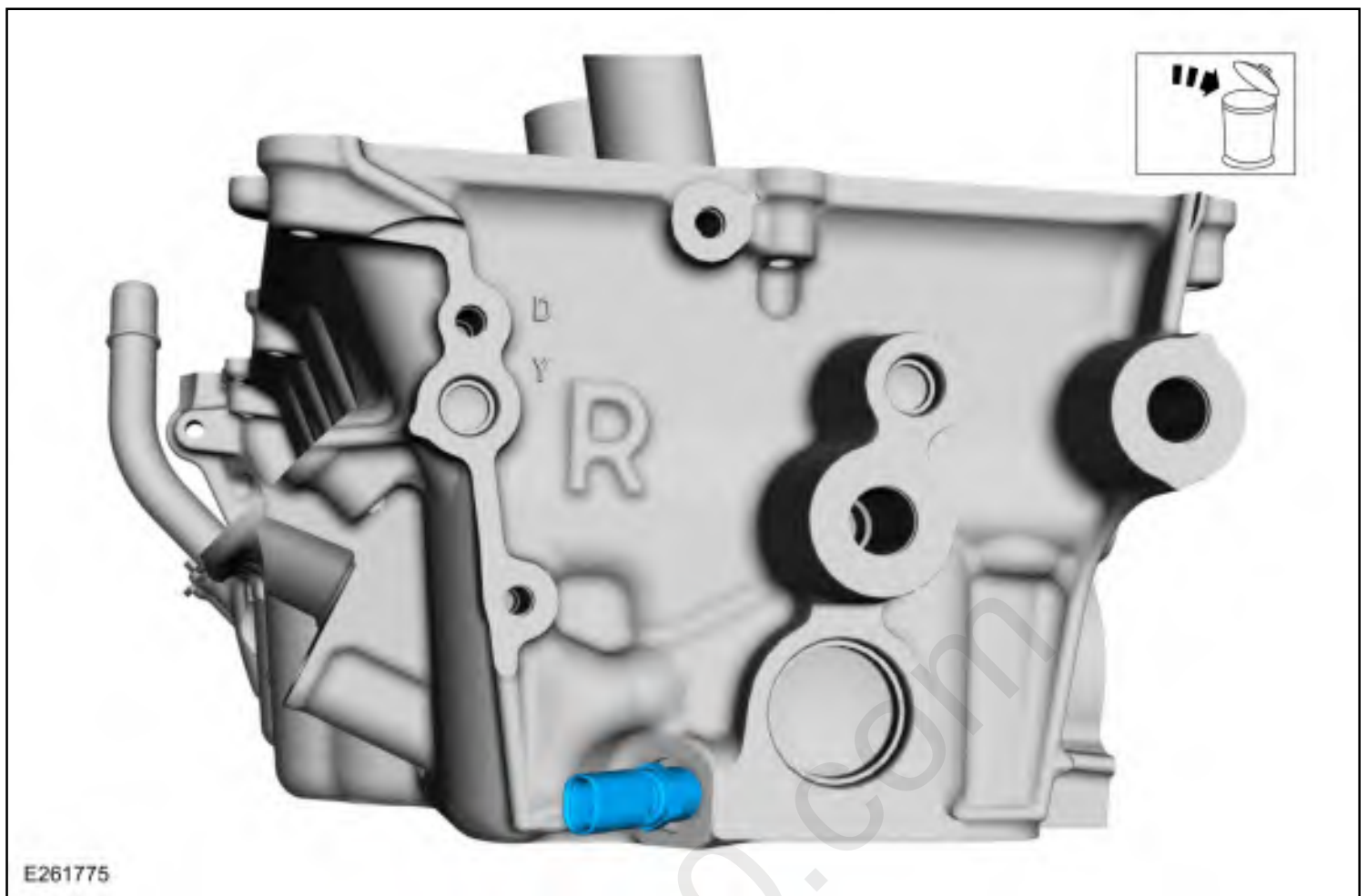


## RH cylinder heads

2. Remove the bolt and the coolant outlet.
  - Discard the O-ring seal.

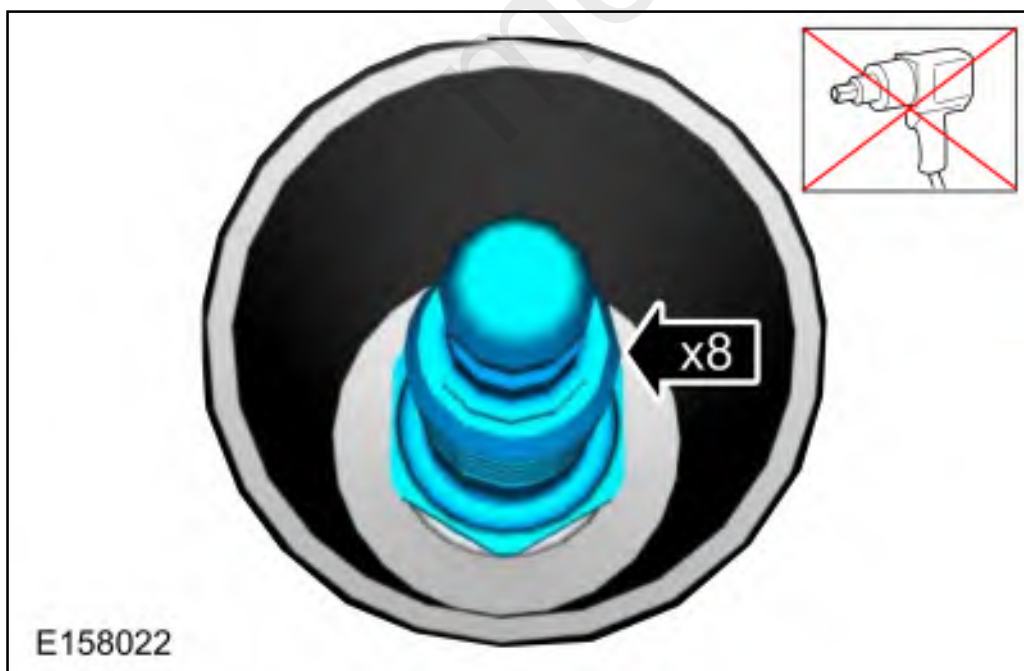


3. Remove and discard the CHT sensor.



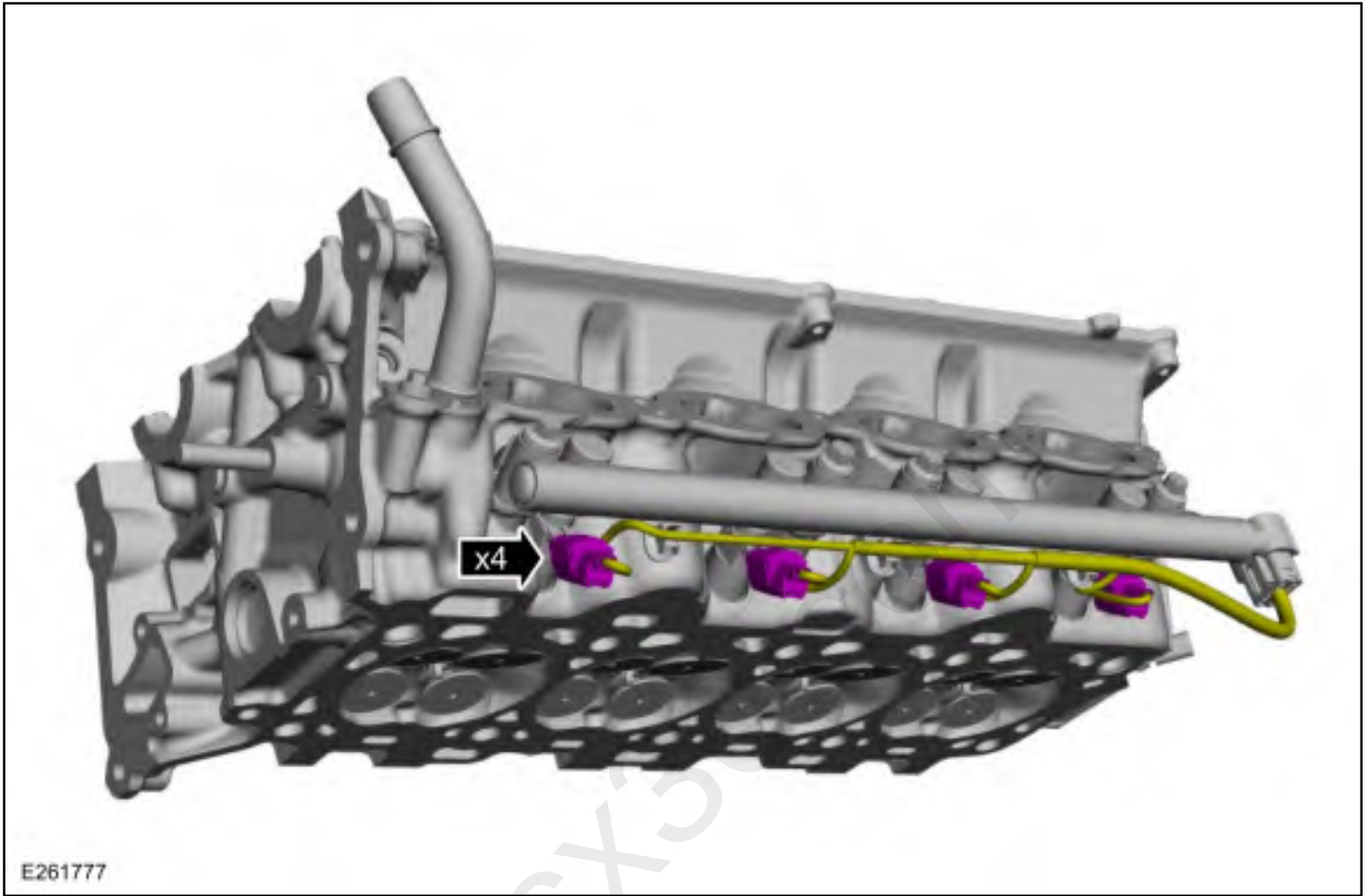
## All cylinder heads

4. Remove the spark plugs.



5. **NOTE:** *RH shown, LH similar.*

Disconnect the fuel injector electrical connectors.



