Countries:	CANADA, UNITED STATES	**Document ID**:	IK1201372
Availability:	ISIS, Bus ISIS, FleetISIS, IsSIR	**Revision**:	3
Major System:	ENGINES	**Created**:	6/1/2017
Current Language:	English	**Last Modified**:	1/8/2019
Other Languages:	NONE	**Author**:	Marcelo Sahagun
Viewed:	2076		

Less Info

Hide Details Coding Information

Copy Link	Copy Relative Link	Bookmark	Add to Favorites	Print	Provide Feedback	Helpful	Not Helpful
		View My Bookmarks				14	3

Title: Excessive Aluminum (AL) PPM in Oil Analysis

Applies To: 2010-2013 MaxxForce DT/9/10

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

01/08/2019- Republished for feedback purposes
07/31/2017 - Initial Article Release

DESCRIPTION

This document will guide the user through the proper repair procedure for a failed oil analysis due to excessive Aluminum (AL)

SYMPTOM(s)

Description
High Aluminum in Oil Analysis

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number
Gasket Alignment Pins	ZTSE 4955
EGR Valve Puller	ZTSE 4941
General Electric Hot Plate or Equivalent	Obtain Locally- Equivalent Specifications to Model 45ZN 169214: 120V AC 60Hz 1500W
Infared Temprature Gun	Obtain Locally
Torque Wrench	Obtain Locally
Carburetor Cleaner	Obtain Locally

P-80 Lubricant	Obtain Locally

Tools Resource Center

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required
KIT, EGR MIXING DUCT W/SEALS	1889327C94 (Or Subsequent)	1
Clamp, Hose Turbocharger	1889144C1	1

DIAGNOSTIC STEP(s)

Step	Action	Decision
1	**DIAGNOSTIC:** As of January 1, 2017: Do the 2 (TWO) most recent and consecutive oil sample analysis contain Aluminum (AL) ppm limits above 50ppm?	**Yes**. Proceed to ***STEP 2***
		No. Article does NOT apply

Step	Action	Decision
2	**DIAGNOSTIC:** View engine's warranty history: Has an ***Air Duct EGR Mixer Assembly w/ Heater*** been replaced since 01/2014 - present? Review parts listed under noun codes: 1. Grid Heater 2. Intake Manifold 3. Power Cylinder Kit 4. Works Kit	**Yes**. If a base engine concern has recently been addressed, this article does **NOT** apply. Otherwise: Proceed to performing a ***CPA Blow-By Test (BBT).*** Follow onscreen instructions
		No. Proceed with ***Repair Steps*** section below

REPAIR STEP(s)

WARNING:

To prevent property damage, personal injury, and/or death, park vehicle on hard flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in both directions

WARNING:

To prevent personal injury and/or death, always wear safety eye protection when performing vehicle maintenance

WARNING:

To prevent property damage, personal injury, and/or death, remove the ground cable from the negative terminal of the battery/batteries before disconnecting any electrical components. Always connect the ground cable last.

REMOVAL PROCEDURE:

1. Bring vehicle into shop and park on flat surface.
2. Shift transmission to Park or Neutral and set parking brakes.
3. Install wheel chocks.
4. Remove operator-side battery box cover.
5. Disconnect and isolate ground cable from negative battery terminal.
6. Unlatch and open hood.

