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Coding Information

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Title: EPA 10 MaxxForce 7 Turbocharger Cleaning

Applies To: Cleaning, Induction cleaning, Turbocharger cleaning, turbochargers,

CHANGE LOG

2015/05/07 - Added Injector cleaning procedure to step 23
 2014/12/10 - Added replace/retire to description
 2014/12/01 - Initial Article Release

QUICK LINKS

Description	Symptoms	Tools	Parts
Diagnostics	Repair-Removal	Repair-Installation	Warranty

DESCRIPTION

The current repair for turbochargers calls for replacement, anytime the compressor housing is found fouled/coked. A new procedure will allow cleaning of the turbo without removing it from the engine, and utilizes the induction cleaner tool with adapters. This document will cover the repair procedure for cleaning turbochargers on EPA 10 MaxxForce 7 Engines.

This Document replaces / retires the following:

- TR3000011 - MaxxForce® 7 Turbocharger Compressor Cleaning
- IK1200965 - 2010 - 2013 MaxxForce 7 Turbo Cleaning

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SYMPTOMS

See symptoms leading to iKNows [IK1201172](#).

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SPECIAL TOOLS

Tool Description	Tool Number	Comments	Instructions
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Medium Duty Induction Cleaner	12-544-02		
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SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
Cleaning Solution	3015979C1	1	Parts Catalog
Oil Filter Kit	1899332C91	1	Parts Catalog
Engine Oil	Source Locally	As Needed	Source Locally

[Return to top](#)**PROCEDURE OVERVIEW****WARNING**

To prevent personal injury or death, read all safety instructions in the "Safety Information" section of the diagnostic manual, [linked here](#).

WARNING

To prevent personal injury or death, shift transmission to park or neutral, set parking brake, and block wheels before doing diagnostic or service procedures.

WARNING

To prevent personal injury or death, make sure the engine has cooled before removing components.

WARNING

To prevent personal injury or death, do not let engine fluids stay on your skin. Clean skin and nails using hand cleaner and wash with soap and water. Wash or discard clothing and rags contaminated with engine fluids.

WARNING

Install crankcase breather tube into shop exhaust vent. Failure to comply may result in personal injury / or death.

WARNING

Always wear safe eye protection when performing vehicle maintenance. Failure to do so may result in personal injury and / or death.

WARNING

Park vehicle on hard flat surface, turn the engine off, set the parking brake, and block the wheels to prevent the vehicle from moving in either direction. Failure to do so may result in property damage, personal injury, and / or death.

WARNING

When cleaning turbochargers on MaxxForce® 7 (EPA 10) with HD-OBD engine, connect the Induction Cleaning Tool only if the vehicle is parked and the parking brake is set. Never drive the vehicle with the Induction Cleaning Tool (or hoses) connected to the engine. Failure to comply may result in property damage, personal injury, and / or death.

DIAGNOSTIC STEPS

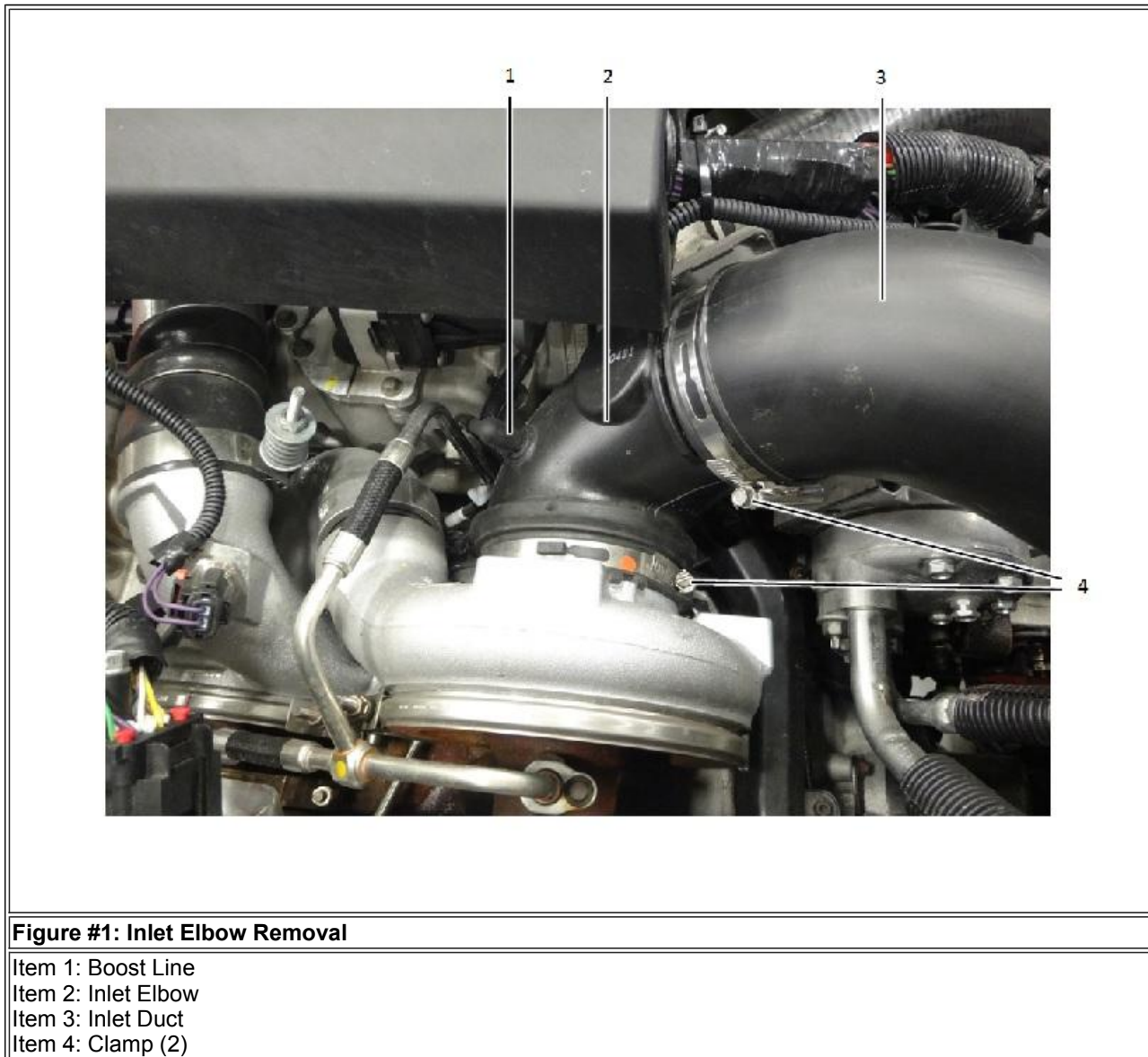
All diagnostics should be completed through either of the following iKNow's; [IK1201172](#).

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REPAIR STEPS

REMOVAL PROCEDURE

1. Bring truck into shop and park on flat surface.
2. Shift transmission to Park or Neutral, set parking brake, and install wheel chocks.
3. Unlatch and open hood.



4. Remove boost line (**Figure 1**, Item 1) from turbo inlet elbow (**Figure 1**, Item 2).
5. Loosen the two hose clamps (**Figure 1**, Item 4) on the inlet elbow and remove inlet duct (**Figure 1**, Item 3) from inlet elbow, then remove inlet elbow (**Figure 1**, Item 2).



Figure #2: 12-544-01-19 Installation

Item 1: Turbocharger Inlet Adapter (12-544-01-19)

Item 2: Inlet Duct

Item 3: Clamp (2)

Item 4: Boost Line

6. Install Turbocharger Inlet Adapter (12-544-01-19) (**Figure 2**, Item 1), then re-install inlet duct (**Figure 2**, Item 2) and torque both clamps to 48 in lbs.
7. Re-install boost line (**Figure 2**, Item 4) onto Turbocharger Inlet Adapter (12-544-01-19) (**Figure 2**, Item 1).

