

Fuel Rail Supply Tube

Materials

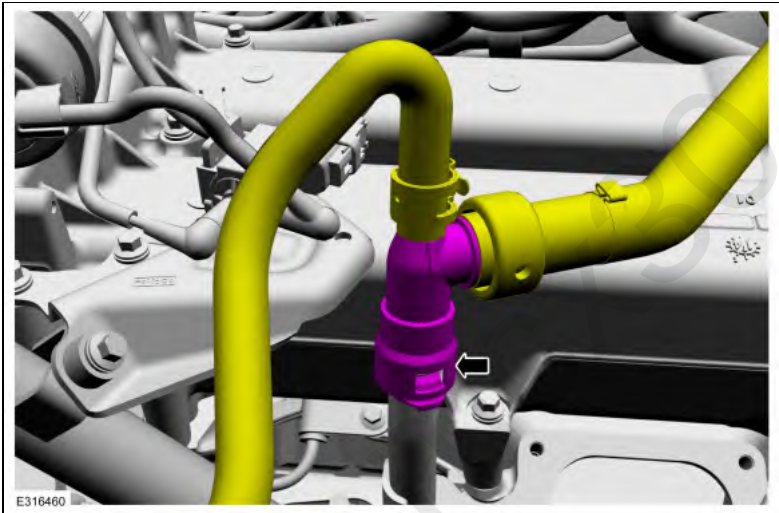
Name	Specification
Motorcraft® Metal Brake Parts Cleaner PM-4-A, PM-4-B	-

Removal

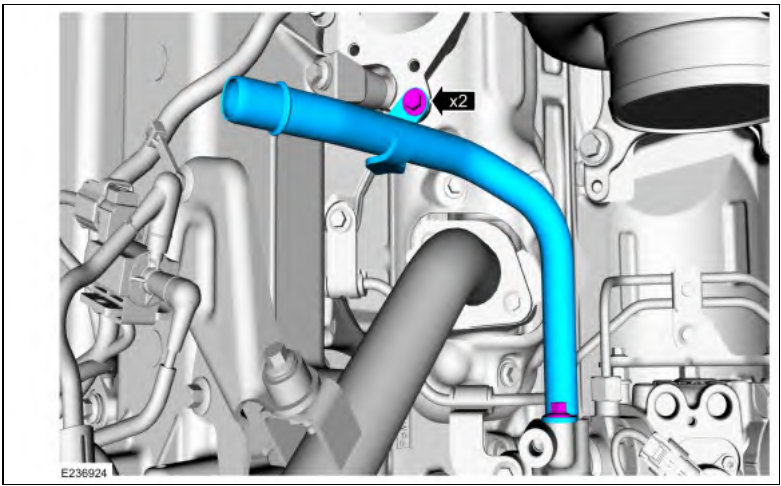
NOTICE: Do not work on the fuel system until the pressure has been released and the engine has cooled. Fuel in the high-pressure fuel system is hot and under very high pressure. High-pressure fuel may cause cuts and contact with hot fuel may cause burns. Failure to follow these instructions may result in serious personal injury.

NOTICE: Fuel injection equipment is manufactured to very precise tolerances and fine clearances. To prevent fuel system damage, it is essential that absolute cleanliness is observed when working with these components.

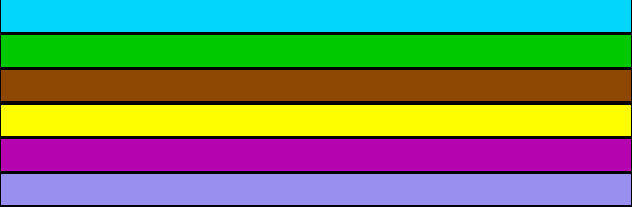
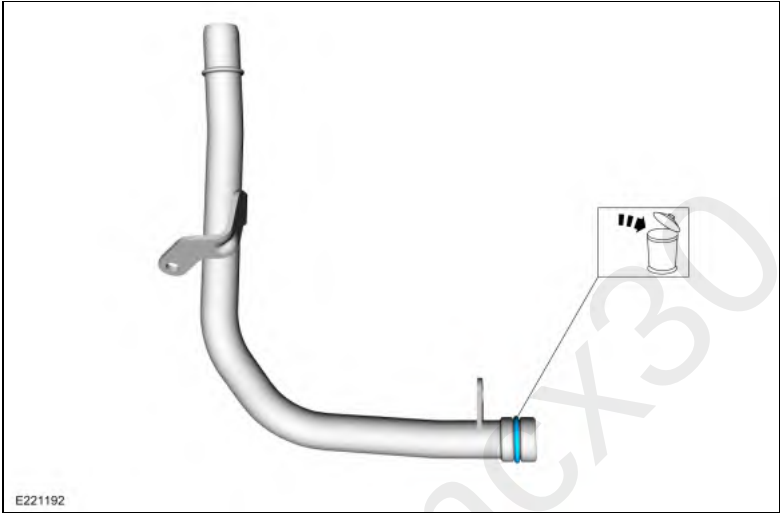
1. Drain the engine cooling system
Refer to: Engine Cooling System Draining, Vacuum Filling and Bleeding (303-03B Engine Cooling - 6.7L Power Stroke Diesel, General Procedures).
2. Remove the air cleaner.
Refer to: Air Cleaner (303-12B Intake Air Distribution and Filtering - 6.7L Power Stroke Diesel, Removal and Installation).
3. Remove the fuel injection pump supply tube assembly.
Refer to: Fuel Injection Pump Supply Tube Assembly (303-04B Fuel Charging and Controls - 6.7L Power Stroke Diesel, Removal and Installation).
4. Follow the directions for the quick release coupling type 11. Disconnect the coolant pipe quick release coupling.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .



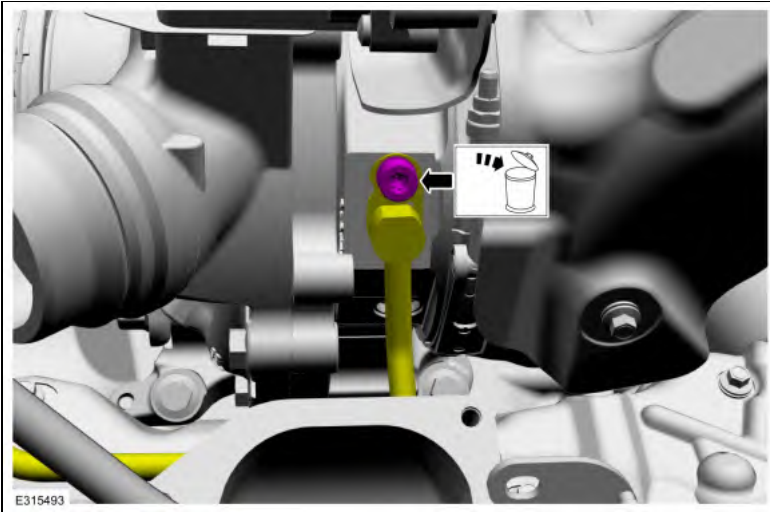
5. Remove the coolant pipe bolts, then remove the pipe.