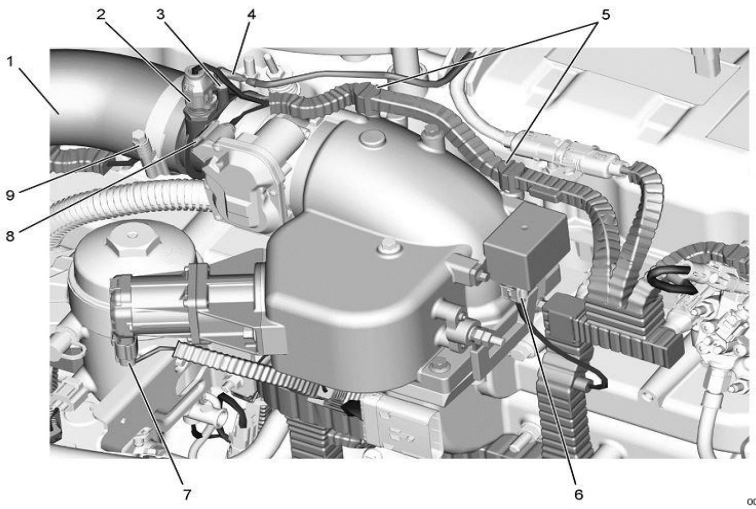

Figure 1: Charge Air Cooler (CAC) Inlet Tube and Engine Harness Connectors

1. Tube
2. Intake Air Temperature (IAT) sensor connector
3. Clamp
4. Vacuum line connector
5. Tie strap (2)
6. Intake Air Heater (IAH) harness connector
7. EGR control valve connector
8. Engine Throttle Valve (ETV) assembly connector
9. CAC inlet tube clamp

7. Access and loosen CAC inlet tube clamp (Figure 1, Item 9).
8. Remove CAC inlet tube (Figure 1, Item 1).

NOTE: If equipped with IAT sensor, perform Steps 9 – 10. Otherwise, proceed to Step 11.

9. Disengage lock on IAT sensor connector (Figure 1, Item 2). Push release tab and disconnect connector.
10. Disengage lock on ETV sensor connector (Figure 1, Item 8). Push release tab and disconnect connector.
11. Remove and discard tie straps (Figure 1, Item 5) securing engine harness.
12. Disengage lock on EGR control valve connector (Figure 1, Item 7). Push release tab and disconnect connector.
13. Remove and discard clamp (Figure 1, Item 3). Disconnect vacuum line connector (Figure 1, Item 4) from inlet tube adapter.
14. Disconnect IAH harness connector (Figure 1, Item 6).
15. Remove power cable and nut.

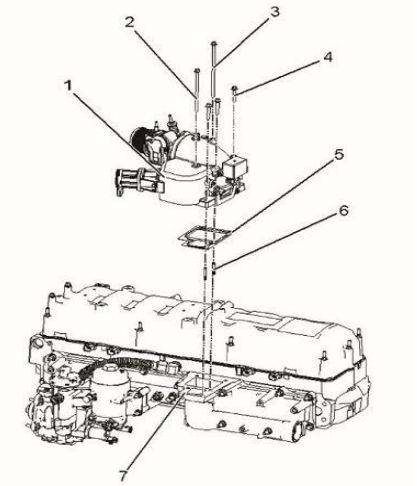

Figure 2: Air Duct and EGR Mixer Assembly

1. Air duct and EGR mixer
2. M8 X 130 bolt
3. M8 X 170 bolt
4. M8 X 40 bolt (3)
5. Inlet duct to intake gasket
6. Mixing bowl alignment pins (2)
7. Intake manifold

16. Remove five EGR mixer assembly bolts (Figure 2, Items 2, 3, & 4) securing EGR mixer assembly (Figure 2, Item 1) to intake manifold (Figure 2, Item 7).

NOTE: Save alignment pins for reuse.
17. Remove mixing bowl alignment pins (Figure 2, Item 6).
18. Remove air duct and EGR mixer as an assembly.
19. Remove and discard inlet duct to intake manifold gasket (Figure 2, Item 5).