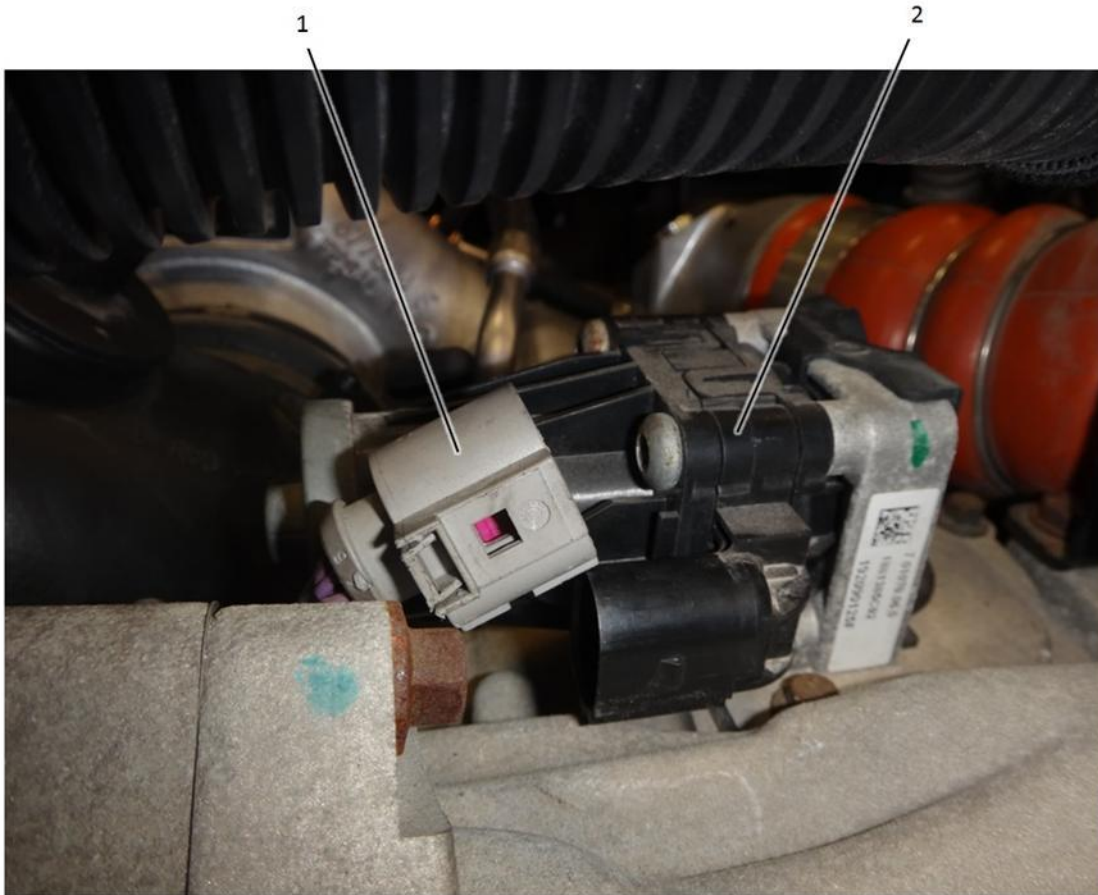


Figure #3: Disconnecting EGR Valve

Item 1: EGR Valve Electrical Connector
Item 2: EGR Valve

CAUTION

Position Exhaust Gas Recirculation (EGR) valve connector away from any moving/hot components and surfaces, failure to comply may result in property damage.

8. Disconnect the EGR Valve electrical connector (**Figure 3**, Item 1) from EGR Valve (**Figure 3**, Item 2), and reposition as necessary.



Figure #4: Loosening Turbocharger Down Pipe

Item 1: Turbocharger Down Pipe Clamp
Item 2: Turbocharger Down Pipe

9. Loosen turbocharger down pipe clamp (**Figure 4**, Item 1).

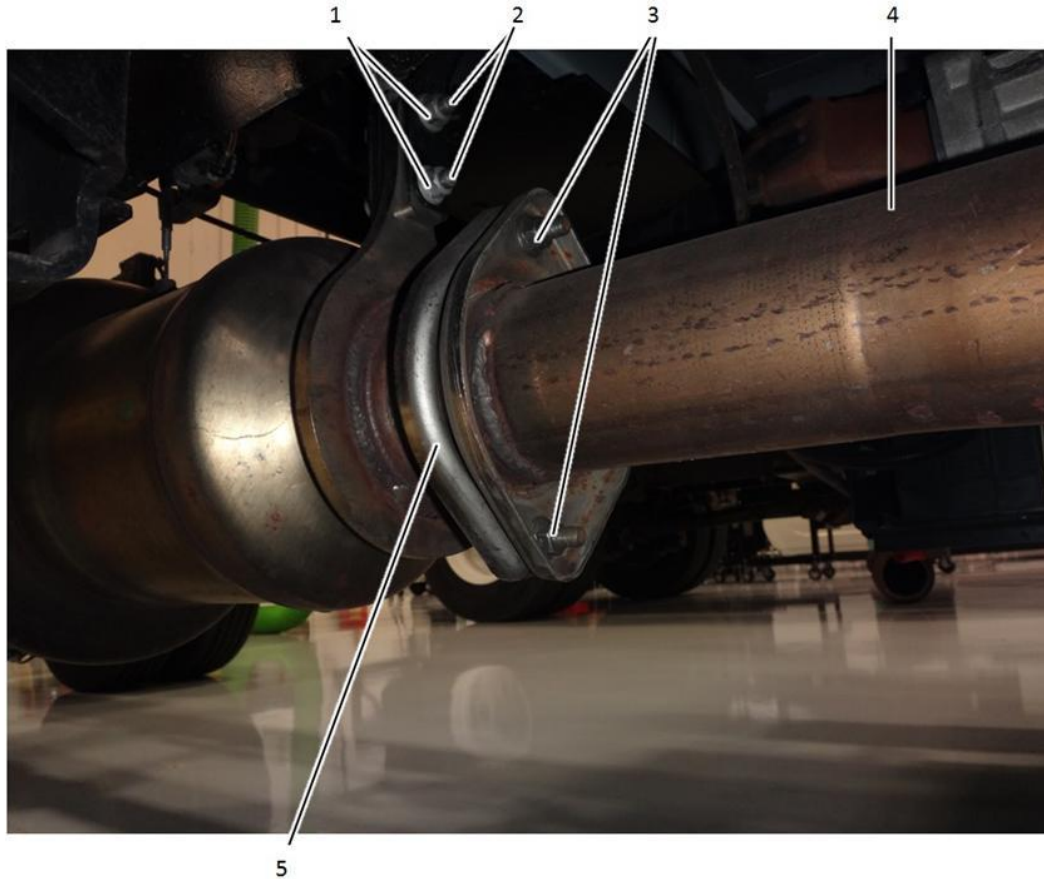


Figure #5: Disconnecting DOC

Item 1: Bolt

Item 2: Nut (2)

Item 3: Nut (2)

Item 4: Turbocharger Down Pipe

Item 5: DOC Inlet

10. Remove two nuts (**Figure 5**, Item 3) securing the turbocharger down pipe (**Figure 5**, Item 4) to the DOC inlet (**Figure 5**, Item 5).

11. Remove two nuts (**Figure 5**, Item 2) and two bolts (**Figure 5**, Item 1) from DOC hanger bracket.

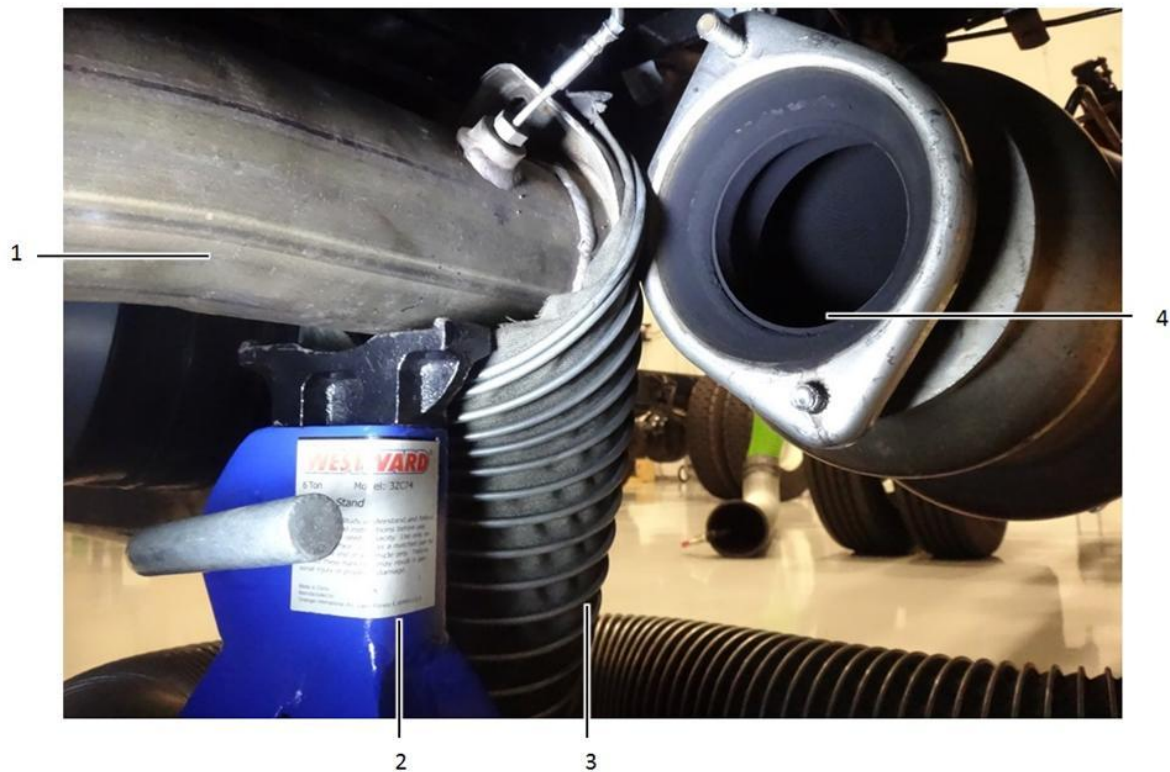


Figure #6: Repositioning Turbocharger Down Pipe

Item 1: Turbocharger Down Pipe
 Item 2: Jack Stand
 Item 3: Turbocharger Down Pipe Vent Tube
 Item 4: DOC

CAUTION

Redirecting the exhaust flow is critical, failure to do so may result in damage to equipment.

12. Reposition the turbocharger down pipe (**Figure 6**, Item 1) so exhaust flow doesn't enter the DOC (**Figure 6**, Item 4), if needed use a jack stand (**Figure 6**, Item 2) to assist in repositioning.
13. Torque turbocharger down pipe clamp (**Figure 4**, Item 1) to 124 to 168 in lbs.
14. Install turbocharger down pipe vent hose (**Figure 6**, Item 3).

