

2014 ENGINE

Engine Exhaust - Acadia, Enclave And Traverse

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Catalytic Converter Brace Bolt	50 N.m	37 lb ft
Catalytic Converter Hanger Clamp Nut	18 N.m	13 lb ft
Catalytic Converter to Exhaust Flexible Pipe Nut	28 N.m	21 lb ft
Catalytic Converter to Exhaust Manifold Nut	50 N.m	37 lb ft
Exhaust Flexible Pipe to Three-Way Converter Nut	50 N.m	37 lb ft
Exhaust Manifold Bolt	20 N.m	15 lb ft
Exhaust Manifold Heat Shield Bolt	10 N.m	89 lb in
Exhaust Manifold Lower Heat Shield Bolt (Small Bolt)	10 N.m	89 lb in
Exhaust Manifold Lower Heat Shield Bolt (Large Bolt)	50 N.m	37 lb ft
Exhaust Muffler Heat Shield Nut	9 N.m	80 lb in
Three-Way Catalytic Converter to Muffler Assembly Nut	50 N.m	37 lb ft

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - ENGINE EXHAUST

- Review the exhaust system description in order to familiarize yourself with the exhaust system components and the intended function of the components. Refer to **Exhaust System Description**.
- All diagnostics on a vehicle should follow a logical process. Strategy Based Diagnostics is a uniform approach for repairing all systems. The diagnostic flow is the place to start when repairs are necessary and may always be used in order to resolve a system problem. For a detailed explanation, refer to **Strategy Based Diagnosis**.

Visual/Physical Inspection

- Inspect for aftermarket or non-OEM devices such as, but not limited to; tailpipe extensions, headers and exhaust cutouts. Any aftermarket exhaust system devices could affect the operation and proper performance of the exhaust system.
- Verify the exact operating conditions under which the concern exists. Note factors such as engine RPM, engine temperature, engine load and frequency of concern.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause any symptom.

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating as designed.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- Loss of power

Refer to **Restricted Exhaust**

- Poor acceleration

Refer to **Restricted Exhaust**

- Poor fuel economy

Refer to **Restricted Exhaust**

- Excessive smoke diesel

Refer to **Restricted Exhaust**

- Exhaust hissing noise

Refer to **Exhaust Leakage**

- Exhaust popping noise

Refer to **Exhaust Leakage**

- Exhaust rattle noise

Refer to **Exhaust Noise**

- Loud exhaust noise

Refer to **Exhaust Noise**

- Exhaust buzz, groan, hum noise

Refer to **Exhaust Noise**

RESTRICTED EXHAUST

Special Tools**J-35314-A** Exhaust Back Pressure Gauge**Diagnostic Aids****WARNING:** Refer to Hot Exhaust System Warning .

For dual exhaust systems a quick check of exhaust flow will help determine which side of the exhaust system is restricted. The side that has less exhaust flow is the side that will be suspect and diagnosis should begin there.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

4

The exhaust system has very low back pressure under normal conditions. If the exhaust system is restricted, a significant increase in the exhaust pressure is noticed on the **J-35314-A** gauge.

Removing the HO2S sensor may set a DTC. When finishing this diagnostic table, be sure to clear all codes.

5

This step will isolate the catalytic converter from the remainder of the exhaust system.

8

Confirming that the condition has been fixed is essential. If the symptom still exists and the vehicle has a dual exhaust system, proceed to step 2 and repeat diagnostic procedure on the opposite exhaust pipe.

Restricted Exhaust

Step	Action	Value(s)	Yes	No
1	Did you verify the customers complaint?	-	Go to Step 2	-
2	Did you review the exhaust symptoms diagnostic information and perform the necessary inspections?	-	Go to Step 3	Go to Symptoms - Engine Exhaust
3	Is the system equipped with dual exhaust?	-	Go to Diagnostic Aids	Go to Step 4
	1. Remove the heated oxygen sensor (HO2S) that is in front of the catalytic converter. Refer to the appropriate procedure. Refer to Heated Oxygen			