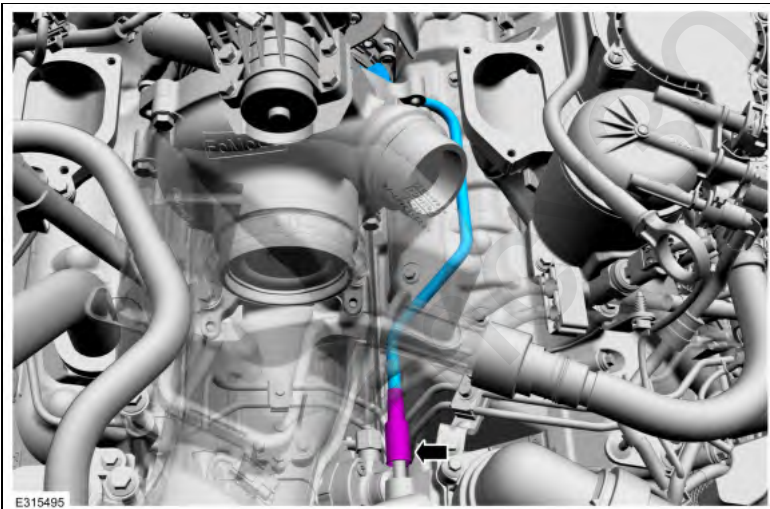
6. Remove and discard the O-ring seal from the coolant pipe.



7. Remove and discard the turbocharger coolant return tube bolt, then disconnect the tube.

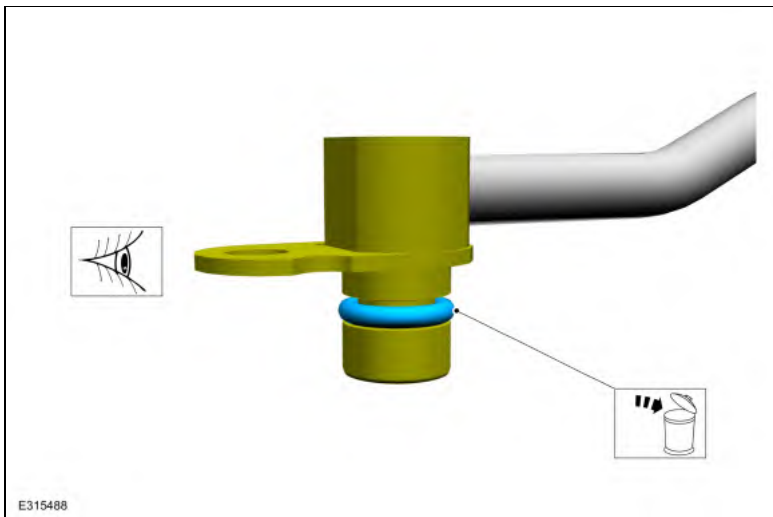


8. Disconnect and remove the turbocharger coolant return tube.



- 9.
1. Remove and discard the turbocharger coolant return tube O-ring seal.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
 2. **NOTICE: Use brake cleaner and a nylon brush to clean. Do not use a metal brush, damage to sealing area will result in leaks.**

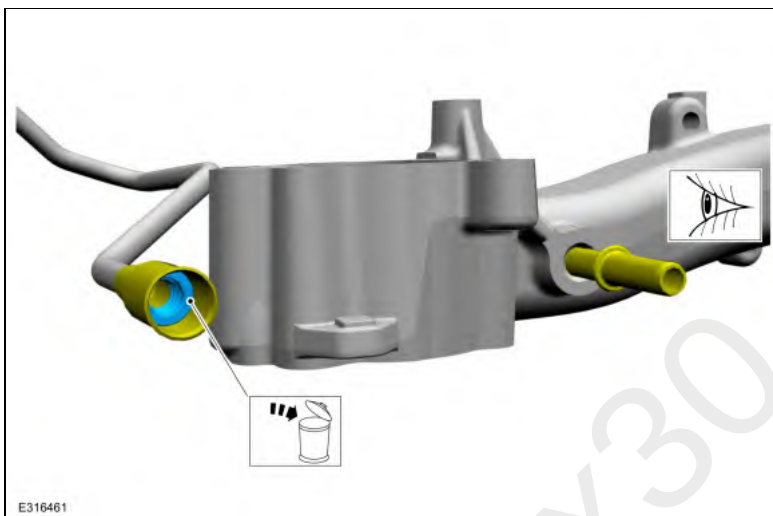
Clean the turbocharger coolant tube sealing surfaces. Inspect the sealing surfaces for debris or damage and make sure the retaining bracket is not bent, check for squareness of the O-ring area. Install new components if necessary.



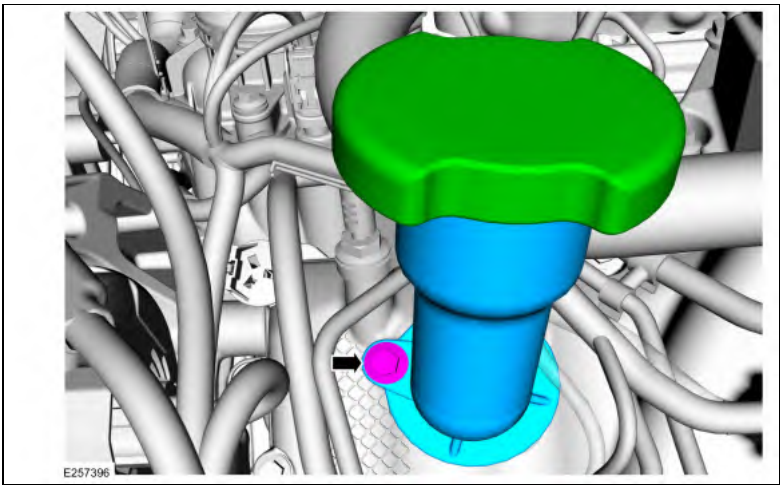
10. **NOTICE:** Use brake cleaner and a nylon brush to clean. Do not use a metal brush, damage to sealing area will result in leaks.

Remove and discard the rubber gasket. Inspect and clean the turbocharger cooling tube sealing surfaces, install new components if necessary.

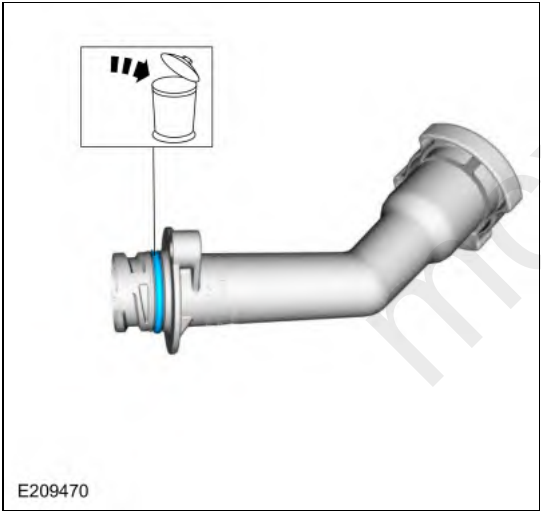
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B



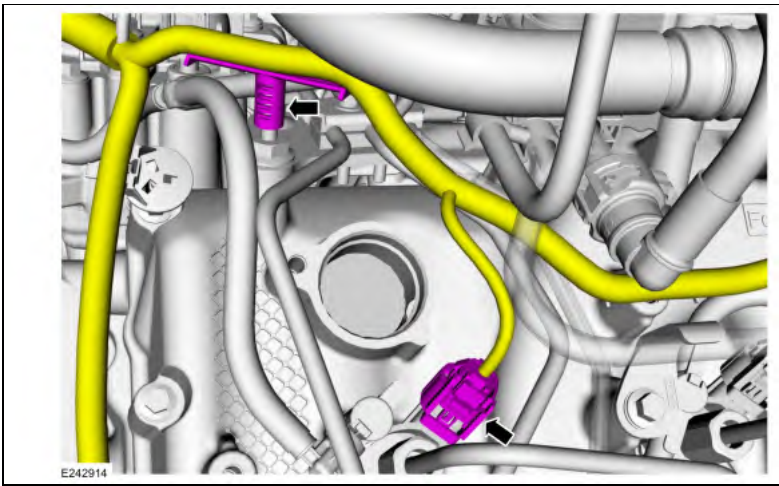
11. Remove the oil fill cap. Remove the oil fill pipe bolt, then remove the oil fill pipe.