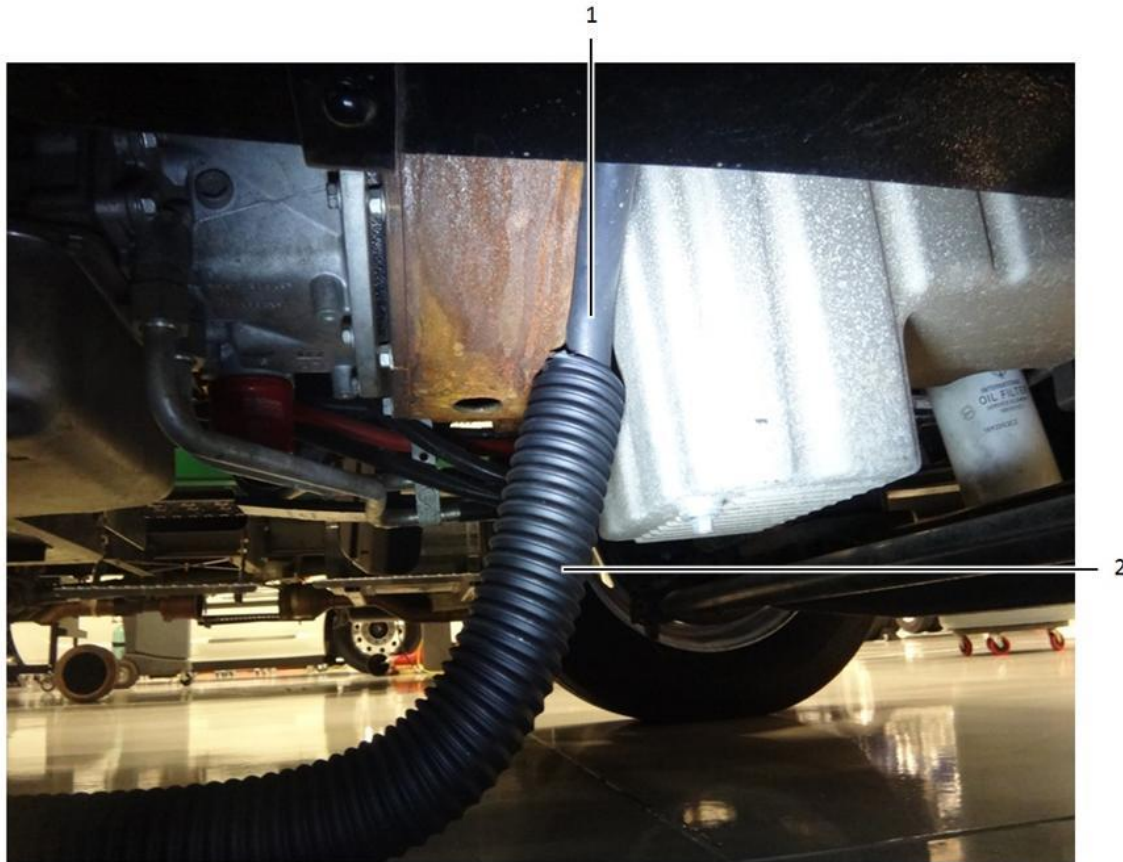


Figure #7: Installing Road Draft Tube Vent

Item 1: Road Draft Tube

Item 2: Breather Redirect Tube

WARNING

Install crankcase breather tube into shop exhaust vent. Failure to comply may result in personal injury and / or death.

15. Install breather redirect tube (Figure 7, Item 2) onto road draft tube (Figure 7, Item 1).

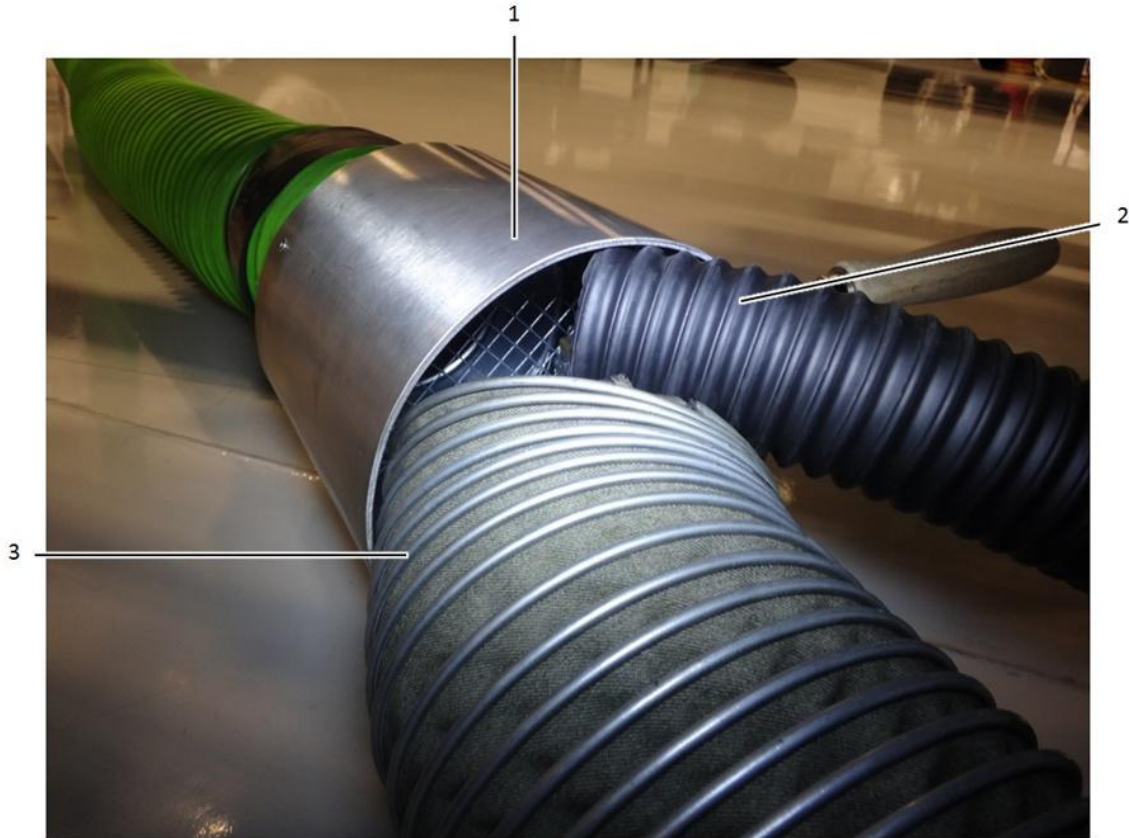


Figure #8: Vent Hose

Item 1: Vent Hose

Item 2: Breather Redirect Tube

Item 3: Turbocharger Down Pipe Vent Hose

WARNING

Install crankcase breather tube and turbocharger down pipe vent tube into shop exhaust vent. Failure to comply may result in personal injury and / or death.

16. Install vent hose (**Figure 8**, Item 1) to turbocharger down pipe vent hose (**Figure 8**, Item 3) and breather redirect tube (**Figure 8**, Item 2).

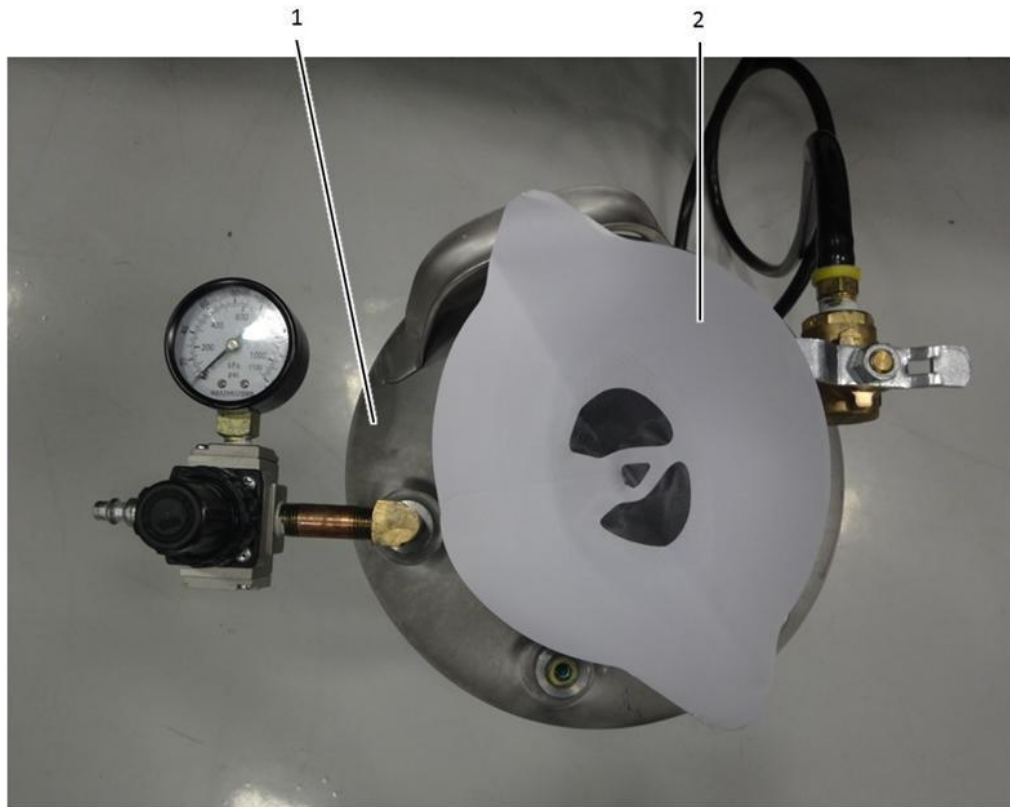


Figure #9: Filling Tank

Item 1: Tank

Item 2: SMT250

NOTE

In some instances, the EGR cleaning solution has been found to crystallize due to freezing temperatures. If you find any crystallization in the fluid, drain the induction cleaning system tank assembly of any solution, and start over with a fresh bottle of solution until no crystallization is found. Using a crystallized solution in the induction cleaning system will cause blockage and will not perform as intended.