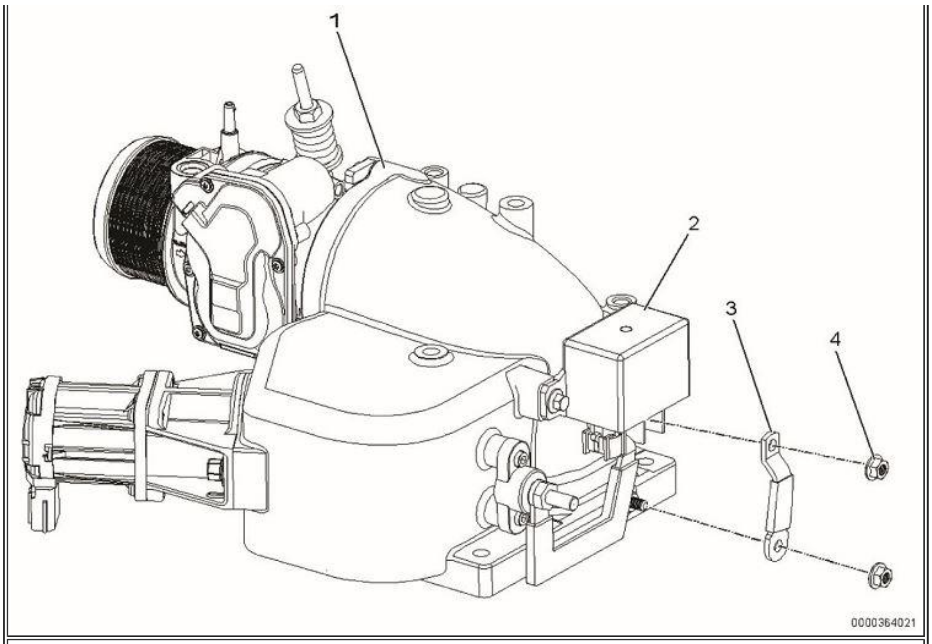

Figure 3: IAH Relay Buss Bar Removal

1. Air duct and EGR mixer
2. IAH relay assembly
3. IAH relay buss bar
4. Serrated nut (2)

20. Remove two serrated nuts (Figure 3, Item 4) and IAH relay buss bar (Figure 3, Item 3) from mixer assembly (Figure 3, Item 1).

NOTE: Save relay assembly and fasteners for reuse.