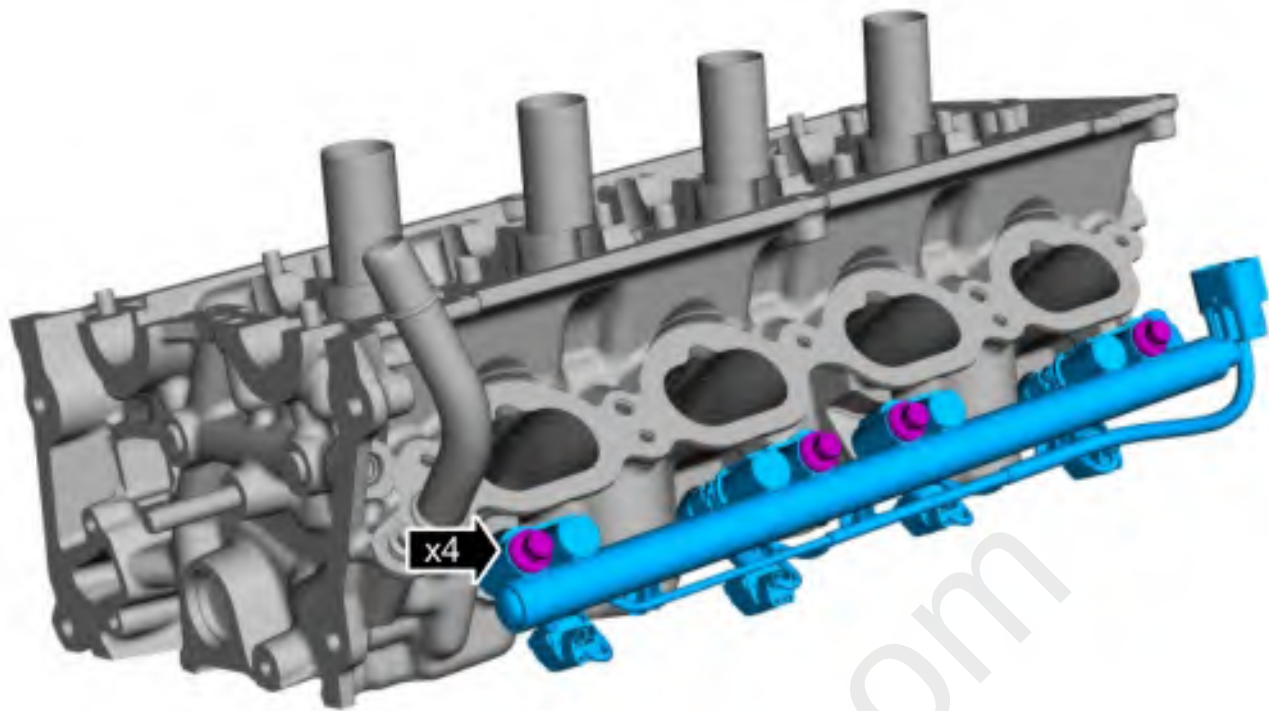
6. **NOTICE:** Pull out the fuel rails in the direction of the fuel injector axis or damage may occur to the fuel injectors.

**NOTE:** Use compressed air and remove any dirt or foreign material from the cylinder head, block and general surrounding area of the fuel rail and injectors.

**NOTE:** When removing the fuel rails, the fuel injectors may remain in the cylinder heads and require the use of a Fuel Injector Remover tool to extract. Wiggling the injector by hand to break it loose may allow the injector to be removed by hand.

**NOTE:** *RH shown, LH similar.*

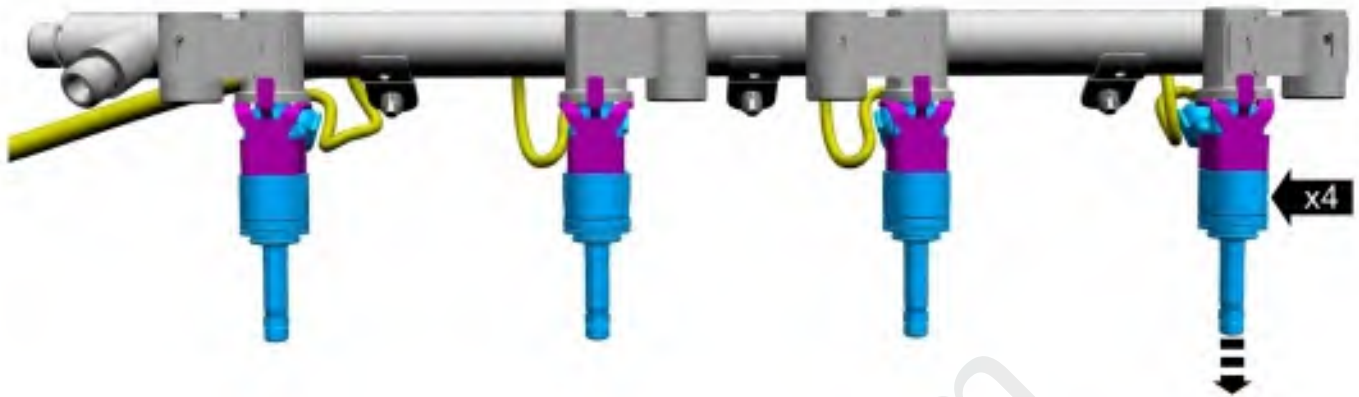
Remove the fuel rail bolts, then remove the fuel rail.



E261778

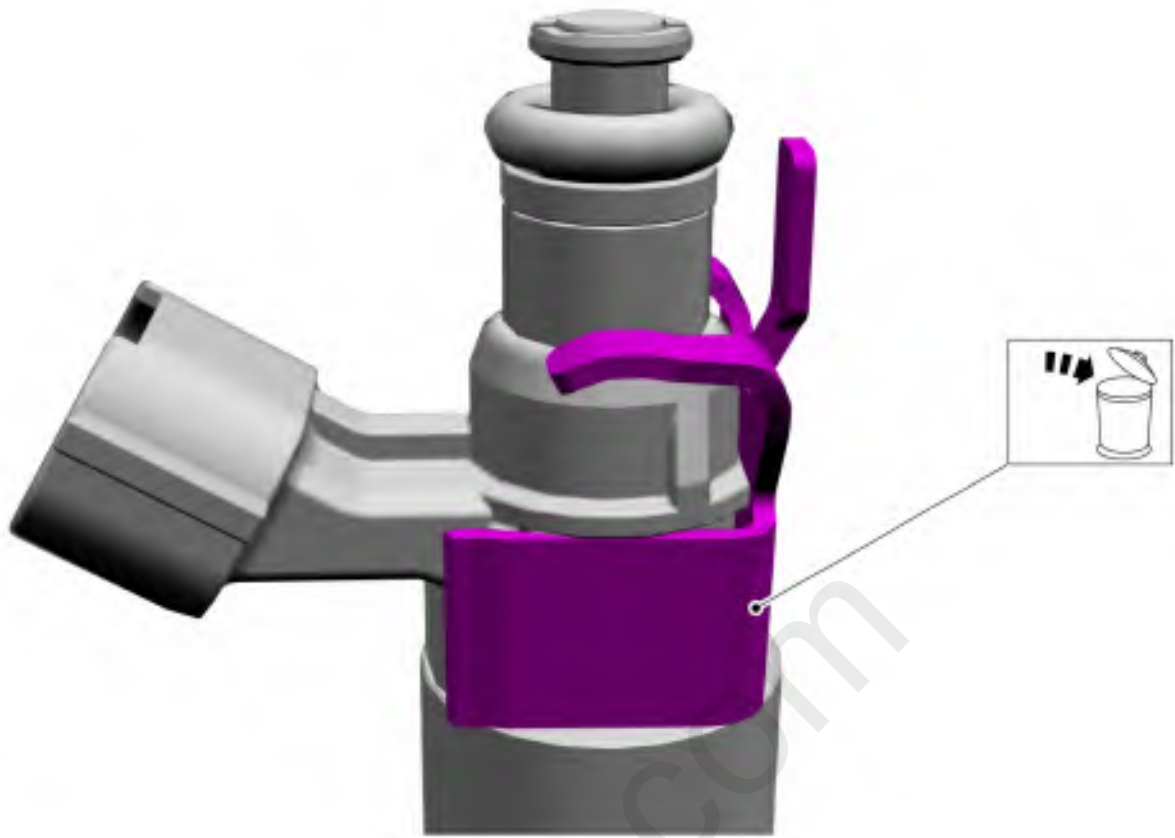
7. **NOTE:** *RH shown, LH similar.*

Remove the fuel injectors from the fuel rail.



E258569

8. Remove and discard the fuel injector clips.

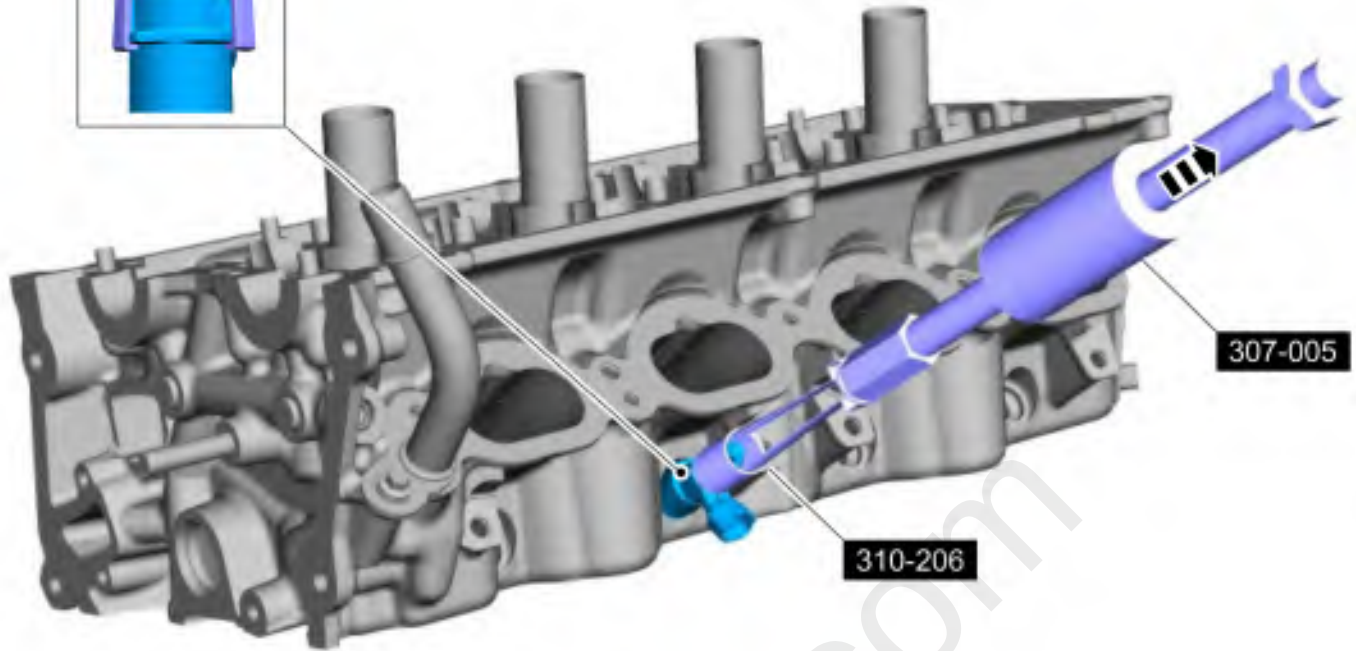
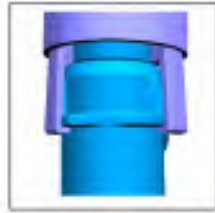


9. **NOTICE:** Use minimal force to remove the fuel injectors that remained in the cylinder head with the Fuel Injector Remover tool or damage to the fuel injector assembly may occur. Wiggling the injector by hand to break it loose may allow the injector to be removed by hand.