17. Remove lid from tank, install filter element (Figure 9, Item 2), then fill the tank with the 2.5 gallon container of Cleaning Solution and 2.5 gallons of clean water.

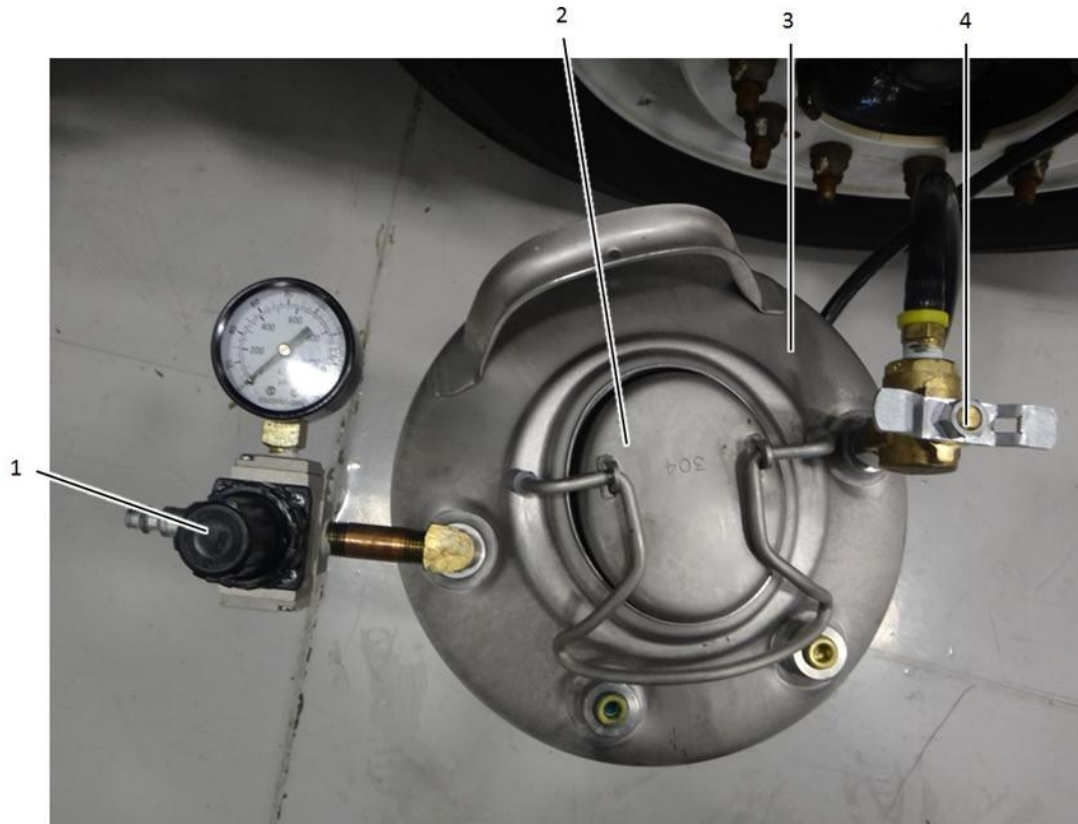


Figure #10: Tank Installation

Item 1: Regulator
Item 2: Lid
Item 3: Tank
Item 4: Shut-Off Valve

18. Re-install lid (**Figure 10**, Item 2) and secure to tank (**Figure 10**, Item 3).

19. Secure the hose assembly to the injector.

WARNING

Before performing Step 20, make sure pressure regulator is set to 0 psi. Failure to comply may result in property damage, personal injury, and / or death.

20. Ensure that the shut-off valve (**Figure 10**, Item 4) is closed and the regulator (**Figure 10**, Item 1) is backed off completely.



Figure #11: Connecting Shop Air

- Item 1: Shop Air
Item 2: Regulator Assembly
Item 3: Shut-Off Valve

21. Connect shop air (**Figure 11**, Item 1) to the regulator assembly (**Figure 11**, Item 2).
22. Regulate air pressure to 60 PSI (**Figure 11**, Item 2).
23. Point the injector into a bucket, open the shut-off valve (**Figure 11**, Item 3) and watch the injector spray pattern. If the injector is not misting the cleaning solution, clean the injector using a blow gun. Point the blow gun at the tip of the injector and apply air pressure to clear any debris. Once complete insert the blow gun into the inlet of the injector, point the injector into a bucket or towards the drain and apply air pressure for 30 seconds to 1 minute. If that doesn't fix the issue, replace the injector and re-test.
24. Close the shut-off valve on the tank.
25. Ensure the shut-off valve (**Figure 11**, Item 3) is in the closed position, disconnect shop air (**Figure 11**, Item 1) from the regulator assembly (**Figure 11**, Item 2) and allow the compressed air to completely discharge from the tank.
26. Remove hose assembly from injector.



Figure #12: Inlet Elbow Removal

Item 1: Bolt (2)

Item 2: Engine Layover Harness

27. If needed, to aid in injector installation remove the two bolts (**Figure 12**, Item 1) securing the engine layover harness (**Figure 12**, Item 2) to the engine harness support bracket.

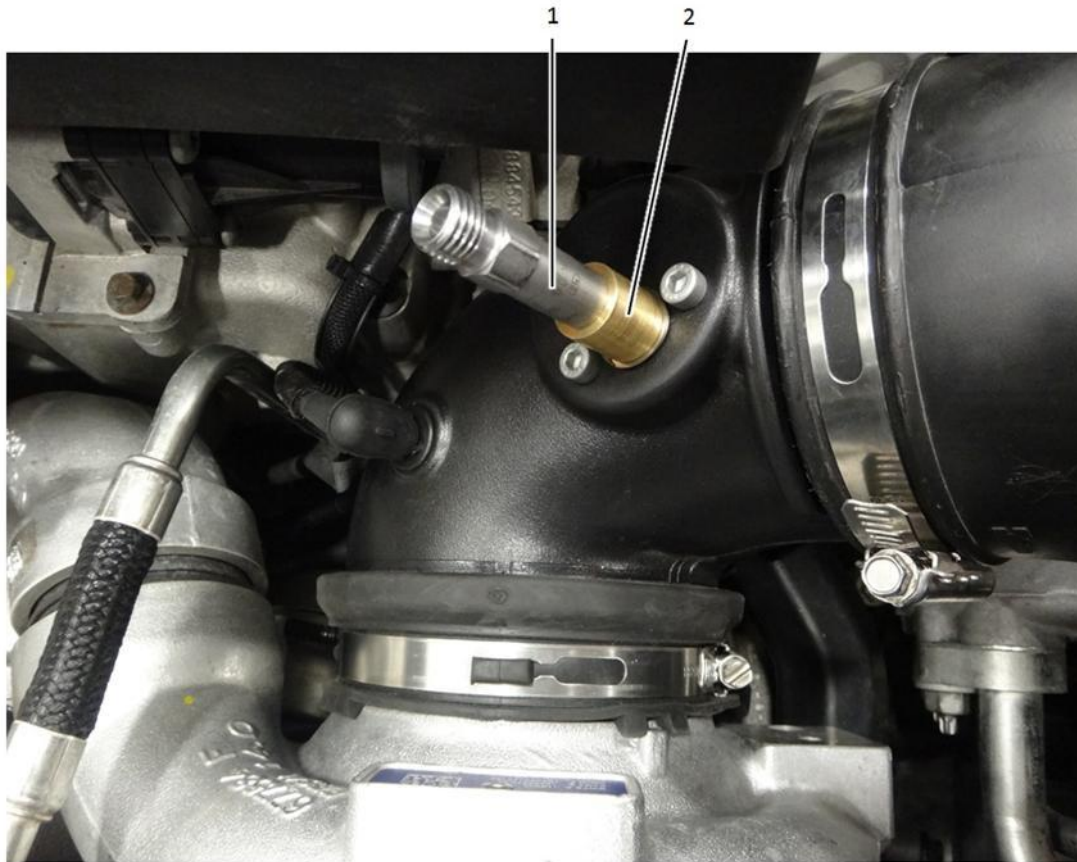


Figure #13: Injector Installation

Item 1: Injector Assembly

Item 2: Grommet

28. Install injector (**Figure 13**, Item 1) into the brass fitting (**Figure 13**, Item 2) on the inlet elbow, torque to 10 in-lb.