21. Remove two bolts and Allen nuts securing IAH relay assembly (Figure 3, Item 2). Remove relay assembly.

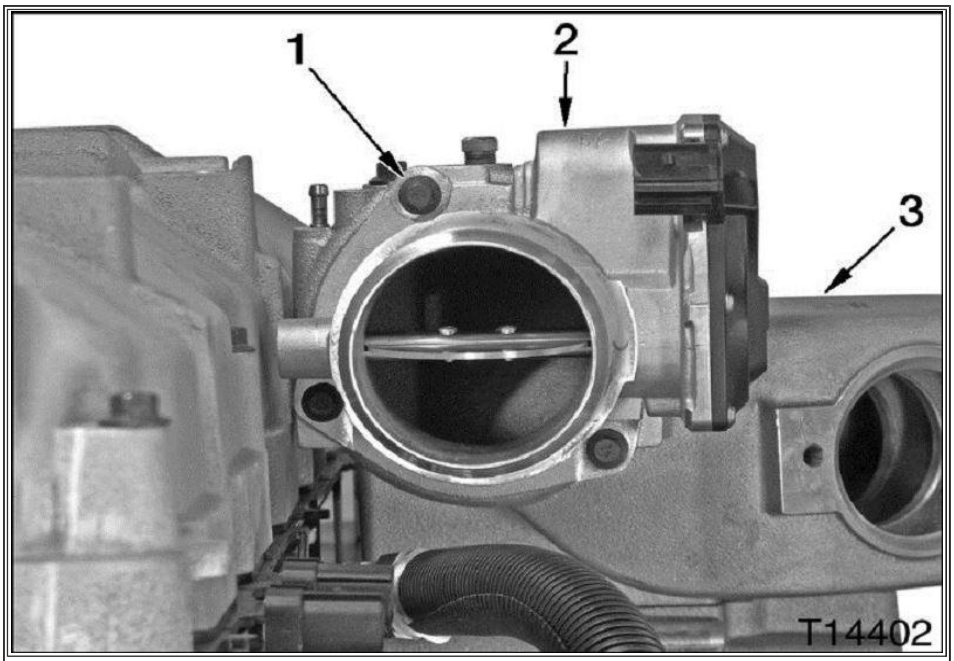

Figure 4: Engine Throttle Valve (ETV) Assembly

1. M6 X 25 bolt (3)
2. ETV assembly
3. Air and EGR mixer duct assembly

22. Disconnect engine harness connector from engine throttle valve assembly.
23. Remove three bolts (Figure 4, Item 1) securing ETV assembly (Figure 4, Item 2) to air and EGR mixer duct assembly (Figure 4, Item 3).

NOTE: Save ETV assembly and fasteners for reuse.

24. Remove ETV assembly.

NOTE: Following procedure will be completed after air duct and EGR mixer assembly have been removed from engine

25. Turn ON hot plate and adjust to hottest temperature setting. Allow five to ten minutes for hot plate to reach maximum temperature.
26. Install EGR Valve Puller tool into EGR mixer duct assembly. Refer to appropriate service manual for detailed instruction
27. Hand tighten EGR Puller force screw placing tension on tool and valve

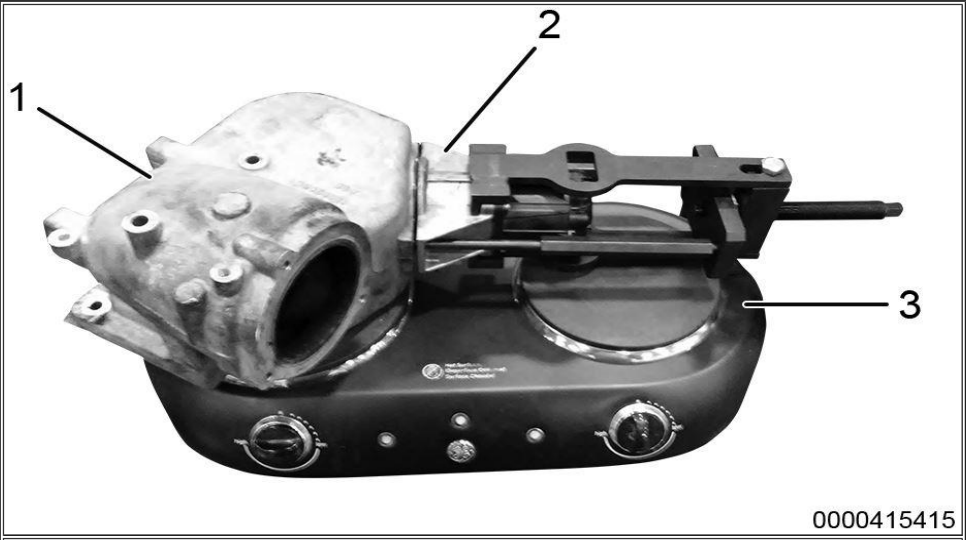

Figure 5: Air duct and EGR mixer assembly- Heat Application

1. Air and EGR mixer duct assembly
2. Electronic actuator
3. Hot Plate

CAUTION:

To prevent property/ component damage, do NOT expose electronic actuator to excessive heat

28. Place air duct and EGR mixer assembly (Figure 5, item 1) onto hot plate (Figure 1, item 3). Position electronic actuator (Figure 1, item 2) away from heat source.