**NOTE:** RH shown, LH similar.

Using the special tools, remove any of the fuel injectors that remained in the cylinder head.

Use Special Service Tool: 307-005 (T59L-100-B) Slide Hammer. , 310-206 Remover, Fuel Injector.



E261780

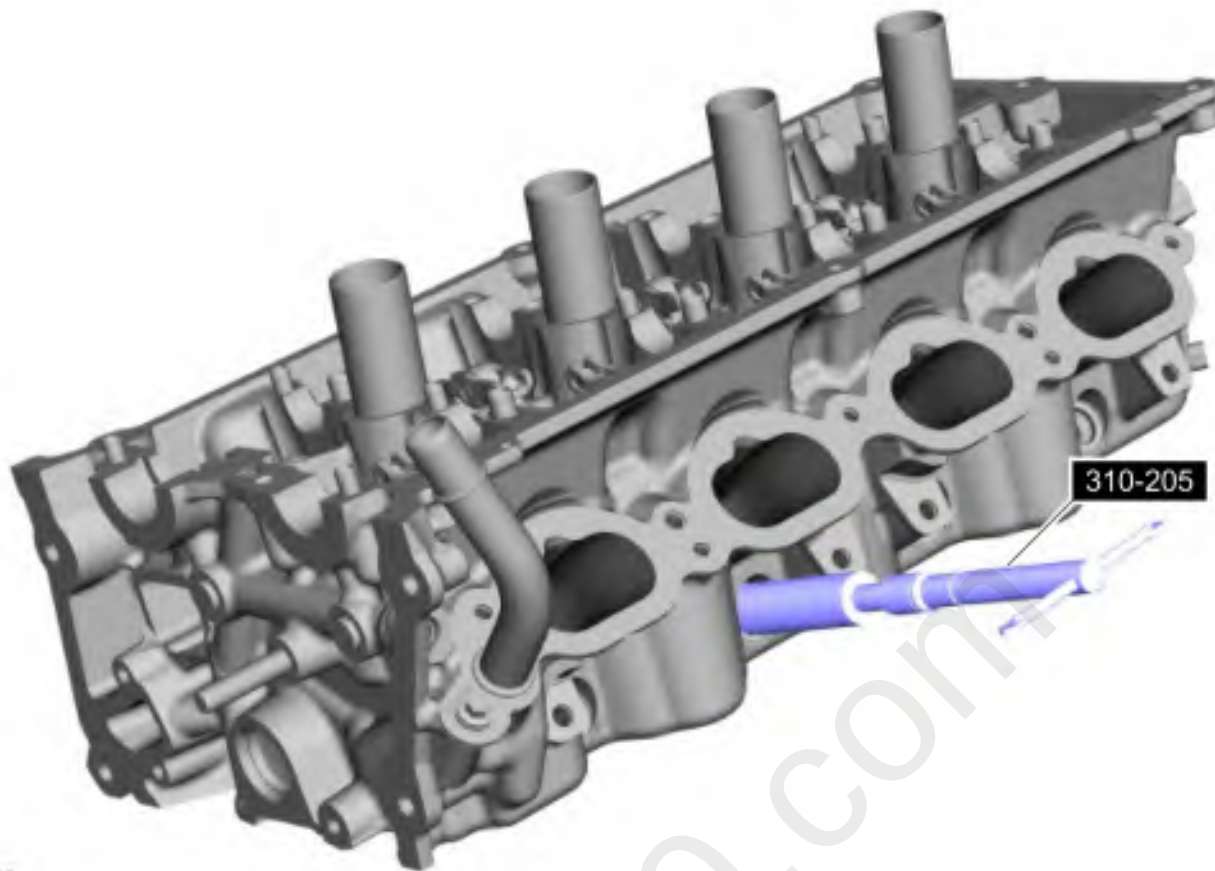
10. **NOTICE:** Make sure to thoroughly clean any residual fuel or foreign material from the cylinder head, block and the general surrounding area of the fuel rails and injectors.

**NOTICE:** Do not use compressed air to clean the tip of the fuel injector.

**NOTICE:** Do not use a brush to clean the tip of the fuel injector.

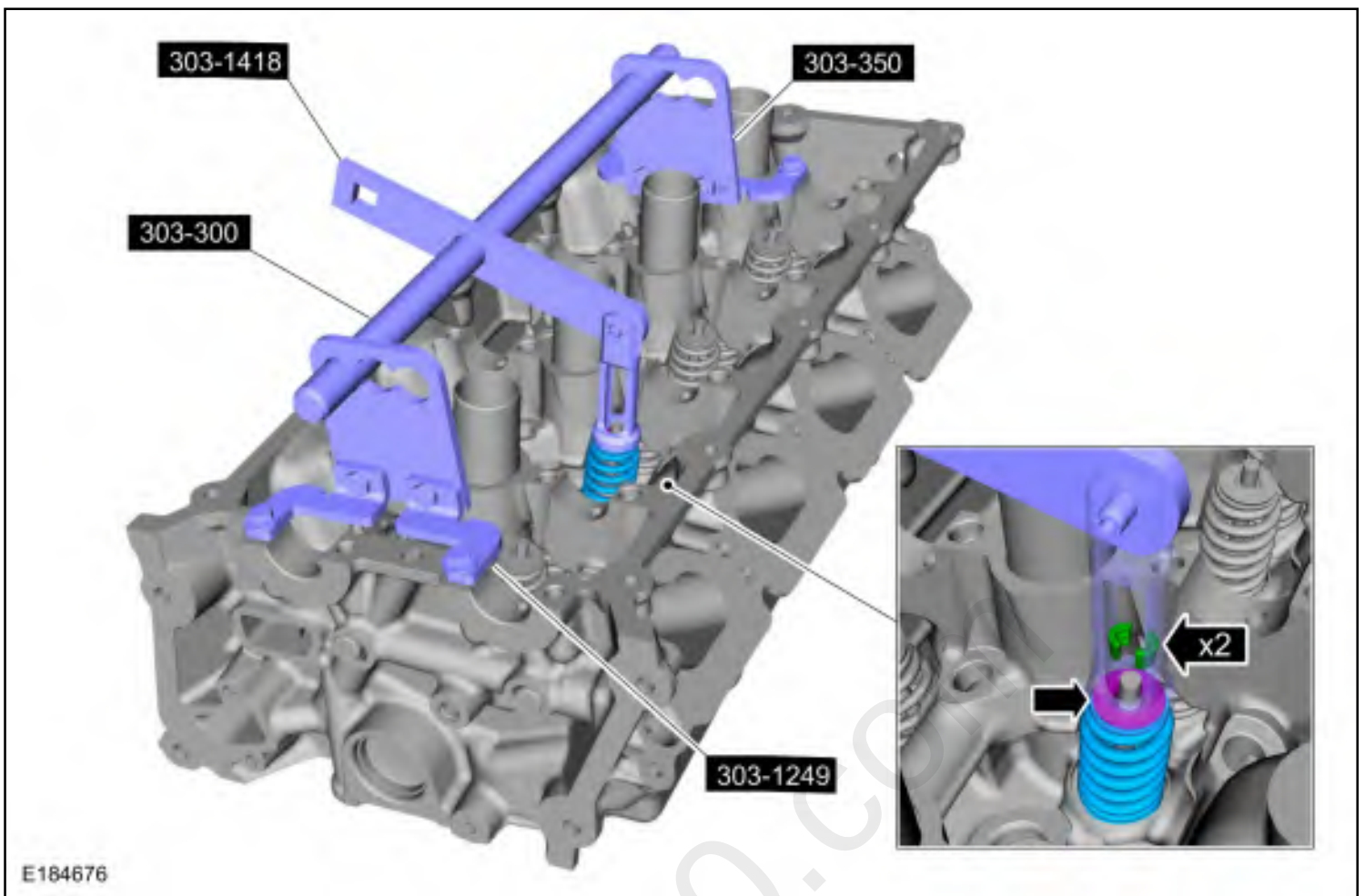
**NOTE:** RH shown, LH similar.

Using the special tool, clean the cylinder head fuel injector bores.  
Use Special Service Tool: 310-205 Fuel Injector Brush.