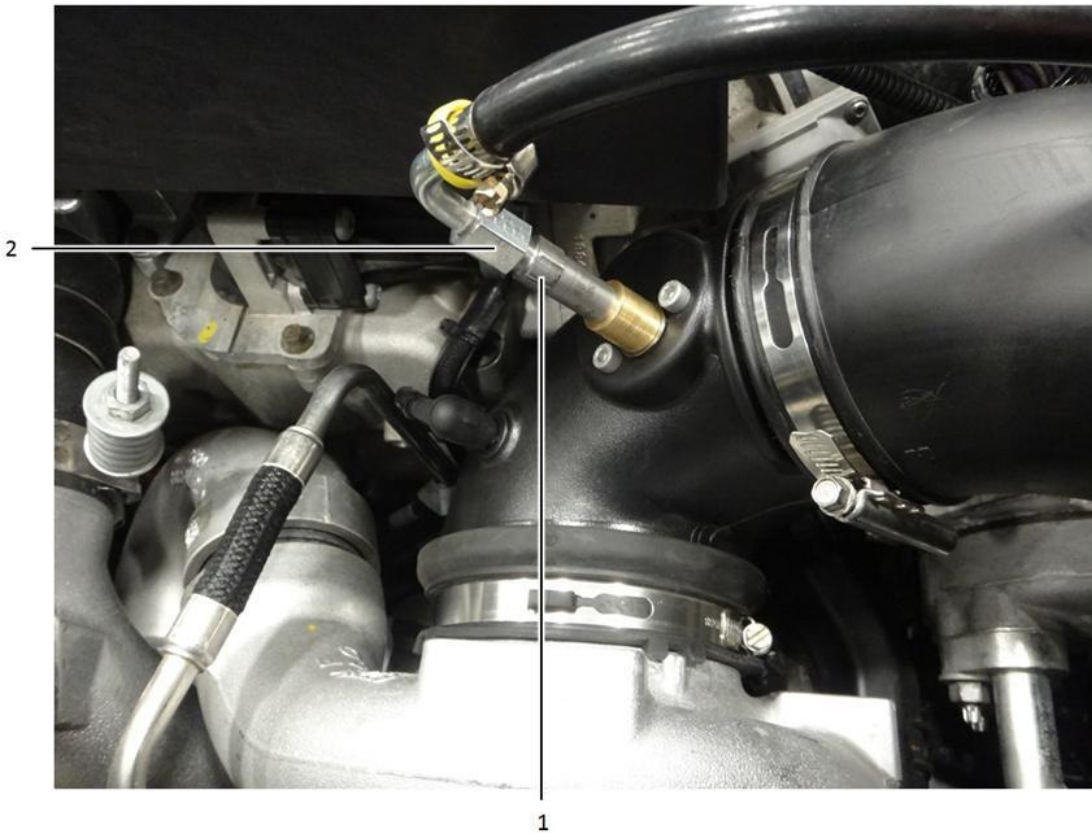


Figure #14: Hose Assembly Fitting Installation

Item 1: Hose Assembly Fitting

Item 2: Injector

WARNING

When cleaning turbochargers on MaxxForce® 7 (EPA 10) with HD-OBD engine, connect the Induction Cleaning Tool only if the vehicle is parked and the parking brake is set. Never drive the vehicle with the Induction Cleaning Tool (or hoses) connected to the engine. Failure to comply may result in property damage, personal injury, and / or death.

CAUTION

Secure the Induction Cleaning Tool hoses away from hot and moving engine parts with cable ties while performing cleaning.

29. Connect and secure hose assembly fitting (**Figure 14**, Item 1) onto injector (**Figure 14**, Item 2).
30. Connect to the 9 pin connector with an Electronic Service Tool (EST).
31. Open ServiceMaxx and connect to vehicle and start the engine.
32. If the engine is not already at operating temperature, warm up to 170 F (77 C).
33. Set cruise control to 1,500 RPM.
34. Once the engine is at operating temperature, record the Intake Manifold Temperature via ServiceMaxx.

CAUTION

In the event of engine shutdown, immediately shut off induction cleaning system tank valve to prevent intake flooding. Failure to comply may result in property damage.

35. Open the tank shut-off valve.

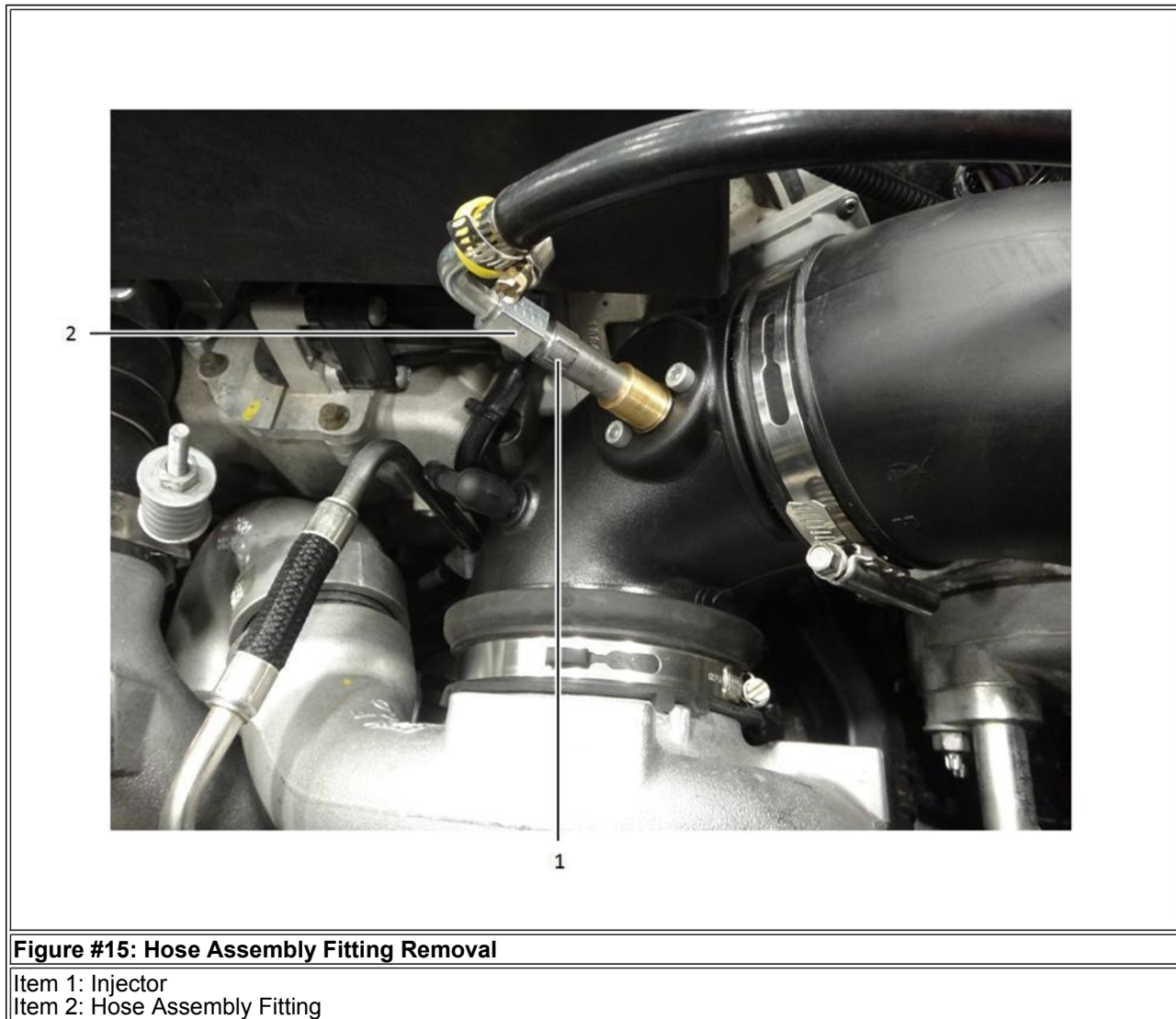
NOTE

If a substantial amount of fluid is remaining in the tank after the test procedure is performed and IMT has increased near previously recorded temperature, injector may be in need of service ([12-544-01](#)).

36. During injection of the cleaning solution monitor the Intake Manifold Temperature, the IMT will drop while the cleaning solution is being injected. The cleaning typically lasts between 40 and 60 minutes.
37. A rise in Intake Manifold Temperature signals the end of the procedure. Allow the engine to run for an additional 5 minutes at 1,500 RPM before shutting down.
38. Close the Shut-Off valve on the tank.
39. Shut down the engine.