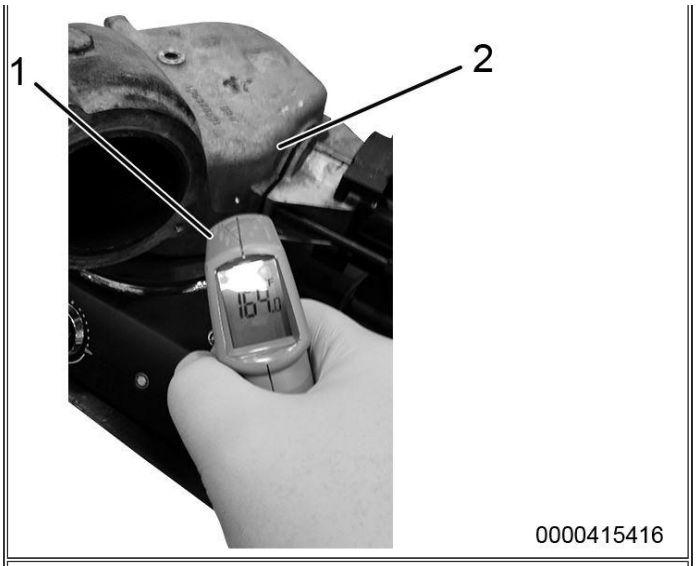

Figure 6: Infared Temperature Gun

1. Infared temperature gun
2. Air and EGR mixer duct assembly

29. Using infared temperature gun (Figure 6, item 1), measure temperature on surface of air duct and EGR mixer assembly (Figure 2, item 2) at five minute intervals.
30. Remove air duct and EGR mixer assembly from hot plate when temperature is 125°F (52°C).

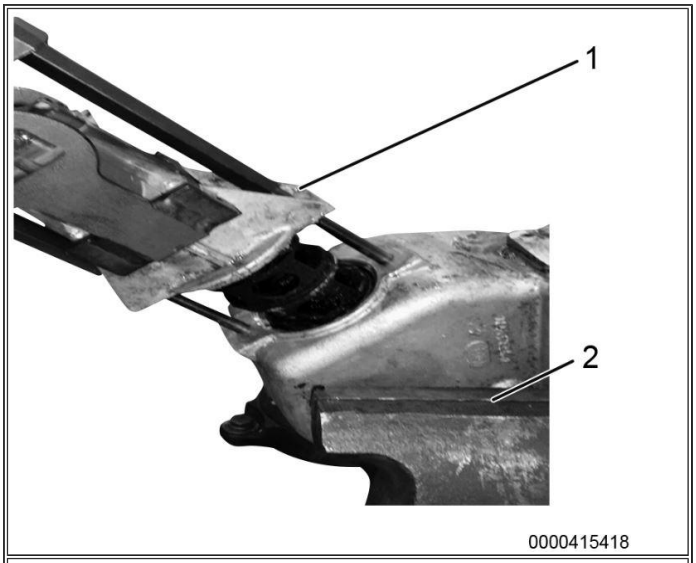

Figure 7: Air duct and EGR Mixer assembly

1. Air and EGR mixer duct assembly
2. Bench vise

31. Position air duct and EGR mixer assembly (Figure 7, item 1) in bench vise with EGR Valve Puller (Figure 7, item 2) accessible.

CAUTION:

To prevent property damage, NEVER use power/ impact tools when performing removal / installation of the EGR valve.

NOTE: If the EGR Valve is NOT easily removed using the EGR Valve Puller, place the air duct and EGR mixer assembly on the hot plate for an additional twenty minutes.

32. Using EGR Puller tool, remove valve from air and EGR mixer duct assembly. Refer to appropriate service manual for detailed instruction.