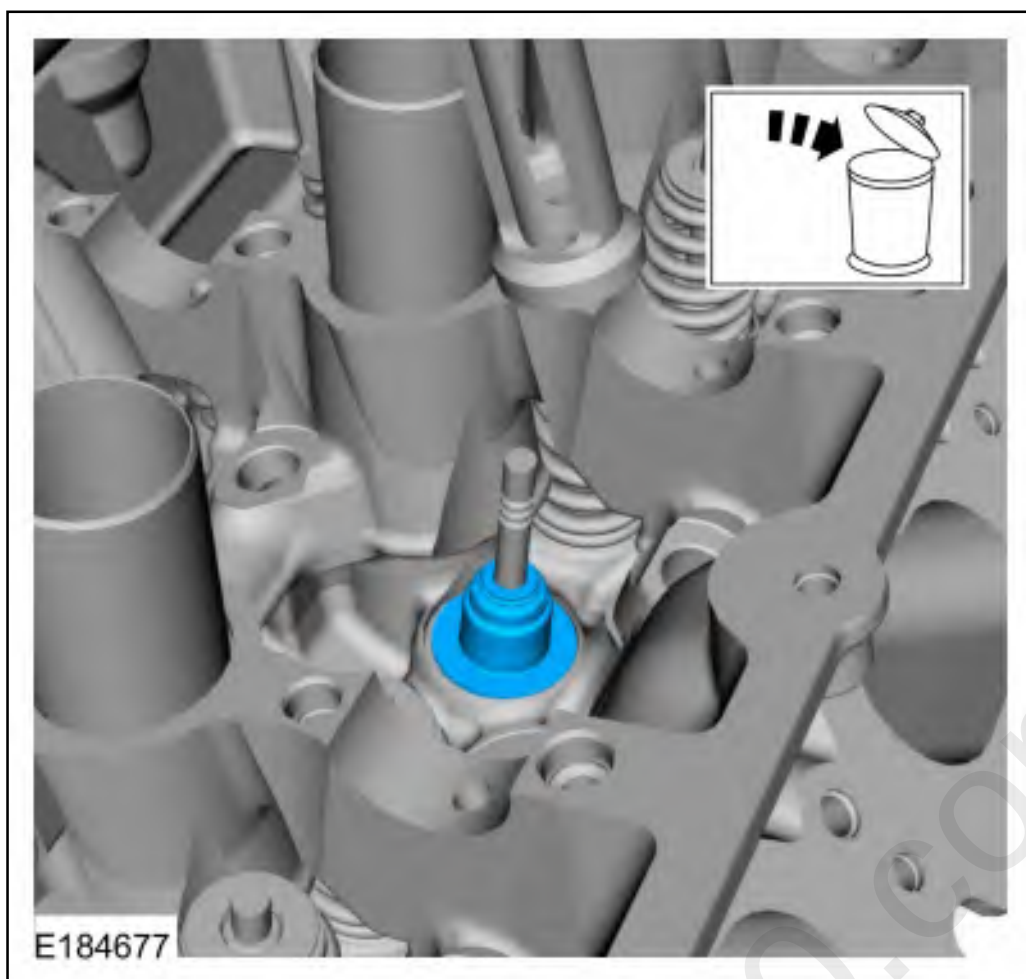


E261779

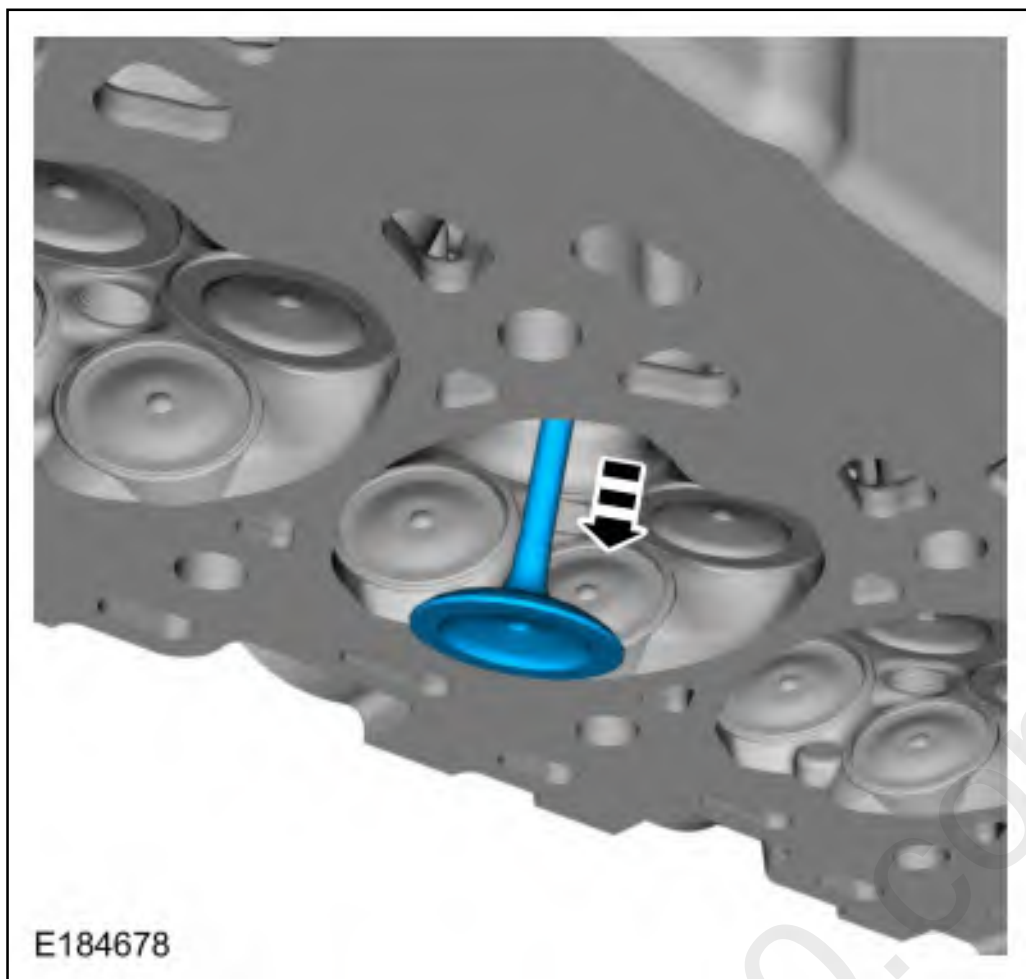
11. Using the special tools, remove the keys, retainer and spring.  
Use Special Service Tool: 303-300 (T87C-6565-A) Set, Valve Spring Compressor. , 303-350 (T89P-6565-A) Compressor, Valve Spring. , 303-1249 Valve Spring Compressor. , 303-1418 Compressor, Valve Spring.



12. Remove and discard the valve stem seal.



13. Remove the valve from the cylinder head.



14. Repeat the previous steps for each of the remaining valves.

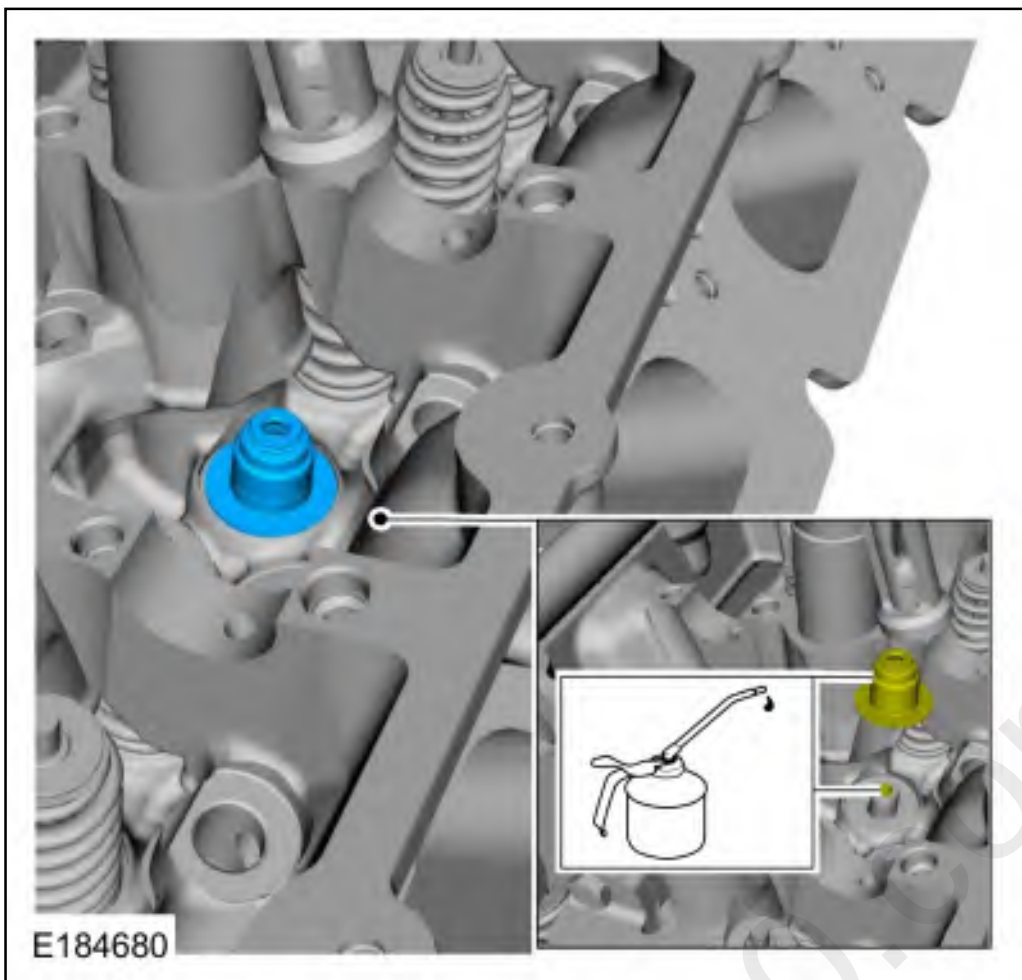
## ASSEMBLY

### All cylinder heads

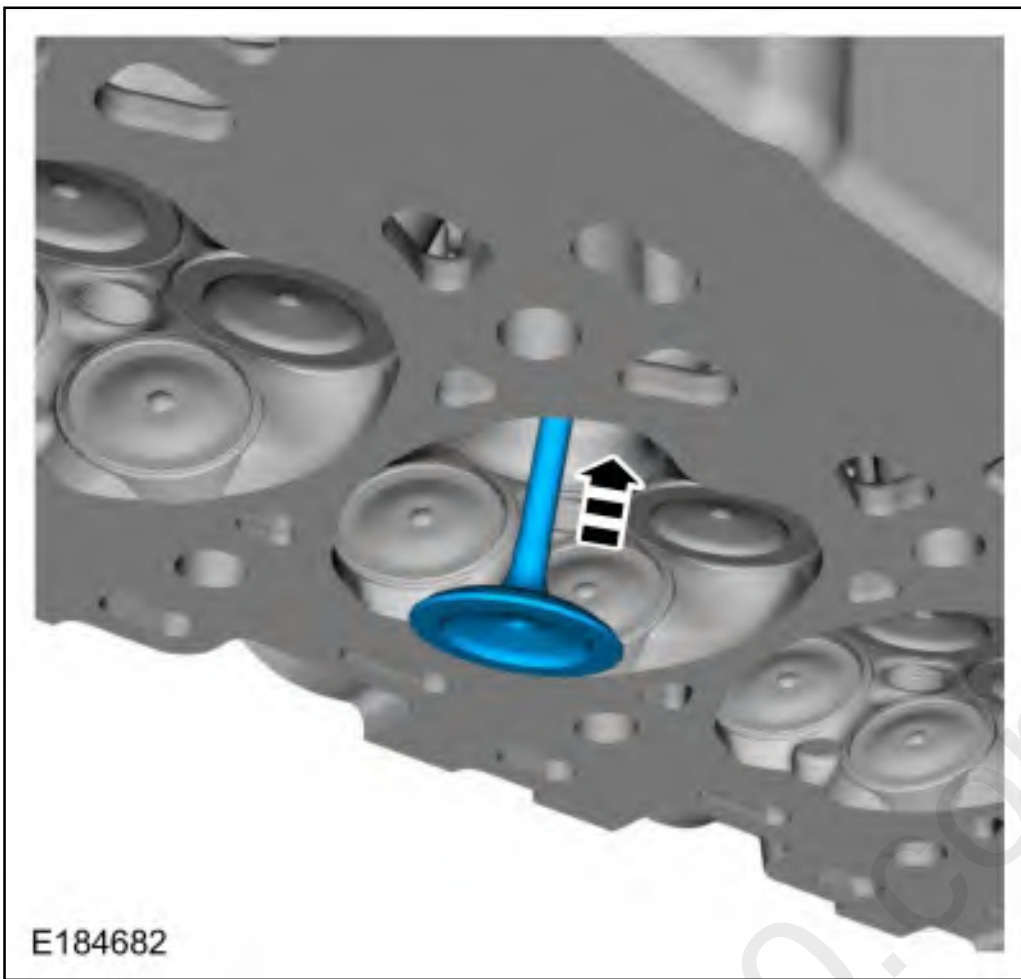
1. **NOTE:** *Lubricate the new valve stem seal and valve guide bore with clean engine oil.*

Install the new valve stem seal.