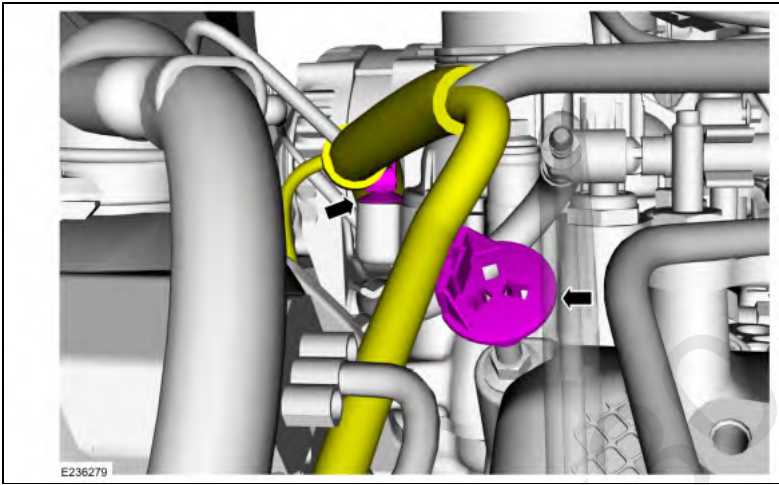
12. Remove and discard the oil fill pipe O-ring seal.



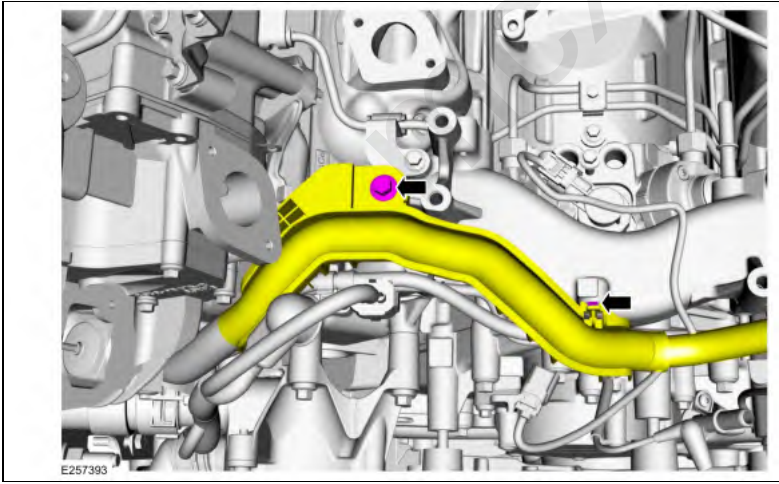
- 13.
- Disconnect the cylinder No. 5 fuel injector electrical connector.
 - Detach the wiring harness retainer from the fuel rail supply tube bracket stud.



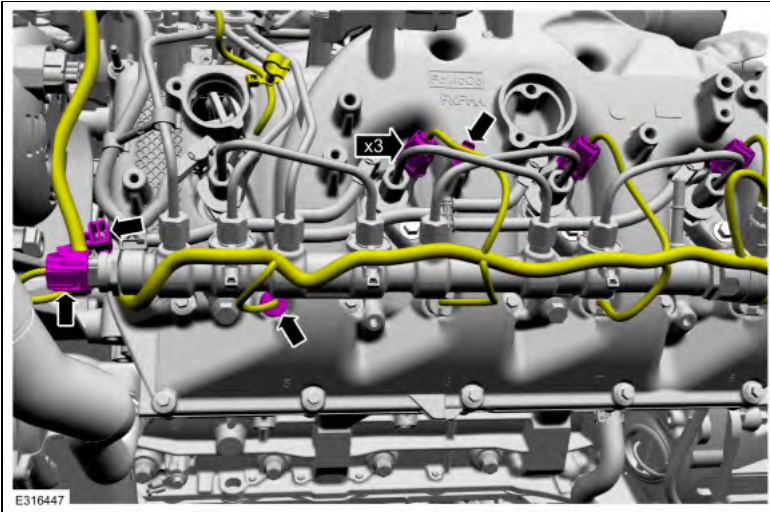
14. Detach the wire harness retainers.



15. Remove the wire harness retainer bolt, then detach the wire harness retainer.

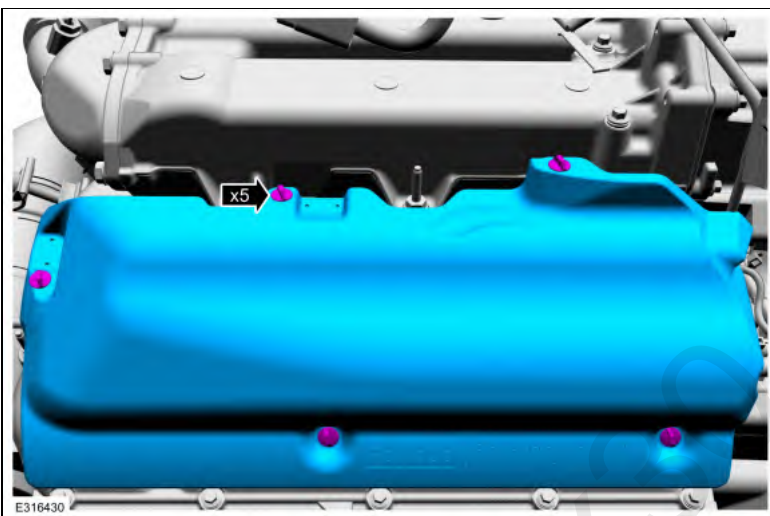


16. Detach the wire harness retainers, then disconnect the electrical connectors.

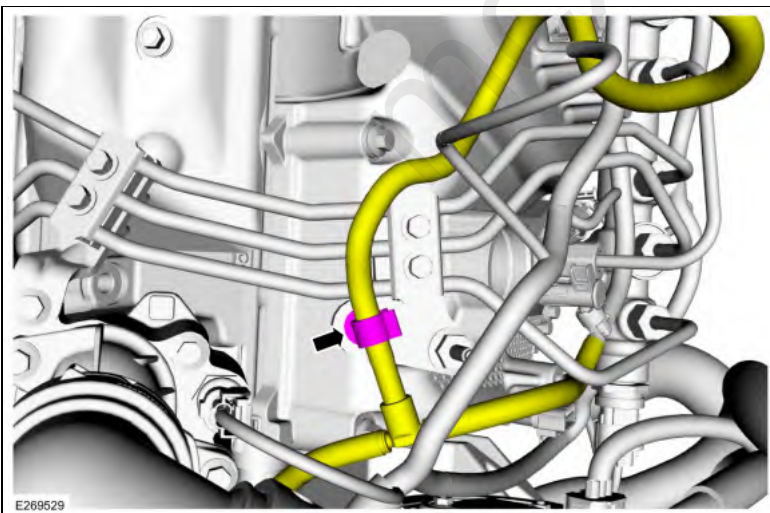


17. **NOTE:** It may be necessary to unthread the engine sound shield retainers from the engine.