INSTALLATION PROCEDURE

1. Disconnect the Electronic Service Tool (EST) from the 9 pin connector.



2. Remove the hose fitting assembly (**Figure 15**, Item 2) from the injector (**Figure 15**, Item 1).

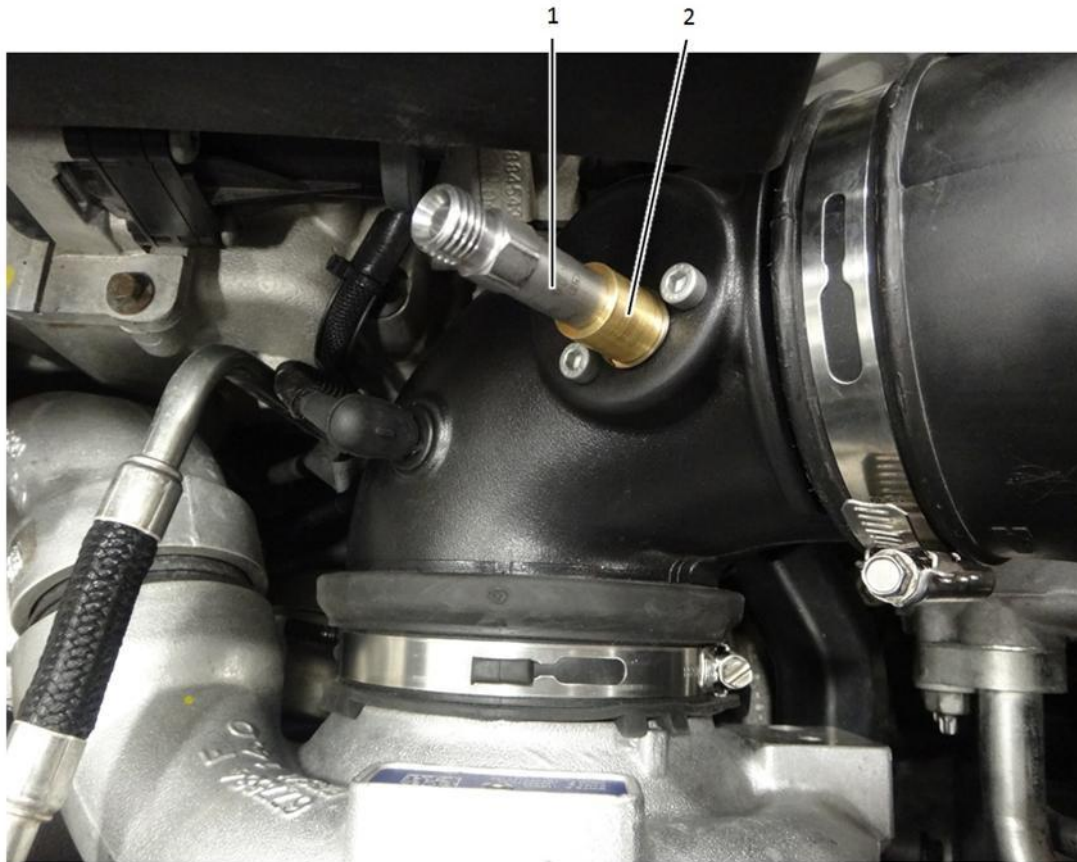


Figure #16: Injector Removal

Item 1: Injector
Item 2: Brass Fitting

3. Remove the injector (**Figure 16**, Item 1) from the brass fitting (**Figure 16**, Item 2) on the inlet elbow.



Figure #17: Discharging Compressed Air

Item 1: Shop Air
Item 2: Regulator Assembly
Item 3: Shut-Off Valve

WARNING

Before performing Step 3, make sure pressure regulator is set to 0 psi. Failure to comply may result in property damage, personal injury, and / or death.

4. Ensure the shut-off valve (**Figure 17**, Item 3) is in the closed position, disconnect shop air (**Figure 17**, Item 1) from the regulator assembly (**Figure 17**, Figure 2) and allow the compressed air to completely discharge from the tank.

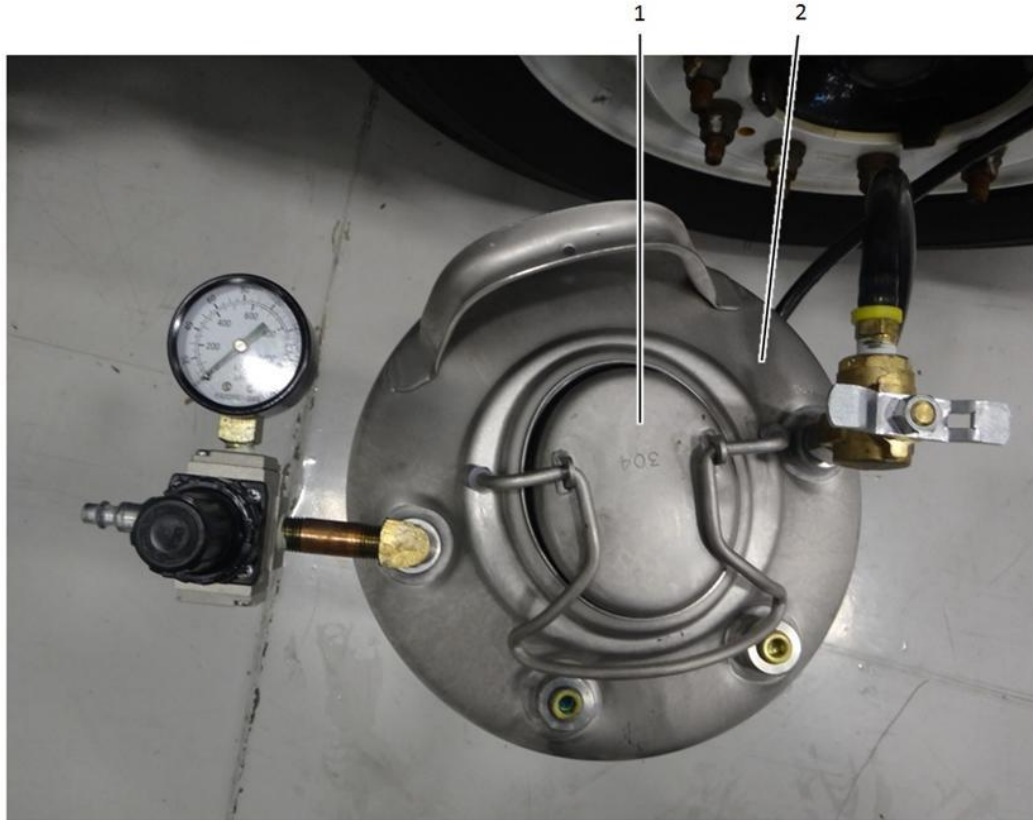


Figure #18: Verify Cleaning Solution Level

Item 1: Lid
Item 2: Tank

5. Once the compressed air has been exhausted, remove the lid (**Figure 18**, Item 2) from the tank (**Figure 18**, Item 1) and verify level of fluid remaining is minimal.

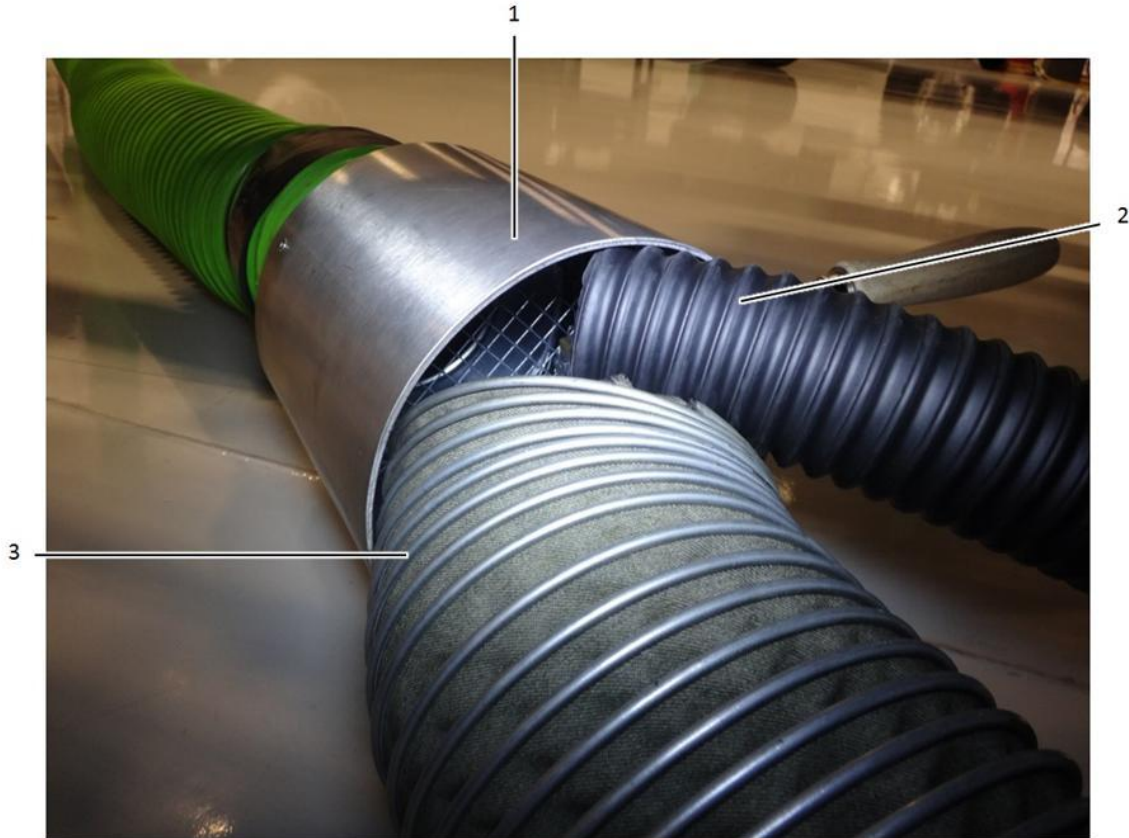


Figure #19: Removing Vent Hoses

Item 1: Vent Hose

Item 2: Breather Redirect Tube

Item 3: Turbocharger Down Pipe Vent Hose

6. Remove breather redirect tube (**Figure 19**, Item 2) and turbocharger down pipe vent hose (**Figure 19**, Item 3) from vent hose (**Figure 19**, Item 1).