*Material:* Motorcraft® SAE 5W-20 Synthetic Blend Motor Oil / XO-5W20-QSP (WSS-M2C945-A)

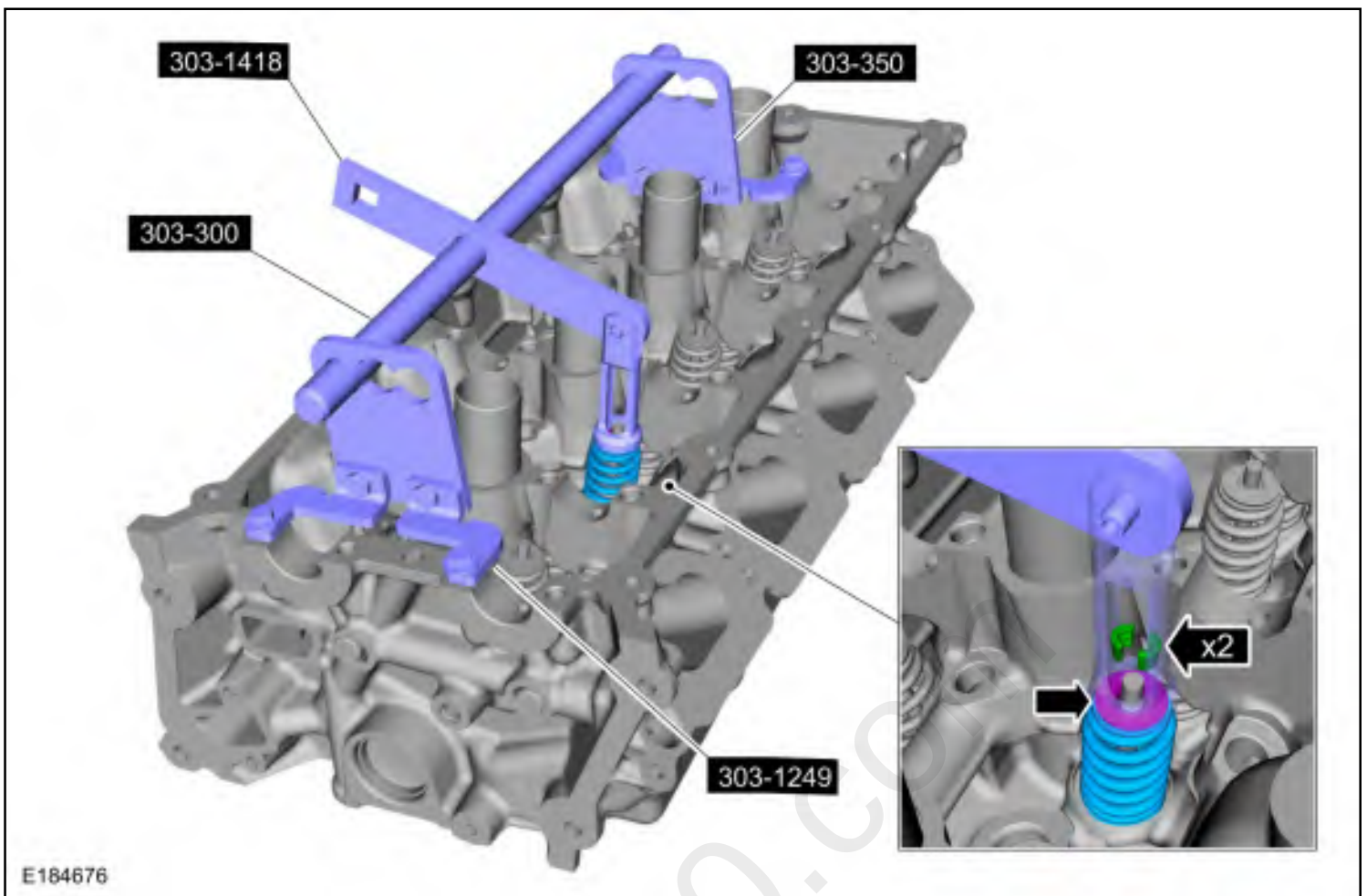


2. Install the valve into the cylinder head.



3. Using the special tools, install the spring, retainer and keys.

Use Special Service Tool: 303-300 (T87C-6565-A) Set, Valve Spring Compressor. , 303-350 (T89P-6565-A) Compressor, Valve Spring. , 303-1249 Valve Spring Compressor. , 303-1418 Compressor, Valve Spring.

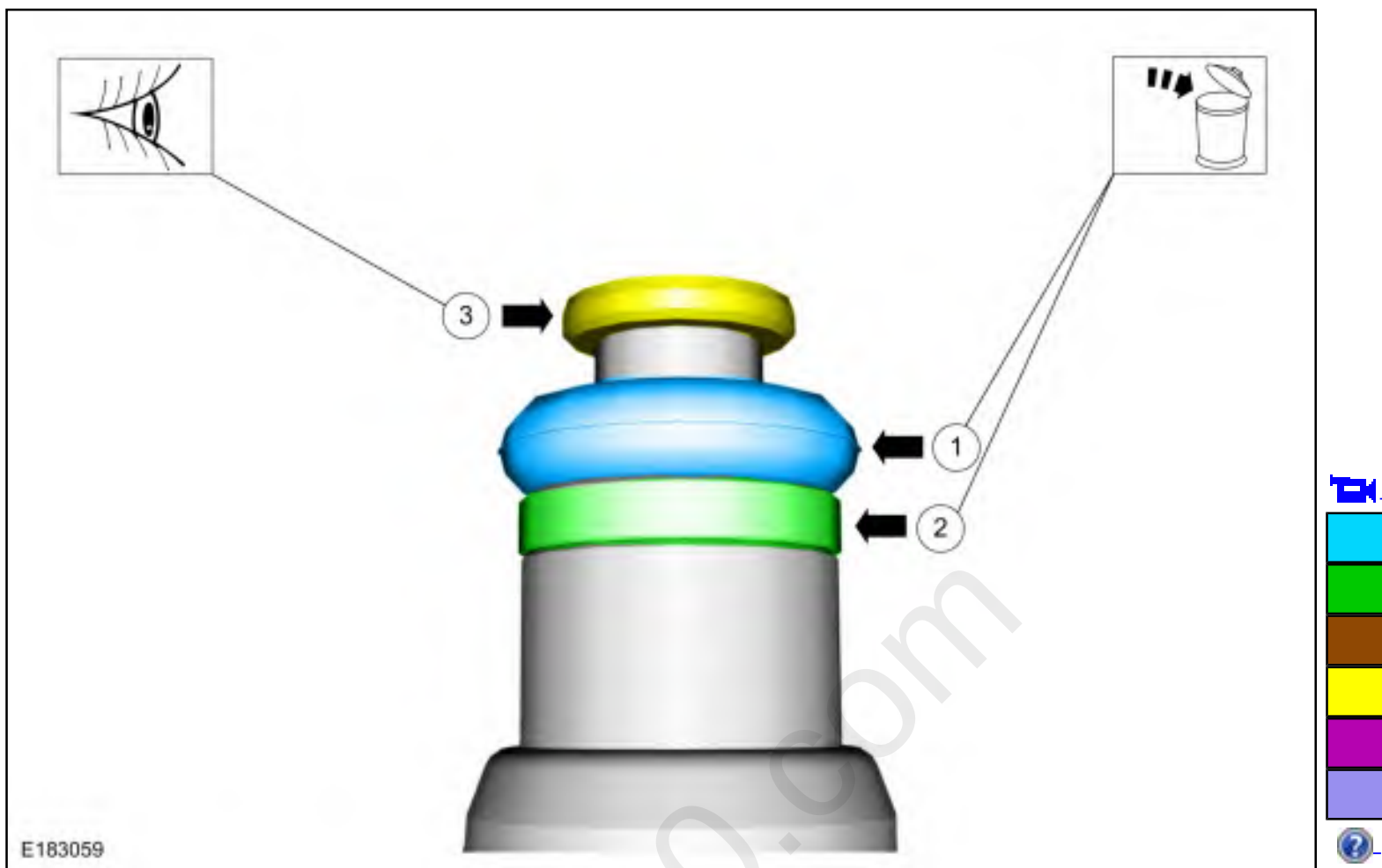


4. Repeat the previous steps for each of the remaining valves.

1. Remove and discard the fuel injector O-ring seals.
2. **NOTE:** *Note the correct orientation of the fuel injector support rings for correct installation of the NEW fuel injector support rings.*

Remove and discard the fuel injector support rings.

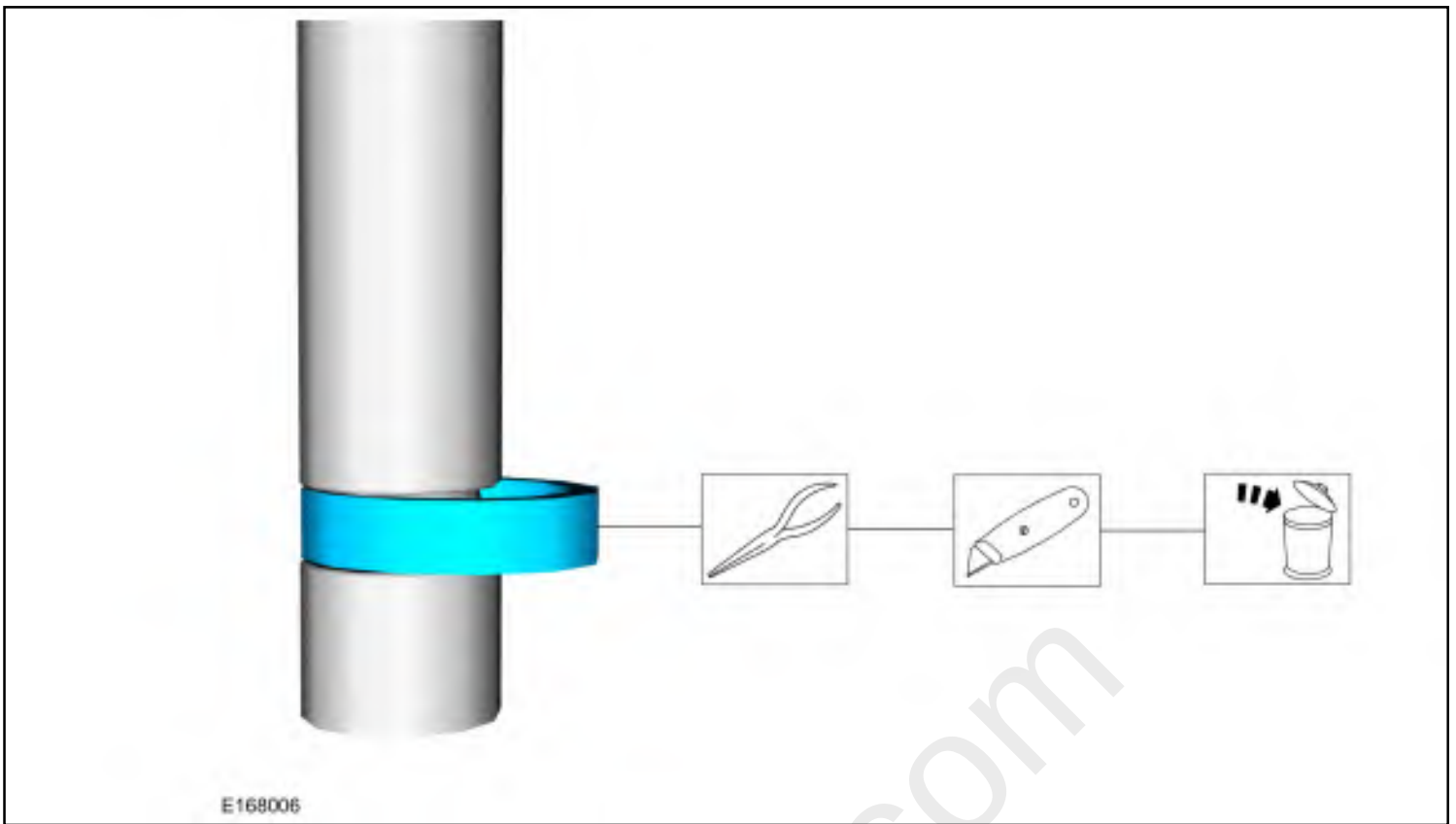
3. Inspect the inlet stopper, if it is damaged or comes off then discard the inlet stopper. The inlet stopper is not needed for proper function. Ensure that any debris from the inlet stopper are removed. If the inlet stopper is intact and undamaged do not remove the inlet stopper from the fuel injector.