Remove the retainers, then remove the sound shield.



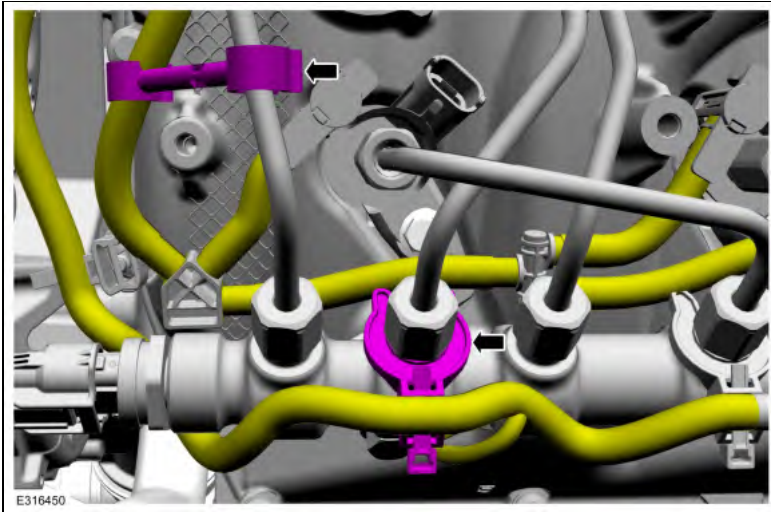
18. Detach the fuel injector return hose retainer.



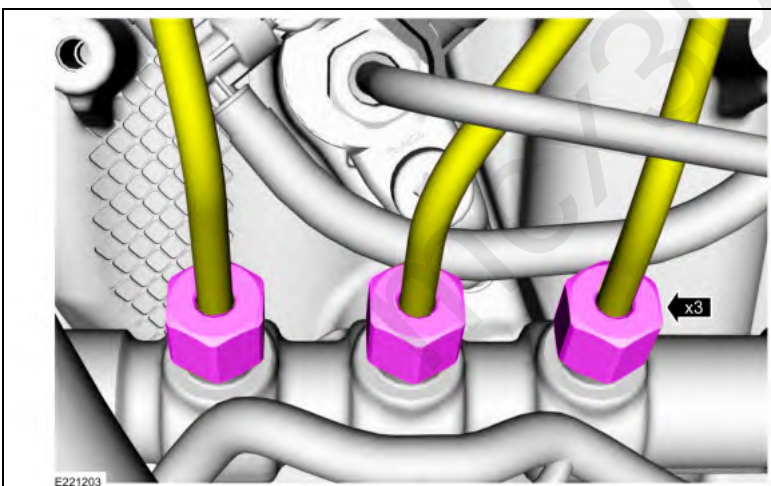
19. Remove the fuel rail supply tube bracket bolts and the stud bolt.



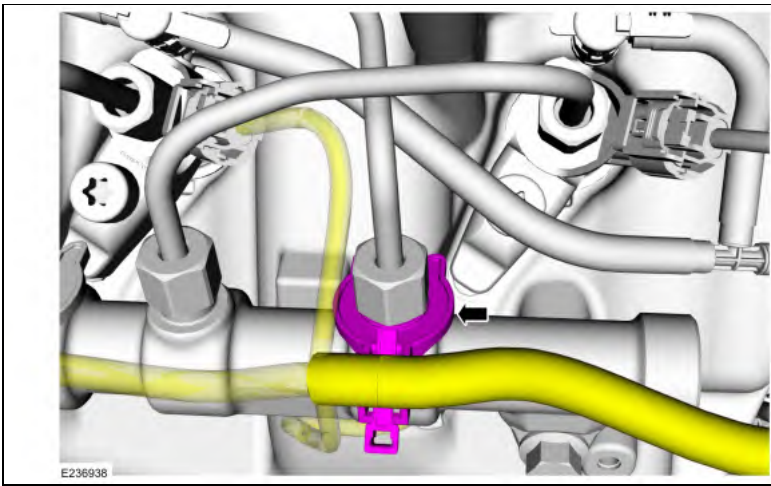
21. Detach the wiring harness from the left fuel rail. Detach the hose retainer.



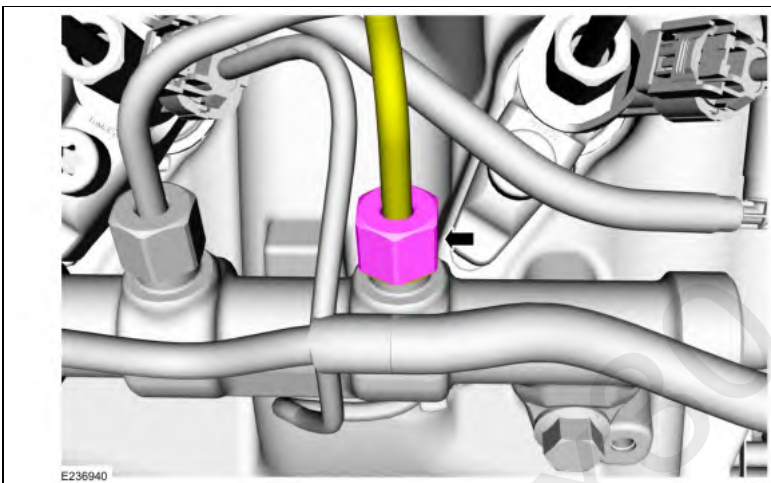
22. Loosen and disconnect the fuel rail supply tube fittings at the left fuel rail.



23. Detach the wiring harness retainer from the right fuel rail.

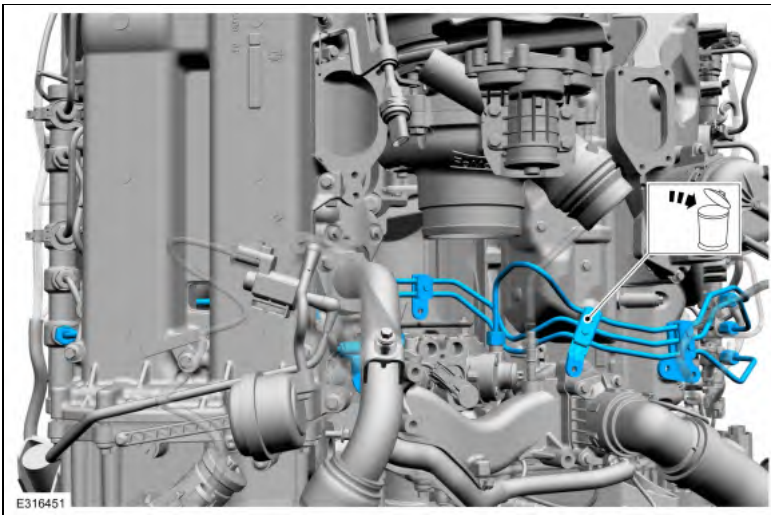


24. Loosen and disconnect the fuel rail supply tube fitting at the right fuel rail.



25. **NOTE:** The fuel rail supply tube cannot be reused. Remove and discard the fuel rail supply tube any time that a fuel rail supply tube high-pressure fitting has been loosened.