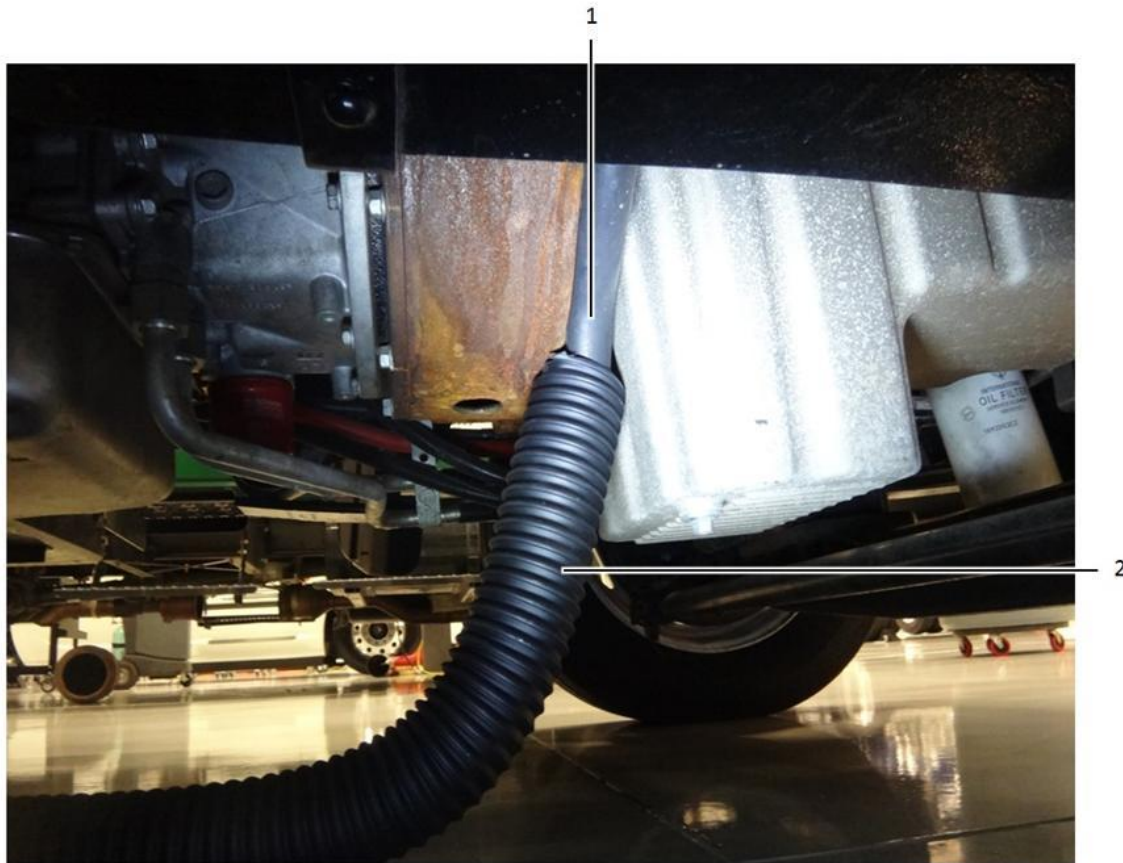


Figure #20: Removing Road Draft Tube Vent

Item 1: Road Draft Tube

Item 2: Breather Redirect Tube

7. Remove the breather redirect tube (**Figure 20**, Item 2) from the road draft tube (**Figure 20**, Item 1).



Figure #21: Turbocharger Down Pipe

Item 1: Turbocharger Down Pipe Clamp
Item 2: Turbocharger Down Pipe

8. Loosen the turbocharger down pipe clamp (**Figure 21**, Item 1).

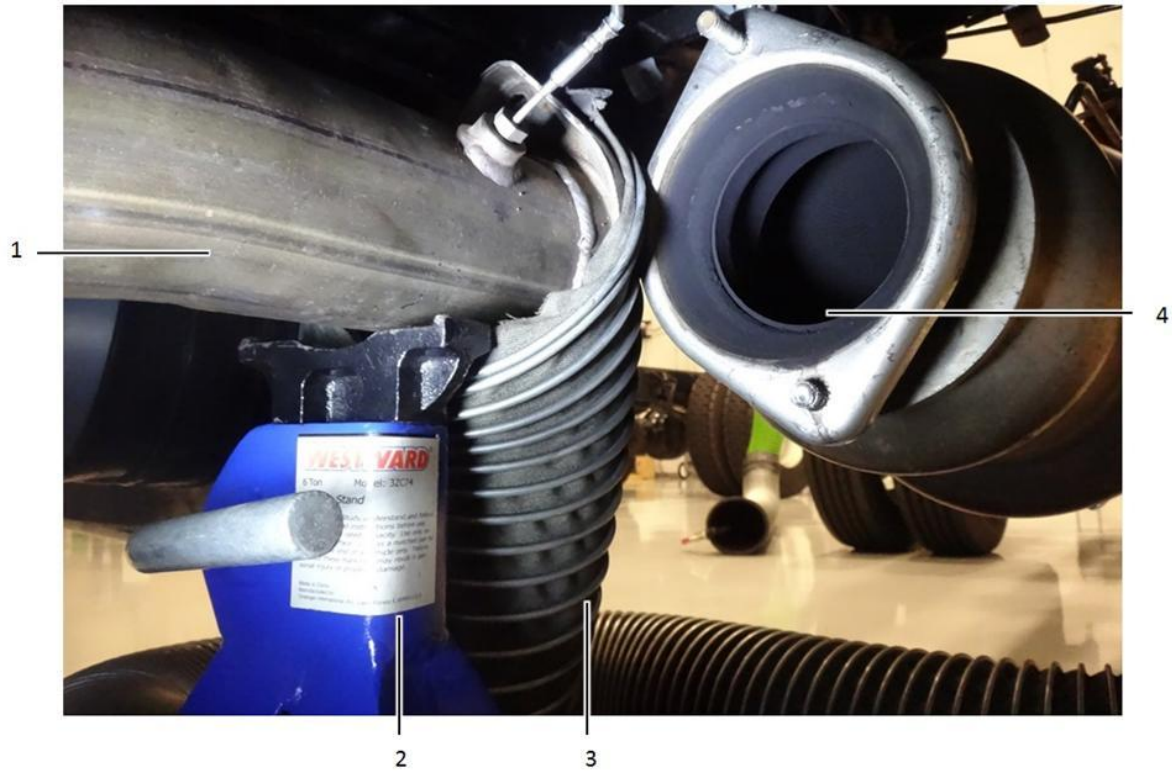


Figure #22: Repositioning Turbocharger Down Pipe

Item 1: Turbocharger Down Pipe

Item 2: Jack Stand

Item 3: Turbocharger Down Pipe Vent Hose

Item 4: DOC Inlet

9. Remove turbocharger down pipe vent hose (**Figure 22**, Item 3) and reposition turbocharger down pipe (**Figure 22**, Item 1) onto the DOC inlet (**Figure 22**, Item 4) for installation.

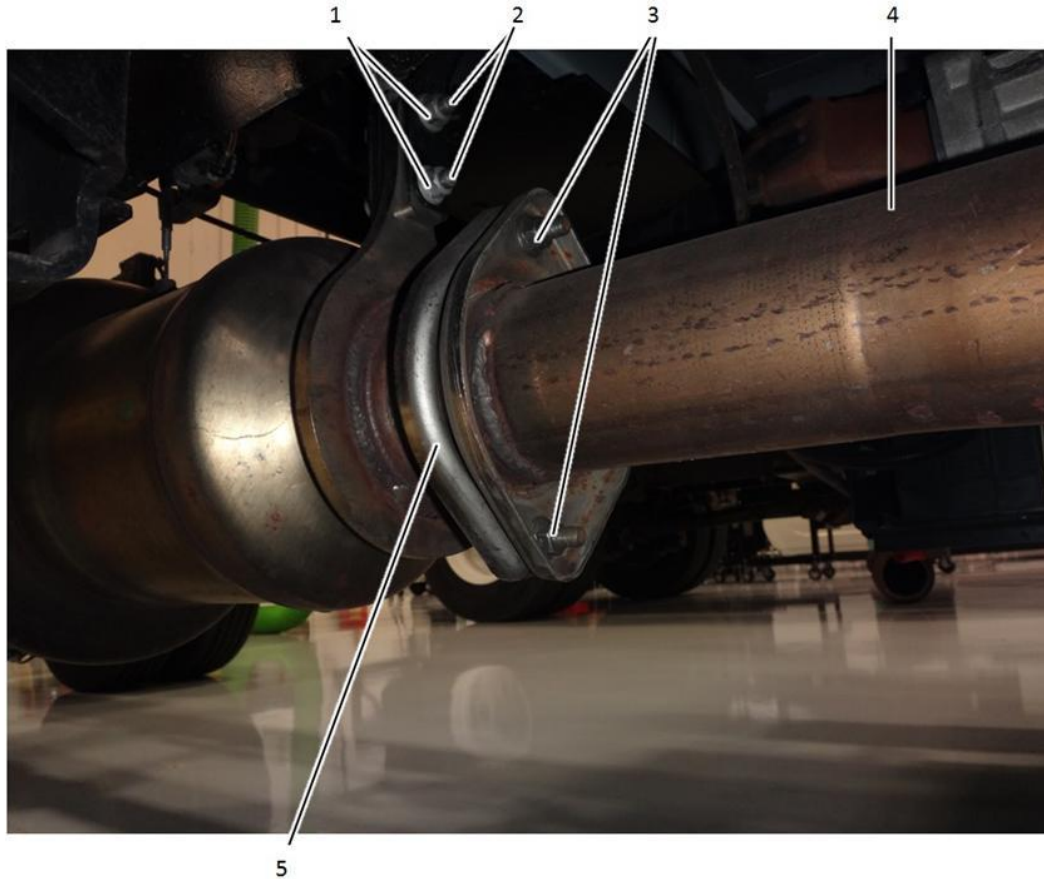


Figure #23: Re-connecting DOC

Item 1: Nut (2)
 Item 2: Bolts (2)
 Item 3: Nuts (2)
 Item 4: Turbocharger Down Pipe
 Item 5: DOC Inlet

10. Install two bolts (**Figure 23**, Item 2) and two nuts (**Figure 23**, Item 1) securing the DOC to the DOC hanger Bracket.
11. Torque the two bolts (**Figure 23**, Item 2) and two nuts (**Figure 23**, Item 1) to 35 to 46 lbf-ft.
12. Install two nuts (**Figure 23**, Item 3) to secure the turbocharger down pipe (**Figure 23**, Item 4) to the DOC inlet (**Figure 23**, Item 5).
13. Torque the two nuts (**Figure 23**, Item 3) to 35 to 37 lbf-ft.
14. Torque the turbocharger down pipe clamp (**Figure 21**, Item 1) to 124 to 168 inch lbs.