6. **NOTICE:** Use care when removing the lower Teflon® seals, not to scratch, nick or gouge the fuel injector.

**NOTICE:** Do not attempt to cut the lower Teflon® seal without first pulling it away from the fuel injector or damage to the injector may occur.

1. Pull the lower Teflon® seal away from the injector.
2. Carefully cut and discard the lower fuel injector Teflon® seal.



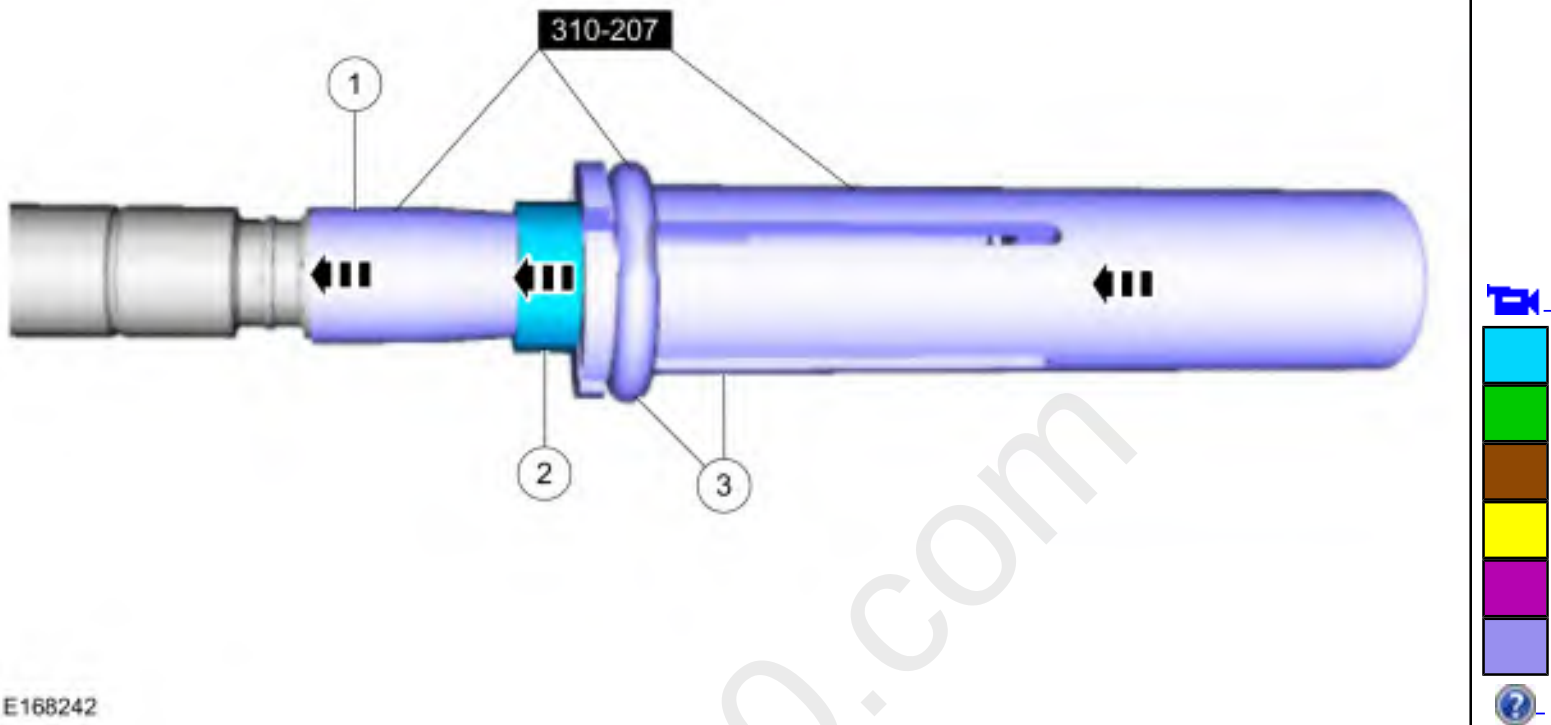
**7. NOTICE: Do not lubricate the NEW lower Teflon® fuel injector seals.**

1. Install the Teflon® Seal Guide onto the fuel injector tip.  
Use Special Service Tool: 310-207 Installer, Fuel Injector Seal Assembly.
2. **NOTICE: Once the Teflon® seal is installed on the Teflon® Seal Guide, it should immediately be installed onto the fuel injector to avoid excessive expansion of the Teflon® seal.**

**NOTE:** Make sure that NEW lower fuel injector Teflon® seals are installed.

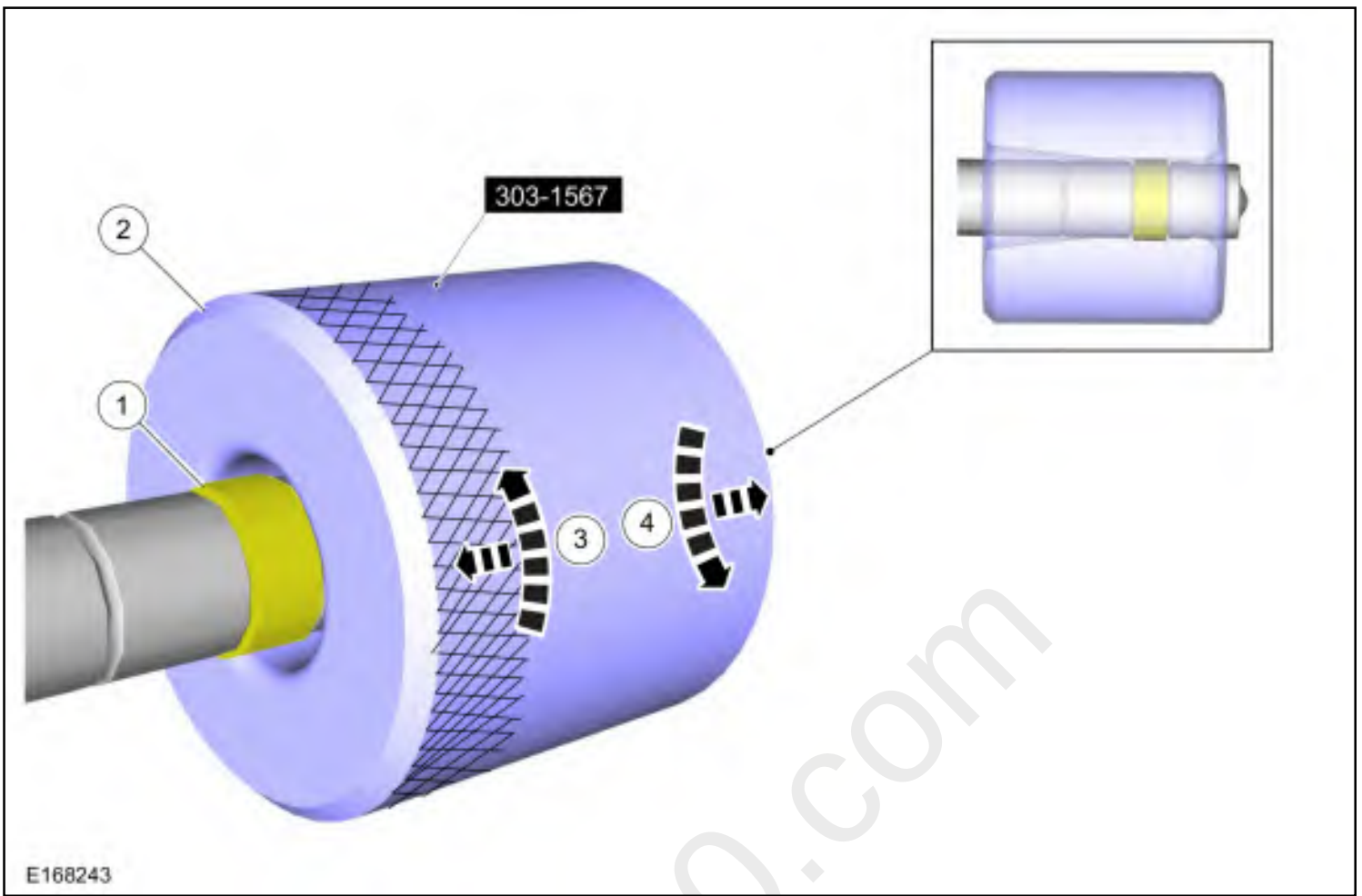
Install the NEW Teflon® seals onto the Teflon® Seal Guide, using the Pusher Tool, slide the Teflon® seals along the Teflon® Seal Guide.

3. Using the Pusher Tool, slide the Teflon® seals off of the Teflon® Seal Guide and into the groove on the fuel injectors.  
Use Special Service Tool: 310-207 Installer, Fuel Injector Seal Assembly.
4. Remove the special tools.



8. **NOTE:** Make sure the Teflon® seal is fully seated in the groove on the fuel injector before sizing the Teflon® seal.

1. Massage and warm the Teflon® seal with your fingers before the Teflon® seal sizer tool is installed. This will aid in installing the Teflon® seal sizer tool.
2. Position the Teflon® seal sizer tool with the larger opening towards the Teflon® seal. Push while turning the Teflon® seal sizer tool 180 degrees.  
Use Special Service Tool: 303-1567 Sizer, Teflon Seal.
3. Once the Teflon® seal sizer tool is installed, check and make sure the Teflon® seal is in the sizing portion of the Teflon® seal sizer tool.
4. After one minute, turn the Teflon® seal sizer tool back 180 degrees and remove.