Remove and discard the fuel rail supply tube.

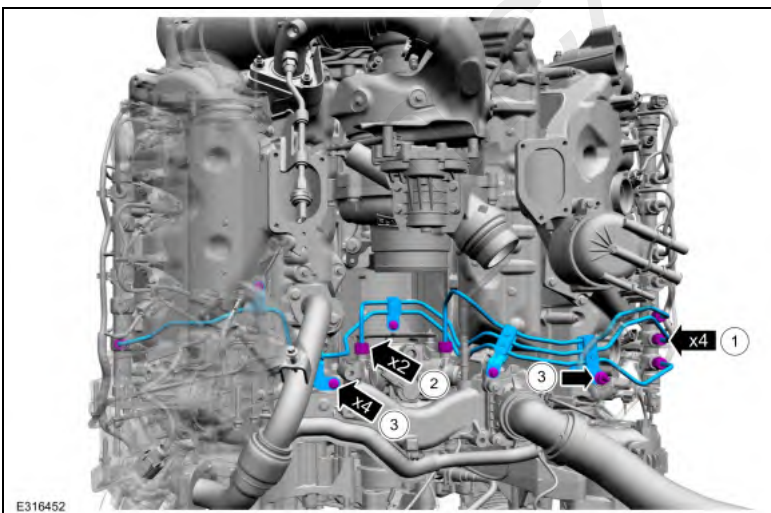


Installation

- NOTE:** Support the tube while hand snug the fittings to make sure of correct assembly of the joints.

Install the new fuel rail supply tube in the following sequence.

1. Connect and hand tighten the fuel rail supply tube to fuel rail fittings.
2. Connect and hand tighten the fuel rail supply tube to the high-pressure fuel injection pump fittings.
3. Install and hand start the fuel rail supply tube bracket bolts and the fuel rail supply tube bracket stud bolt.

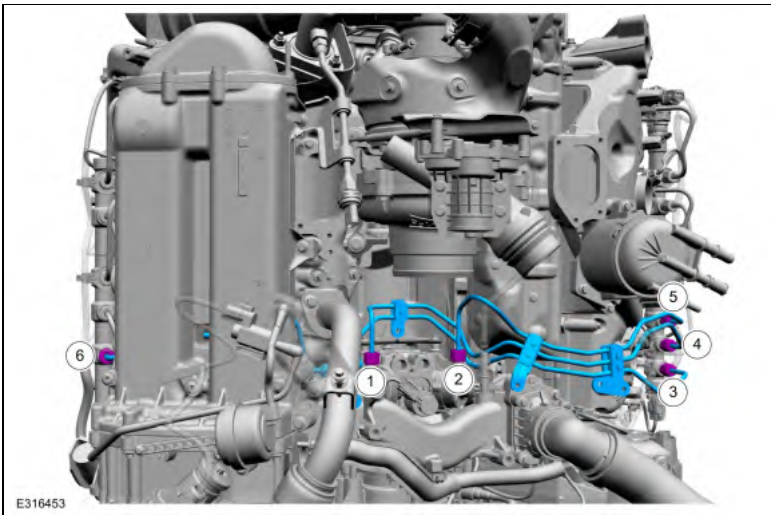


2. Tighten the fuel rail supply tube fittings in the following stages and in the sequence shown.

Torque:

Stage 1: Tighten 1-6 to: 89 lb.in (10 Nm)

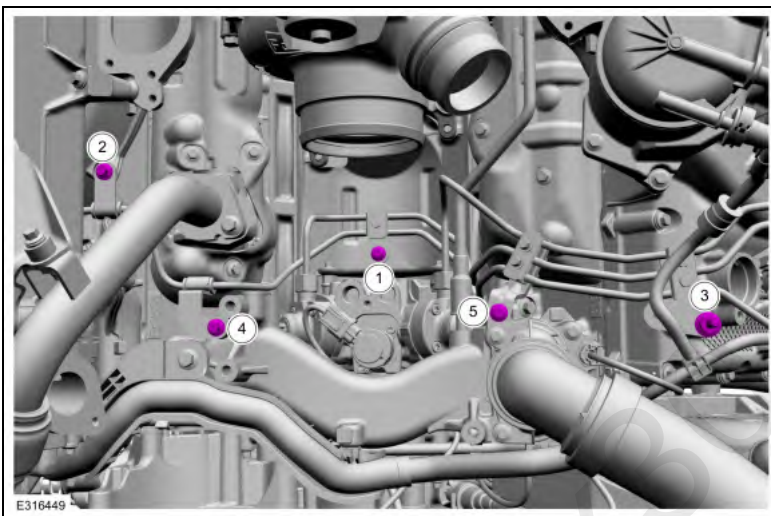
Stage 2: Tighten 1-6 an additional: 65°



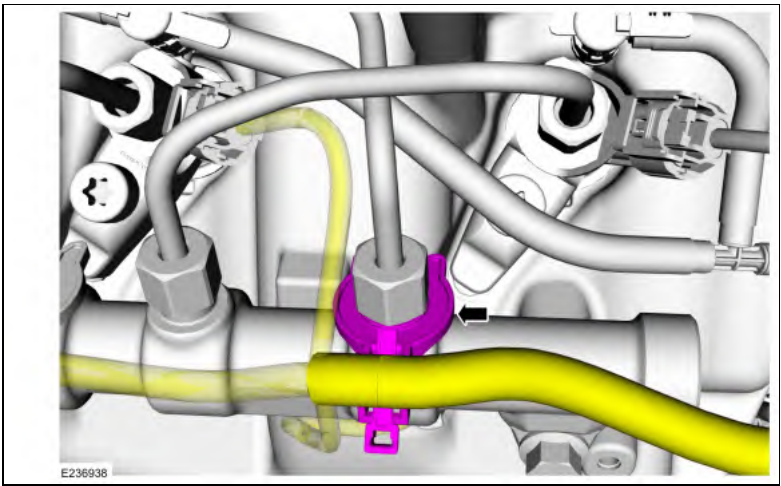
3. Tighten the fuel rail supply tube bracket bolts and the fuel rail supply tube bracket stud bolt in the sequence shown.