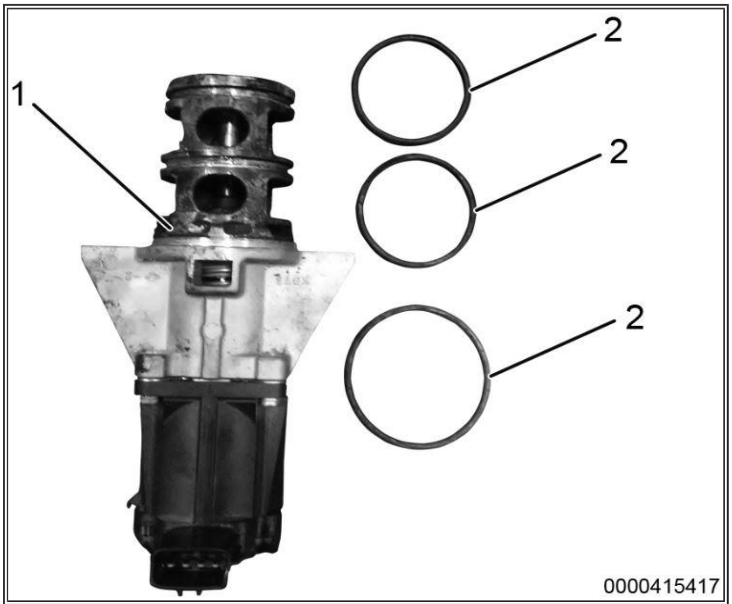

Figure 8: EGR Valve

1. EGR Valve
2. EGR Valve O-ring (3)

33. Remove EGR valve O-rings (Figure 8, item 2) from EGR valve (Figure 8, item 1) and discard. Refer to appropriate service manual for detailed instruction.
34. Using carburetor cleaner, remove carbon build-up from EGR valve and O-ring lands

INSTALLATION PROCEDURE:

CAUTION:

To prevent component damage, do not use power / impact tools to install new components

NOTE: Apply a light coat of clean engine oil on bolt threads and under bolt head when installing fasteners.

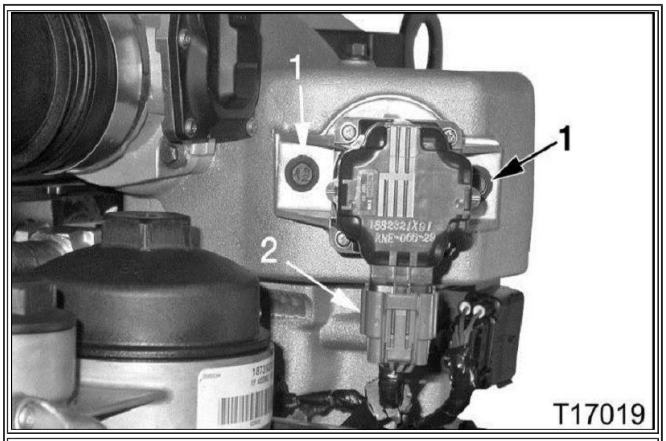

Figure 9: EGR Valve Assembly Bolts

1. M8 x 25.5 bolt (2)
2. EGR harness connector

35. Lubricate and install new EGR valve O-rings. Lubricate O-rings with P-80 lubricant. Refer to appropriate service manual for detailed instruction
36. Install EGR valve into air duct and EGR mixer assembly. Refer to appropriate service manual for detailed instruction

37. Position new EGR valve assembly into air and EGR mixer duct assembly. Push and turn as necessary until valve is completely seated and mounting holes are properly aligned. Using torque wrench, install two mounting bolts (Figure 9, Item 1). Tighten bolts to 23 ft-lb (31 N·m).