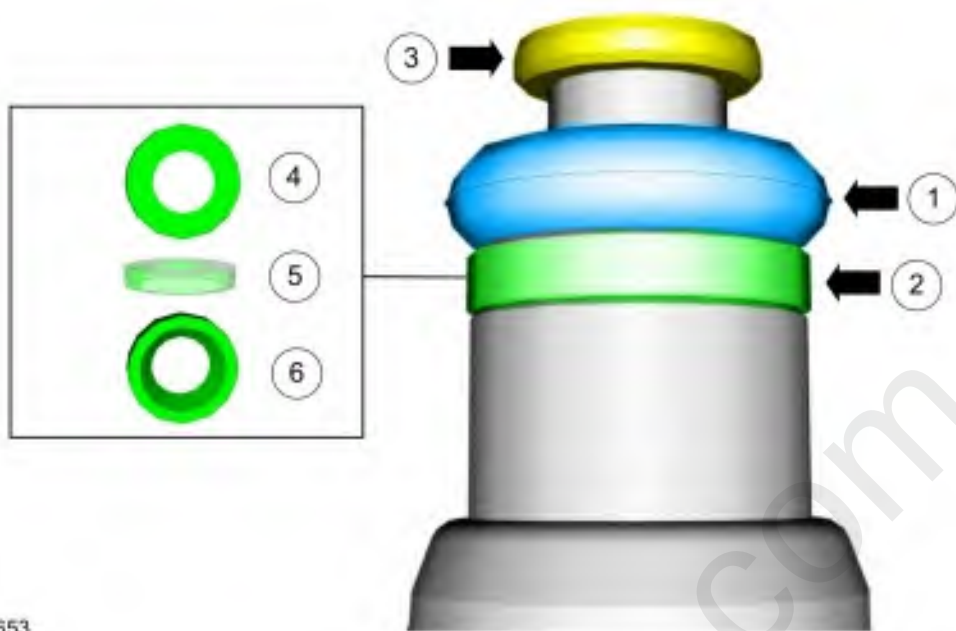


9. **NOTE:** Make sure that *NEW* fuel injector support rings and *NEW* fuel injector O-ring seals are installed.

1. Install the new fuel injector O-rings. The O-rings are pre-lubricated, NO ADDITIONAL lubricant is required.
2. **NOTICE:** The *NEW* the fuel injector support rings must be installed in the correct orientation with the wide surface area facing up against the fuel injector O-ring seals. Improperly installed support rings may cause the fuel system to leak.

Install the *NEW* the fuel injector support rings.

3. Inspect the inlet stopper, if it is damaged or comes off then discard the inlet stopper. The inlet stopper is not needed for proper function. Ensure that any debris from the inlet stopper are removed. If the inlet stopper is intact and undamaged do not remove the inlet stopper from the fuel injector.
4. The upper side of the support ring has the wide surface area.
5. Fuel injector support ring.
6. The lower side of the support ring has the narrow surface area.



E199653

10. Install the NEW fuel injector clips.

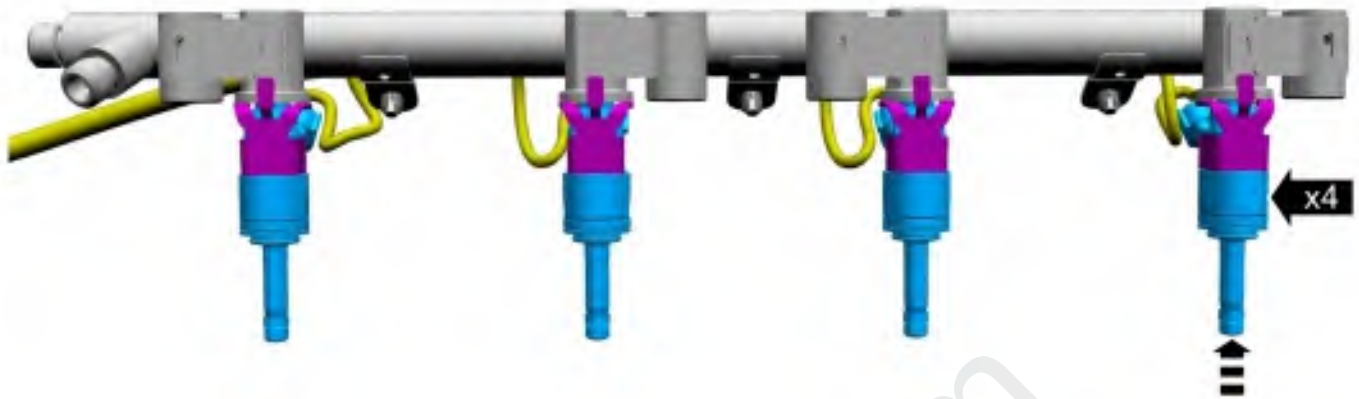


E257412

11. **NOTE:** *The anti-rotation finger of the fuel injector clip must slip into the groove of the fuel rail cup.*

**NOTE:** *RH shown, LH similar.*

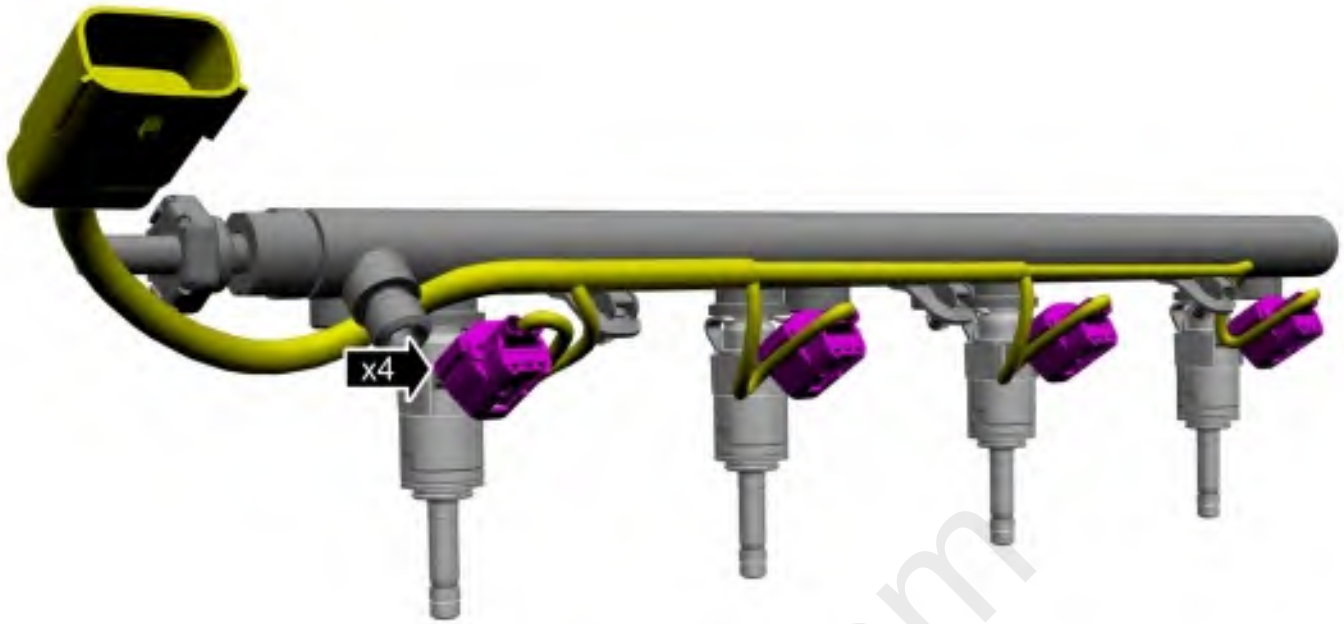
Install the fuel injectors to the fuel rail and then connect the fuel injector electrical connectors.



E258570

12. **NOTE:** *RH shown, LH similar.*

Connect the fuel injector electrical connectors.



E257411

- **NOTE:** Do not lubricate the NEW lower Teflon® fuel injector seals.

**NOTE:** RH shown, LH similar.

Install the fuel rail, push down on the fuel rail above the injectors.

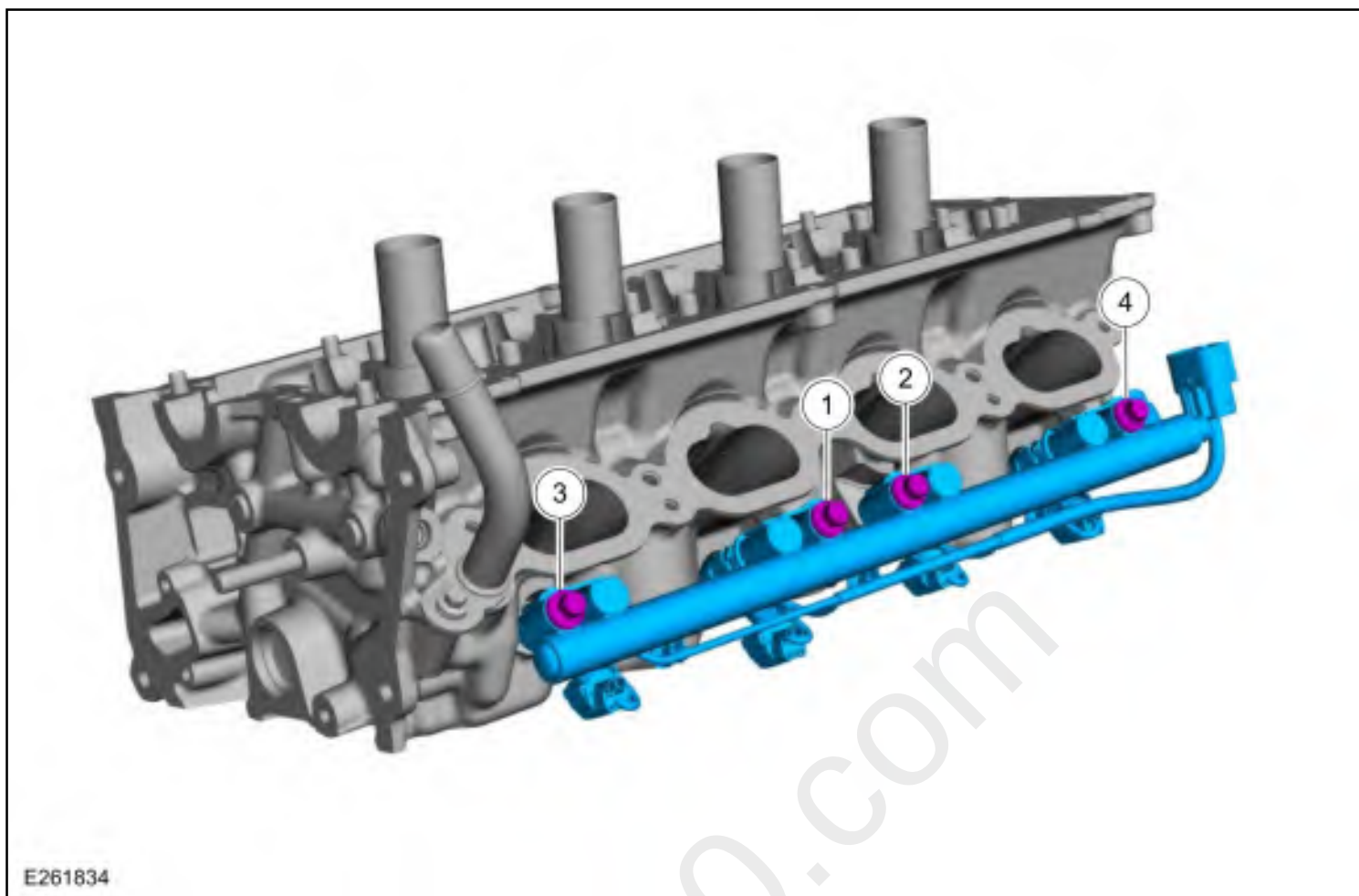
- Hand start all of the fuel rail bolts and finger tighten the fuel rail bolts so they are uniformly in light contact with fuel rail bosses.
- Tighten the fuel rail bolts approximately 90 degrees, in the sequence shown. Repeat to evenly draw down the fuel rail, until the fuel rail bosses are in contact with the cylinder head.