Torque:

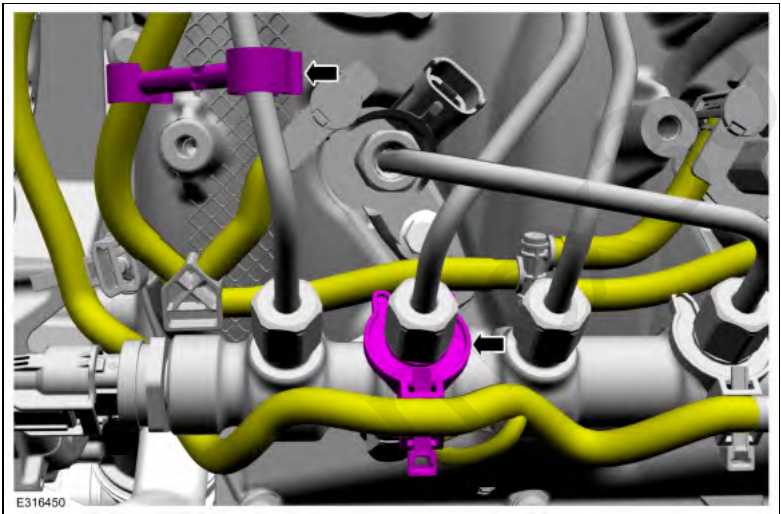
Tighten 1-5 to : 89 lb.in (10 Nm)



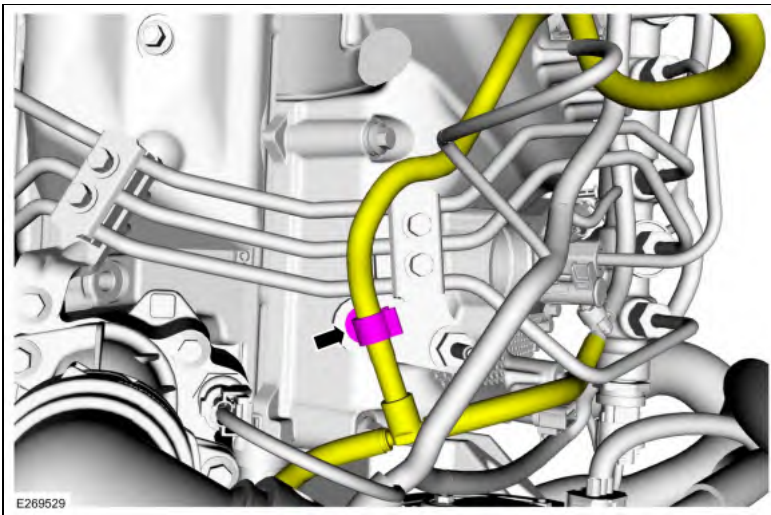
4. Attach the wiring harness retainer to the right fuel rail.



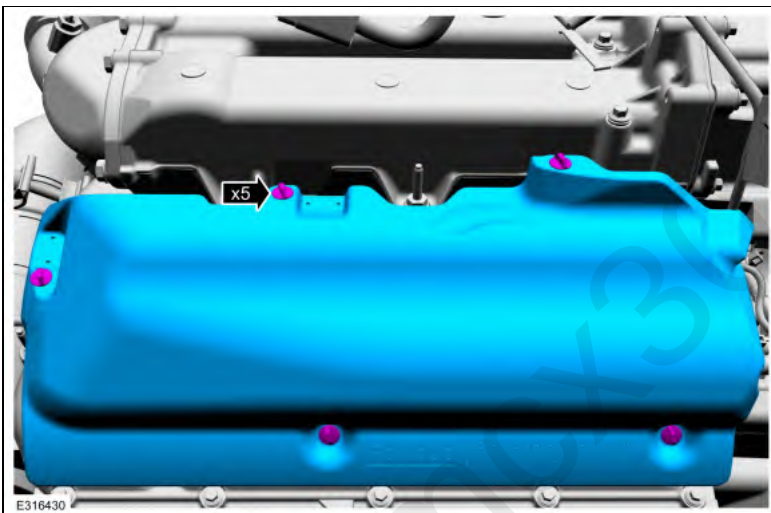
5. Attach the wiring harness retainer to the left fuel rail. Attach the hose retainer.



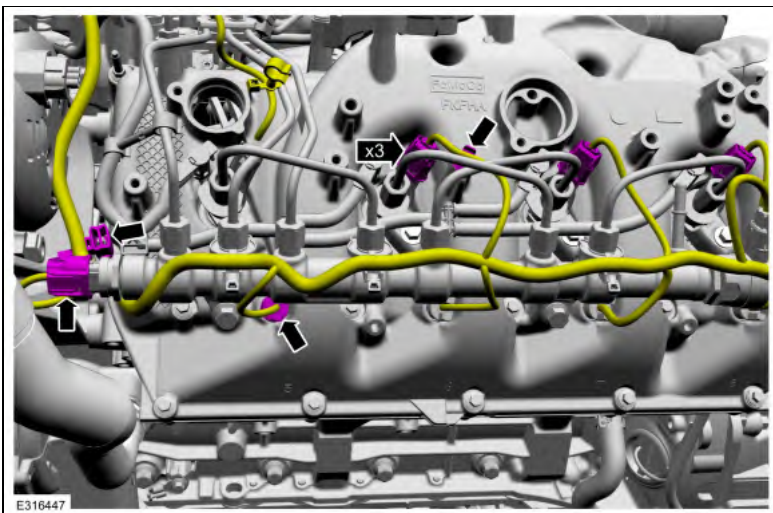
6. Attach the fuel injector return hose retainer to the fuel rail supply tube.



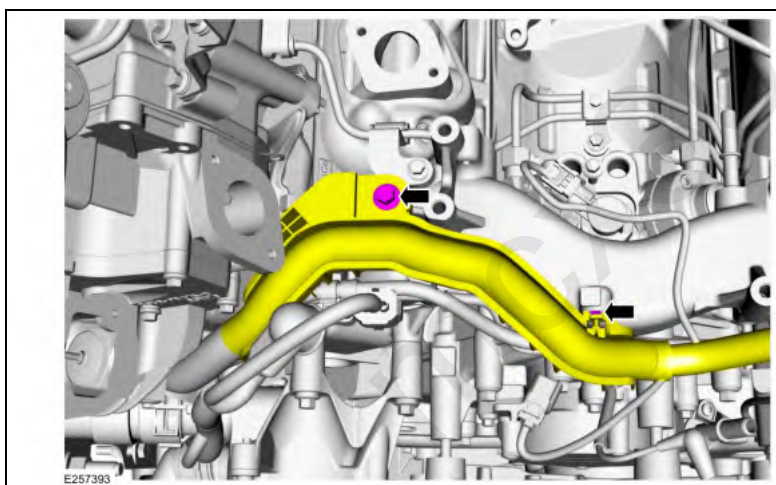
7. Install the right engine sound shield, then install the retainers.



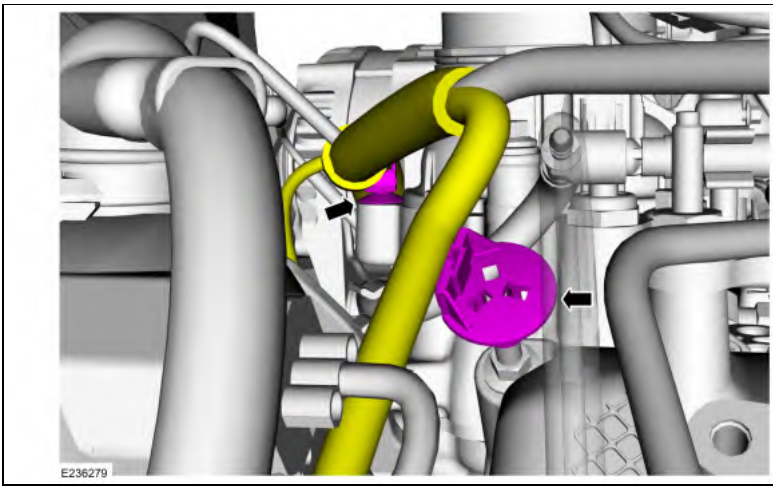
8. Connect the electrical connectors, then attach the wire harness retainers.