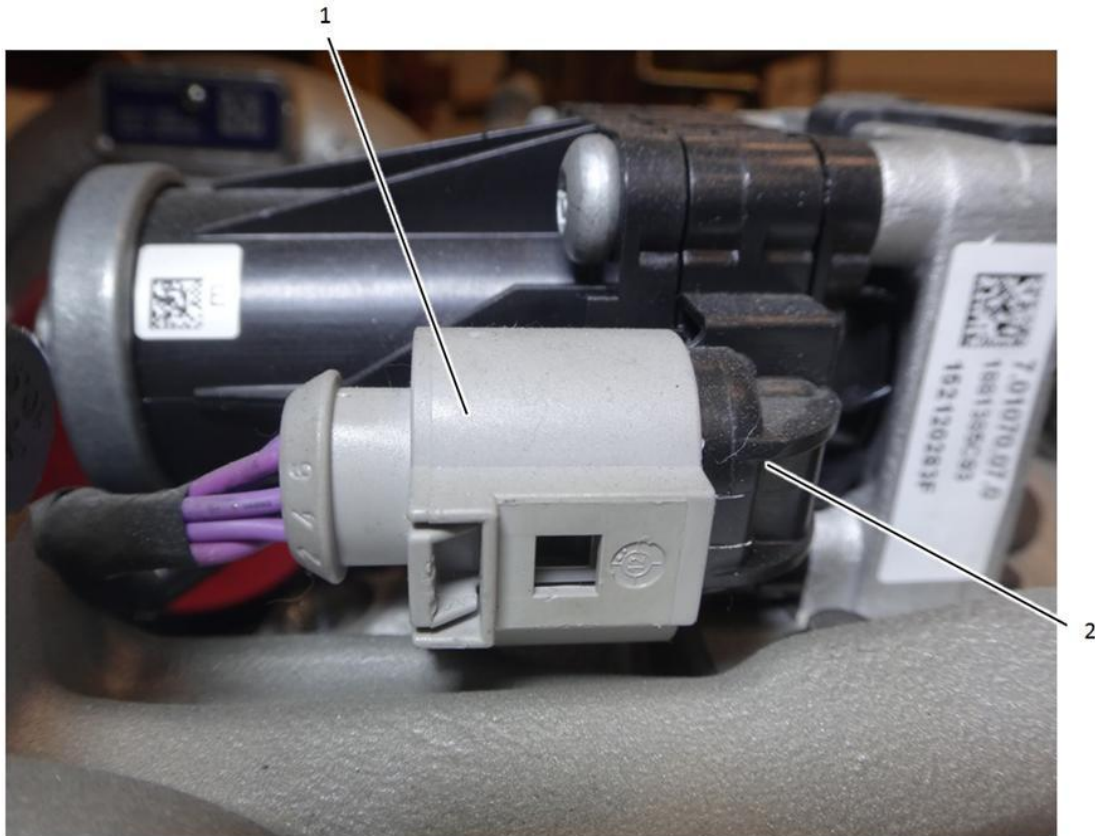


Figure #24: Re-connecting EGR Valve

Item 1: EGR Valve Electrical Connector

Item 2: EGR Valve

15. Reconnect the EGR Valve Electrical connector (**Figure 24**, Item 1) onto the EGR Valve (**Figure 24**, Item 2).



Figure #25: 12-544-01-19 Removal

Item 1: 12-544-01-19

Item 2: Inlet Duct

Item 3: Clamp (2)

Item 4: Boost Line

16. Remove the boost line (**Figure 25**, Item 2) from 12-544-01-19 (**Figure 25**, Item 1).

17. Loosen the two hose clamps (**Figure 25**, Item 3) and remove the inlet duct from 12-544-01-19(**Figure 25**, Item 3) then remove 12-544-01-19.

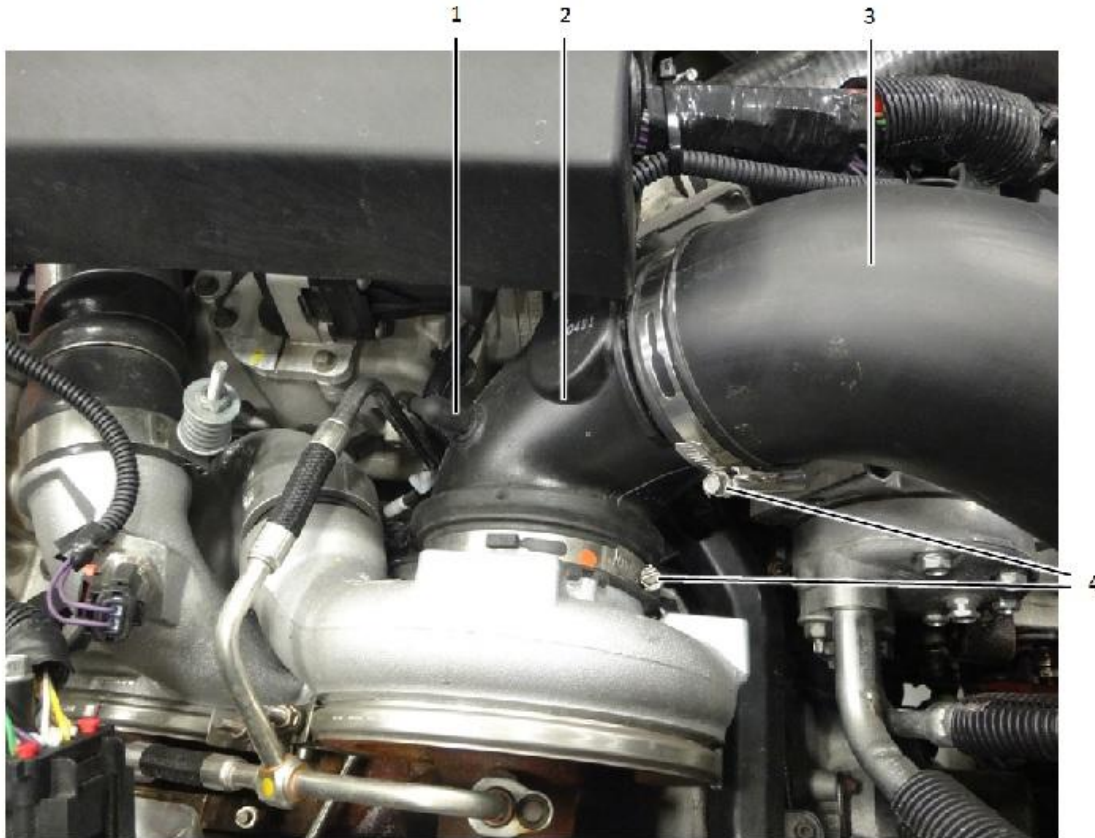


Figure #26: Inlet Elbow Re-installation

Item 1: Boost Line
Item 2: Inlet Elbow
Item 3: Inlet Duct
Item 4: Clamp (2)

18. Re-install the original inlet elbow (**Figure 26**, Item 2) and inlet duct (**Figure 26**, Item 3) with two clamps (**Figure 26**, Item 4).
19. Torque the clamps (**Figure 26**, Item 4) to 48 in lbs.
20. Re-install the boost line (**Figure 26**, Item 1) onto the inlet elbow (**Figure 26**, Item 4) .



Figure #27: Engine Layover Harness Installation

Item 1: Bolt (2)
Item 2: Engine Layover Harness

21. If removed, re-align the engine layover harness (**Figure 27**, Item 2) with the engine harness support bracket and install the two previously removed bolts (**Figure 27**, Item 1).
22. Torque bolts (**Figure 27**, Item 1) to 100 in lbs.
23. Replace engine oil, and oil filter. Refer to [EPA 10 MaxxForce 7 Engine Service Manual](#).
24. Close and latch hood.
25. Remove wheel chocks.

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WARRANTY INFORMATION

Claim Requirements/Approvals:

None

Warranty Claim Coding:

Group:	12000 - Description
Noun:	135 - Description

Warranty Coding Manual

Step	Description	Chassis	Engine	SRT	Hours
All	Turbocharger Cleaning	TerraStar	MaxxForce 7 EPA 10	TS12-6135X-21	2.8
All	Turbocharger Cleaning	A / E Bus	MaxxForce 7 EPA 10	TG12-6135X-21	2.8
All	Turbocharger Cleaning	DuraStar	MaxxForce 7 EPA 10	KL12-6135X-21	2.8
All	Turbocharger Cleaning	CE / BE	MaxxForce 7 EPA 10	GY12-6135X-21	2.8

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