*Torque:*

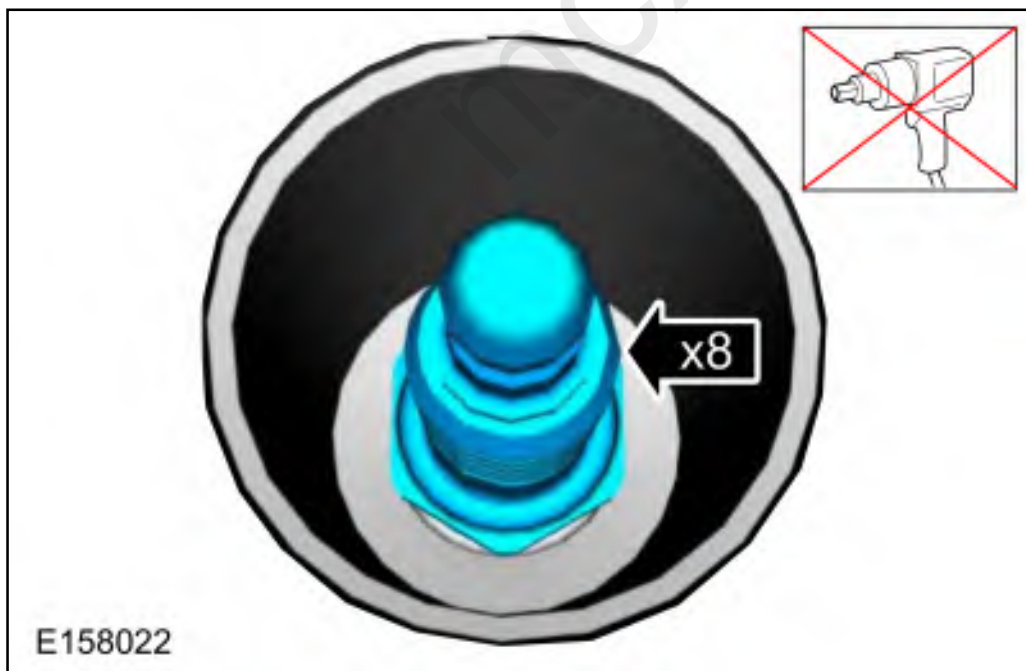
Stage 1: Tighten the fuel rail bolts in the sequence shown to : 89 lb.in (10 Nm)

Stage 2: Tighten the fuel rail bolts in the sequence shown to : 21 lb.ft (28 Nm)

Stage 3: Tighten the fuel rail bolts in the sequence shown an additional : 25°

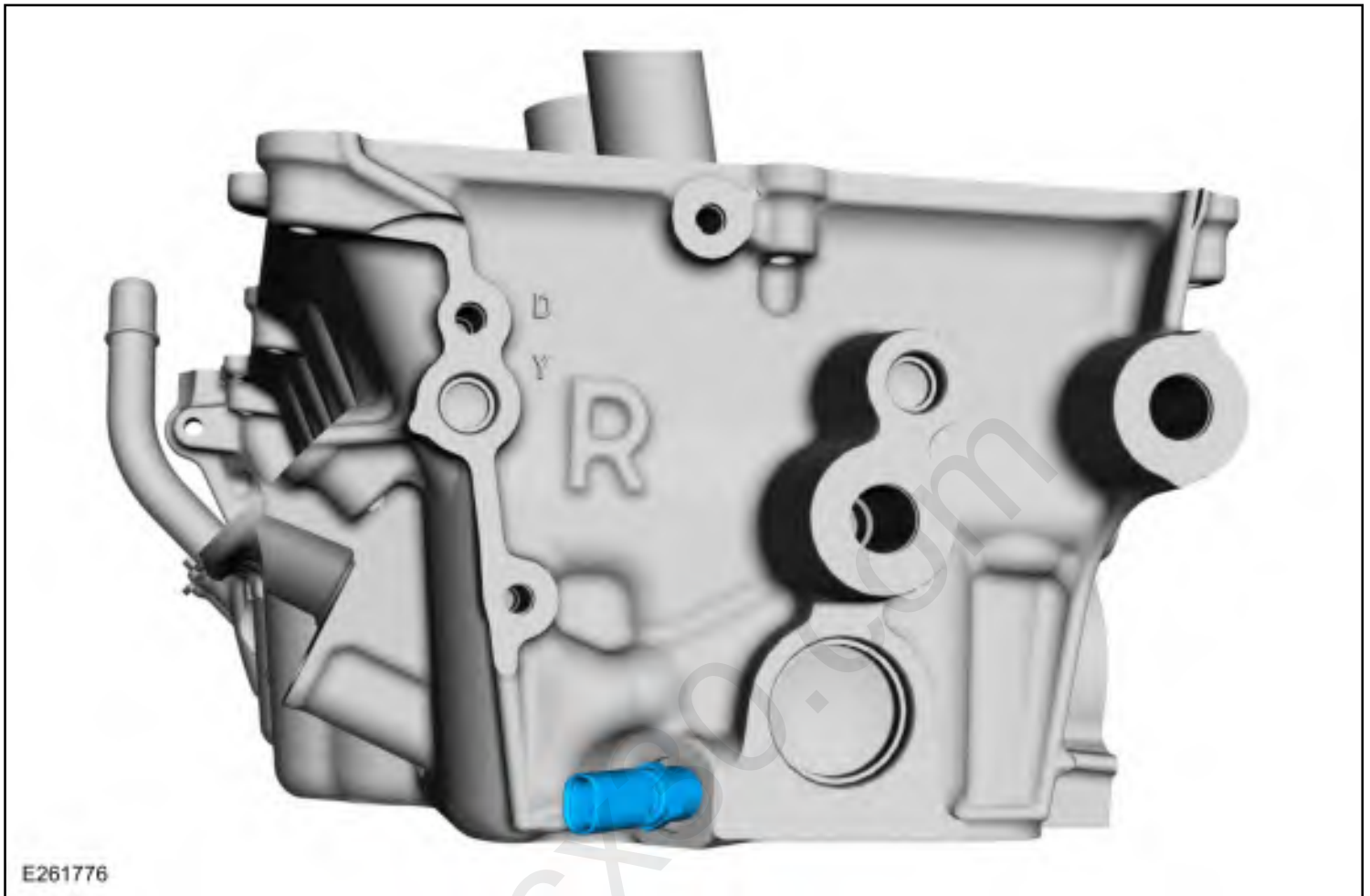


14. Install the spark plugs.  
*Torque: 128 lb.in (14.5 Nm)*



**RH cylinder heads**

15. Install a new CHT sensor.  
*Torque: 97 lb.in (11 Nm)*

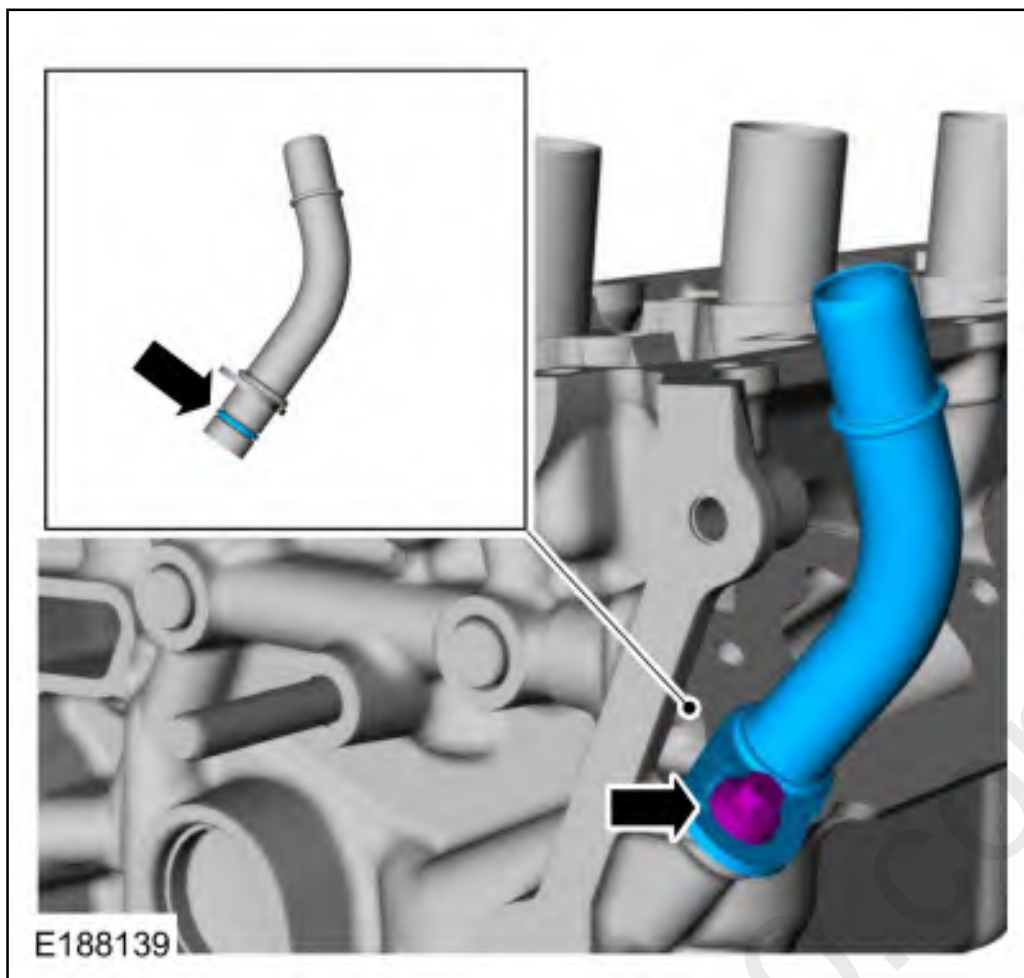


16. **NOTE:** *Lubricate the O-ring seal with clean engine coolant prior to installing.*

Using a new O-ring seal, install the coolant outlet pipe.

*Material: Motorcraft® Orange Concentrated Antifreeze/Coolant / VC-3-B (WSS-M97B44-D)*

*Torque: 89 lb.in (10 Nm)*



## LH cylinder heads

17. Using a new gasket, install the coolant outlet and the bolts.  
*Torque: 89 lb.in (10 Nm)*