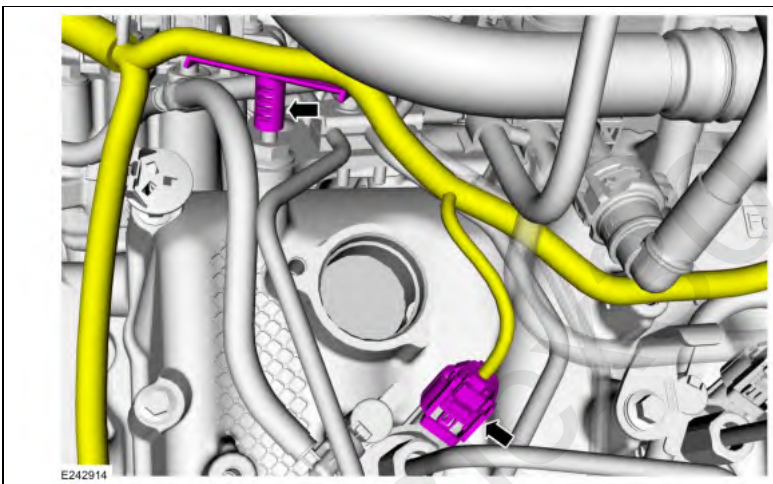
9. Attach the wire harness retainer, then install and tighten the wire harness retainer bolt.
Torque: 106 lb.in (12 Nm)



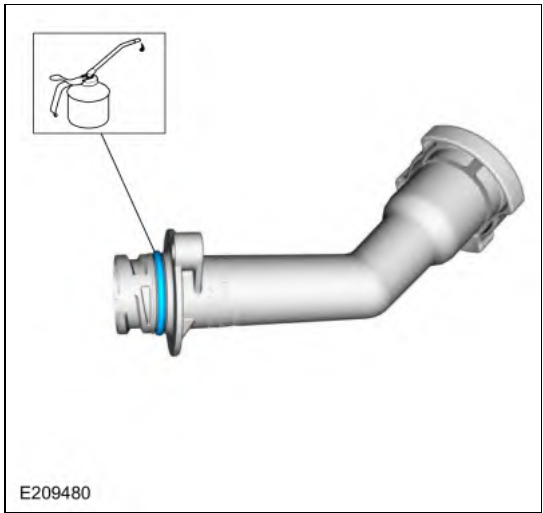
10. Attach the wire harness retainers.



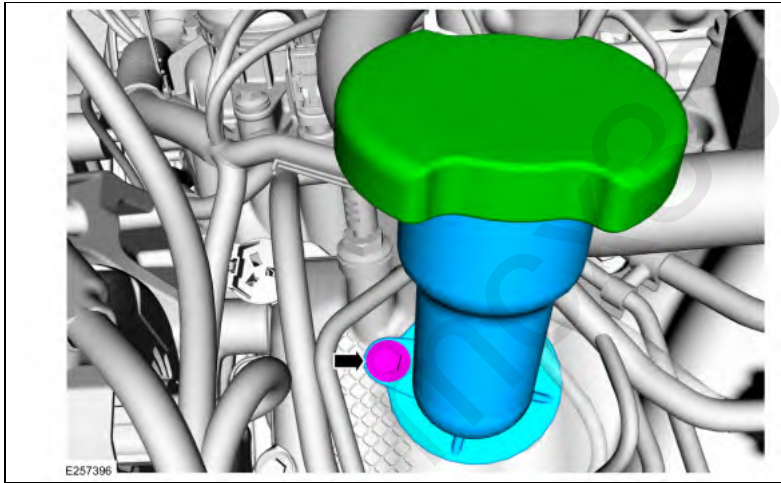
- 11.
- Attach the wiring harness retainer to the fuel rail supply tube bracket stud.
 - Connect the cylinder No. 5 fuel injector electrical connector.



12. Install a new oil fill pipe O-ring seal and lubricate with clean engine oil.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



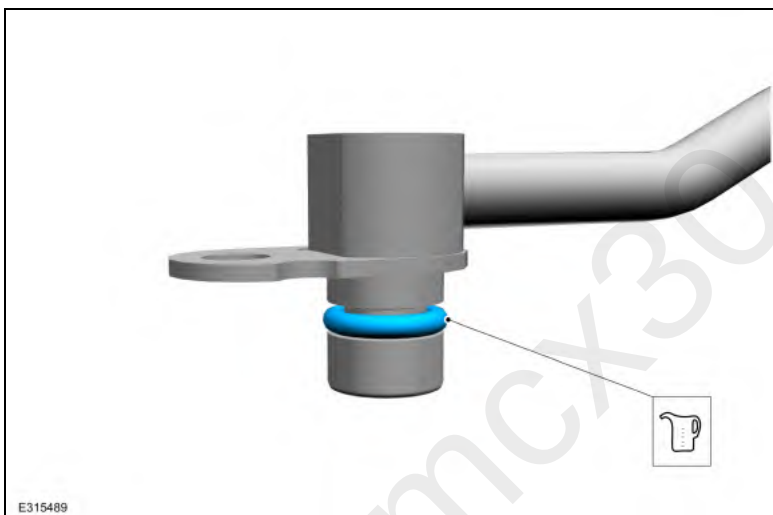
13. Install the oil fill pipe, then install and tighten the oil fill pipe bolt. Install the oil fill cap.
Torque: 89 lb.in (10 Nm)



14. Install the new turbocharger cooling tube rubber gasket, then lubricate with clean engine coolant.
Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).

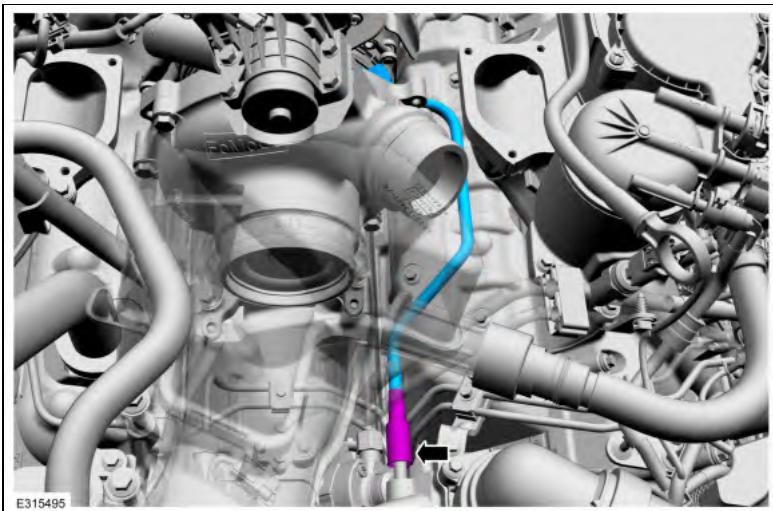


15. Install a new turbocharger coolant return tube O-ring seal, lubricate with clean engine coolant. Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).