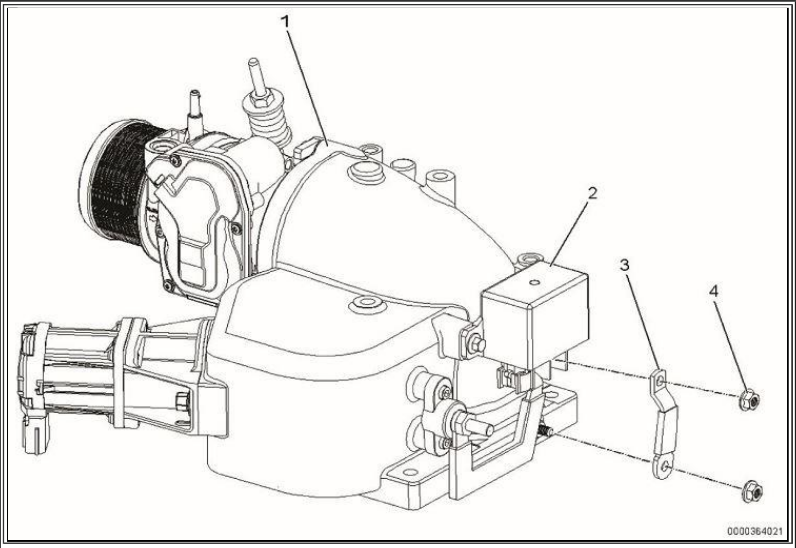

Figure 10: IAH Relay Buss Bar Removal

1. Air duct and EGR mixer
2. IAH relay assembly
3. IAH relay buss bar
4. Serrated nut (2)

38. Position IAH relay (Figure 10, Item 2) onto air and EGR mixer (Figure 10, Item 1).
39. Install two bolts and Allen nuts securing IAH relay assembly (Figure 10, Item 2). Remove relay assembly. Tighten fasteners securely.
40. Position IAH relay buss bar (Figure 10, Item 3) onto mixer assembly (Figure 10, Item 1). Install two serrated nuts (Figure 10, Item 4) and tighten securely.

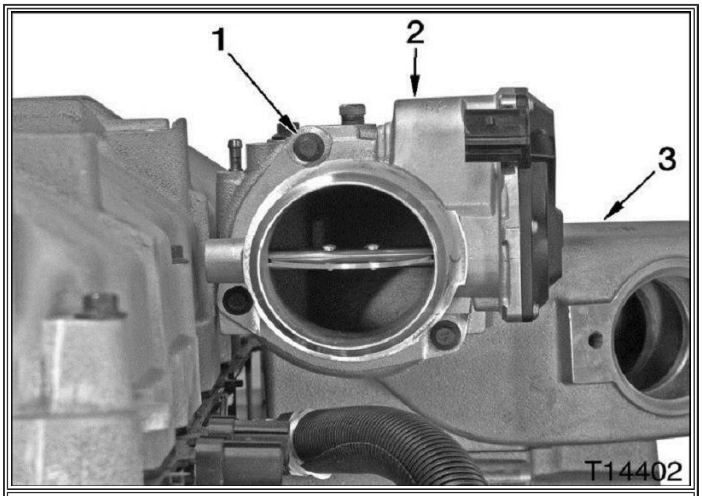

Figure 11: Engine Throttle Valve (ETV) Assembly

1. M6 X 25 bolt (3)
2. ETV assembly
3. Air and EGR mixer duct assembly

41. Install new inlet throttle gasket onto air and EGR mixer (Figure 11, Item 3).
42. Using three previously removed bolts (Figure 11, Item 1), position ETV assembly (Figure 11, Item 2) onto air and EGR mixer duct assembly and loosely install bolts.
43. Using torque wrench, tighten bolts to 9 ft-lb (12 N·m).