A horizontal bar chart with six bars of equal length, stacked vertically. The colors from top to bottom are cyan, green, brown, yellow, purple, and light blue. Each bar has a black outline. The chart is positioned between two empty rectangular boxes.

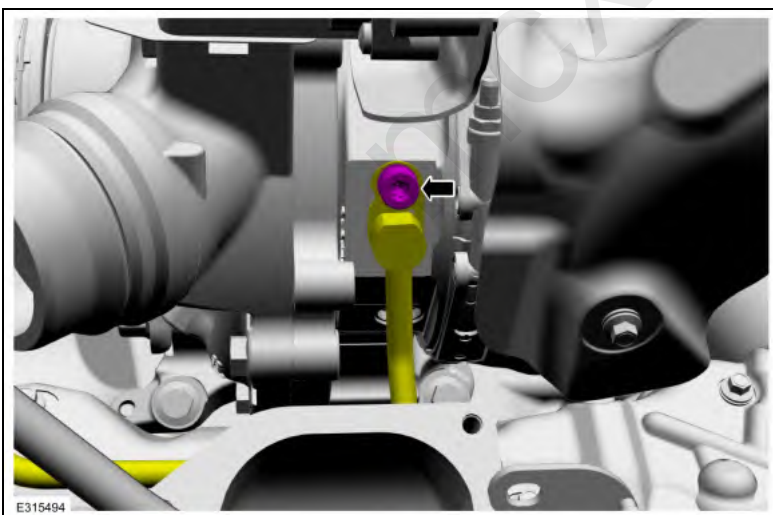
16. Install and connect the turbocharger coolant return tube.



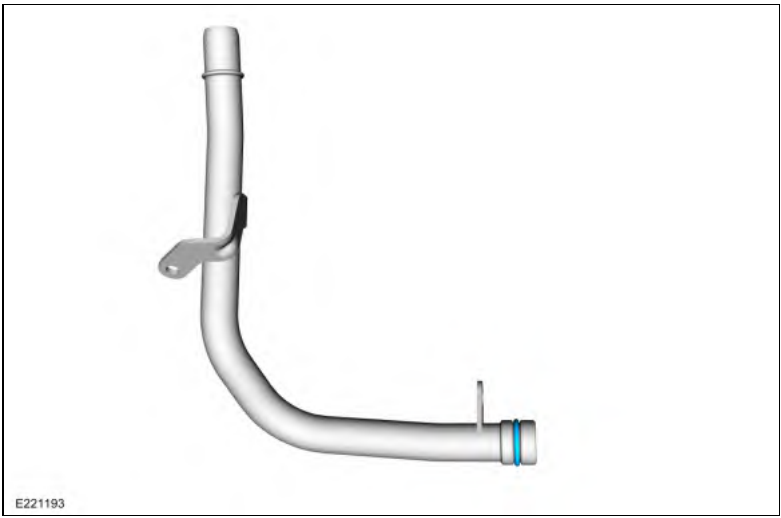
17. NOTICE: Do not use a metal brush damage to sealing area will result in leaks.

NOTE: When installing the turbocharger coolant return tube, the turbocharger coolant return tube must be fully engaged and seated into the turbocharger before the fastener is tightened.

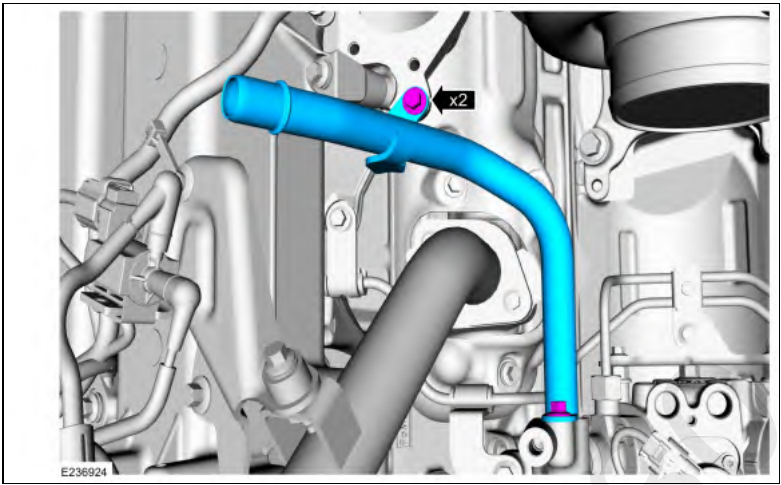
- Carefully use a nylon brush to remove the old O-ring residue, use brake cleaner to rinse the O-ring residue out of the turbocharger tube to engine O-ring bore. Inspect the area for deep scratches and gouges. Install new components if necessary.
 - 1. Connect the turbocharger coolant return tube to the turbocharger, then install and tighten the bolt.
- Material:* Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Torque:
 Stage 1: Tighten to : 106 lb.in (12 Nm)
 Stage 2: Tighten an additional : 30°



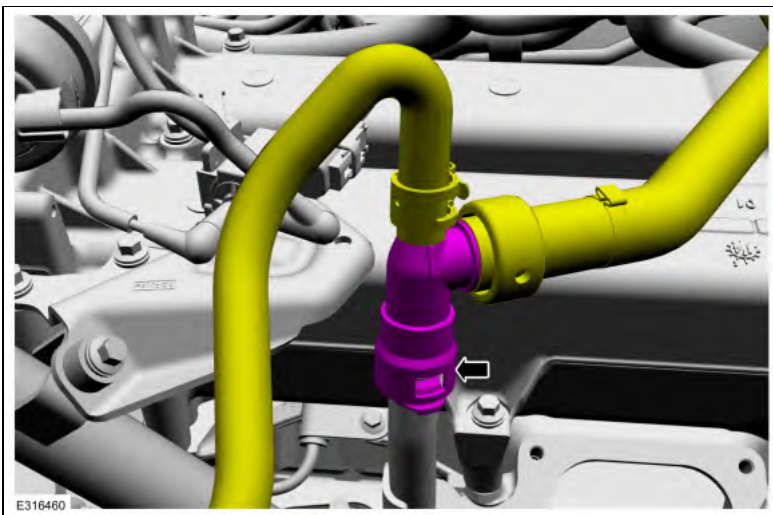
18. Install a new the O-ring seal on the coolant pipe, lubricate with clean engine coolant.
 Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).



19. Install the coolant pipe, then install and tighten the bolts.
Torque: 89 lb.in (10 Nm)



20. Follow the directions for the quick release coupling type 11. Connect the coolant pipe quick release coupling.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .



21. Install the fuel injection pump supply tube assembly.
Refer to: Fuel Injection Pump Supply Tube Assembly (303-04B Fuel Charging and Controls - 6.7L Power Stroke Diesel, Removal and Installation).
22. Install the air cleaner.
Refer to: Air Cleaner (303-12B Intake Air Distribution and Filtering - 6.7L Power Stroke Diesel, Removal and Installation).
23. **NOTICE: Evaluate the cooling system condition before filling the engine cooling system. Failure to follow these instructions can result in damage to the engine.**
Evaluate the cooling system condition.
Refer to: Engine Cooling System Condition Evaluation (303-03B Engine Cooling - 6.7L Power Stroke Diesel, General Procedures).