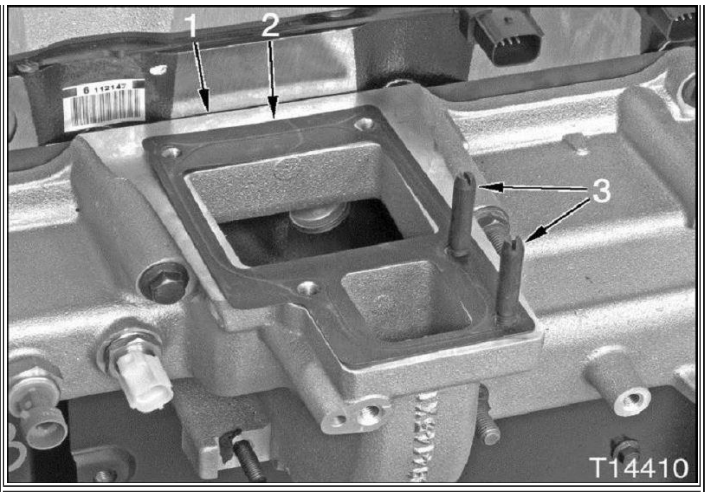

Figure 12: Mixing Bowl Gasket Alignment Pinsitle of Image

1. Intake manifold
2. Inlet duct to intake manifold gasket
3. Pin (2)

44. Install two ZTSE4955 Gasket Alignment Pins (Figure 12, Item 3) into mixing bowl located on intake manifold (Figure 12, Item 1).
45. Install new inlet duct to intake manifold gasket (Figure 12, Item 2).

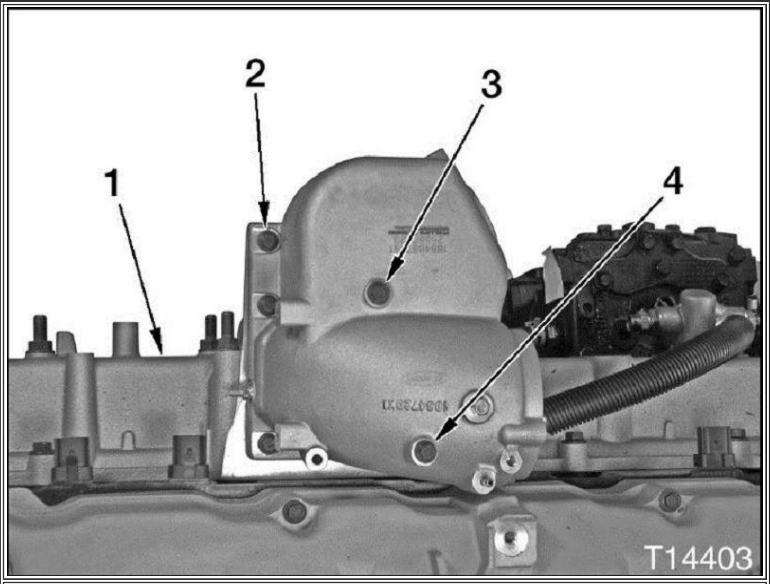

Figure 13: Air and EGR Mixer Duct Assembly

1. Intake manifold
2. M8 X 40 bolt (3)
3. M8 X 130 bolt
4. M8 X 170 bolt

46. Loosely install M8 X170 bolt (Figure 13, Item 4).
47. Loosely install M8 X130 bolt (Figure 13, Item 3).
48. Remove two ZTSE4955 Gasket Alignment Pins (Figure 12, Item 3) from mixing bowl.
49. Loosely install three M8 X 40 bolts (Figure 13, Item 2).
50. Using torque wrench, tighten bolts to 23 lb-ft (31 N·m).
51. Connect vacuum line connector (Figure 1, Item 4) to inlet tube adapter.
52. Install clamp (Figure 1, Item 3). Tighten securely.
53. Connect engine harness to sensor connectors. Ensure sensors are properly connected and locking tabs are secured.
54. Using cable wrap ties, secure engine harness.
55. Install interior engine cover.
56. Close and latch hood.
57. Connect ground cable to negative battery terminal.
58. Install operator-side battery box cover.

59. Connect electronic service tool, clear any necessary codes associated with this procedure.
60. Remove wheel chocks.

WARRANTY INFORMATION

Warranty Claim Coding:

Group	12000
Noun	185-EGR Mixer Manifold or Gasket

Refer to the Warranty Coding Manual for Group and Noun Codes.

Standard Repair Time(s):

Description	Operation Number
Air Inlet/ EGR Mixer Duct, Replace	SRT Link
EGR Valve Removal - Hot Plate Operation	SRT Link

Refer to the SRT Manual for Repair Times

OTHER RESOURCES

Master Service Information Site

Hide Details

Feedback Information

Viewed: 2075
Helpful: 14
Not Helpful: 3

No Feedback Found