4	<u>Sensor Replacement - Bank 1 Sensor 1 or Heated Oxygen Sensor Replacement - Bank 2 Sensor 1</u> 2. Install the J-35314-A Exhaust Back Pressure Gauge in place of the HO2S sensor. 3. Start the engine. 4. Increase and monitor the engine speed at 2, 500 RPM. 5. Observe the exhaust system back pressure reading on the gauge. Does the reading exceed the specified value?	9 kPa (1.25 psi)		
5	1. Turn the engine OFF and place the ignition in the lock position. 2. Remove the J-35314-A gauge. 3. Reinstall the HO2S sensor. Refer to <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 or Heated Oxygen Sensor Replacement - Bank 2 Sensor 1</u>. 4. Remove the post-catalyst HO2S sensor. Refer to the appropriate procedure. Refer to <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 or Heated Oxygen Sensor Replacement - Bank 2 Sensor 2</u>. 5. Install the J-35314-A gauge in place of the post HO2S sensor. 6. Start the engine. 7. Increase and monitor the engine speed at 2, 500 RPM. 8. Observe the exhaust system back pressure reading on the gauge. Does the reading exceed the specified value?	9 kPa (1.25 psi)		
6	Inspect the exhaust system for the following conditions: • Damage in the exhaust pipe • Debris in the exhaust pipe • Muffler or resonator internal failure • Two-layer exhaust pipe separation	-		

	Did you find and correct the condition?		Go to Step 8	-
7	Replace the catalytic converter. Refer to Catalytic Converter Replacement - Left Side or Catalytic Converter Replacement - Right Side . Did you find and correct the condition?	-	Go to Step 8	-
8	1. Remove the J-35314-A gauge. 2. Reinstall the applicable HO2S sensor. Refer to Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 or Heated Oxygen Sensor Replacement - Bank 2 Sensor 2. 3. Clear any codes. 4. Road test the vehicle in order to verify the repair. Did you correct the condition?	-	System OK	Go to Step 2

EXHAUST LEAKAGE

Exhaust Leakage

Condition	Action
WARNING: Refer to Hot Exhaust System Warning .	
DEFINITION: An exhaust leak may show stains at the area of the leak. The leak may be felt by holding a hand close to the suspected areas or using a smoke pencil. The leak may make a popping or hissing noise. Refer to Symptoms - Engine Exhaust prior to beginning this table.	
Misaligned or improperly installed exhaust system components	• Align and tighten the exhaust system components to the specifications. Refer to Fastener Tightening Specifications. • Ensure the exhaust hangers are in the proper locations and not loose.
Exhaust leaks at the following connections: • Exhaust manifold to pipe • Flanges • Pipe clamps	Tighten the components to the specifications. Refer to Fastener Tightening Specifications .
Seals or gaskets leaking; • Exhaust manifold to	Replace the leaking seal or gasket. Refer to the affected components procedure for service.

cylinder head - Exhaust pipes to exhaust manifold - Catalytic converter connection	
Irregularities at the mating surfaces on the flange connections	Repair as required or replace the affected component. Refer to the affected components procedure for service.
Exhaust manifold cracked or broken	Replace the exhaust manifold. Refer to Exhaust Manifold Replacement - Left Side or Exhaust Manifold Replacement - Right Side .
Exhaust system component connection welds leaking	Replace the leaking component. Refer to the affected component's procedure for service.
Muffler or resonator, if equipped, damaged or leaking at the seams	Replace the affected muffler or resonator, if equipped. Refer to Exhaust Muffler Replacement (NB5) , Exhaust Muffler Replacement (NEA/NED or N10) .

EXHAUST NOISE

Exhaust Noise

Condition	Action
WARNING: Refer to Hot Exhaust System Warning .	
DEFINITION: An audible or physical noise due to a faulty component or damaged components causing a loose or misaligned exhaust system resulting in a rattle or vibration noise, i.e. buzz, groan, hum. Refer to Symptoms - Engine Exhaust prior to beginning this table.	
Popping or hissing noise	Exhaust leak-Refer to Exhaust Leakage .
Loud exhaust	1. Compare to a known good vehicle. 2. Inspect for a damaged or failed muffler or resonator, if equipped. 3. Replace the faulty muffler or resonator (if equipped). Refer to Exhaust Muffler Replacement (NB5) , Exhaust Muffler Replacement (NEA/NED or N10) .
External rattle or vibration noise	1. Inspect for a bent or loose hanger, loose heat shield or loose clamp. 2. Inspect for a exhaust pipe causing interference. 3. Repair or replace the affected component. Refer to the affected component's service procedure.
Internal rattle	1. Test the components by tapping with a rubber mallet to confirm a rattle. 2. Replace the faulty catalytic converter, resonator, if equipped or muffler. Refer to Exhaust Muffler Replacement (NB5) and

Exhaust Muffler Replacement (NEA/NED or N10).

REPAIR INSTRUCTIONS

EXHAUST MANIFOLD REPLACEMENT - LEFT SIDE

Removal Procedure

WARNING: Refer to Exhaust Service Warning .

WARNING: Refer to Protective Goggles and Glove Warning .

1. Remove the exhaust manifold heat shield. Refer to Exhaust Manifold Heat Shield Replacement - Left Side.

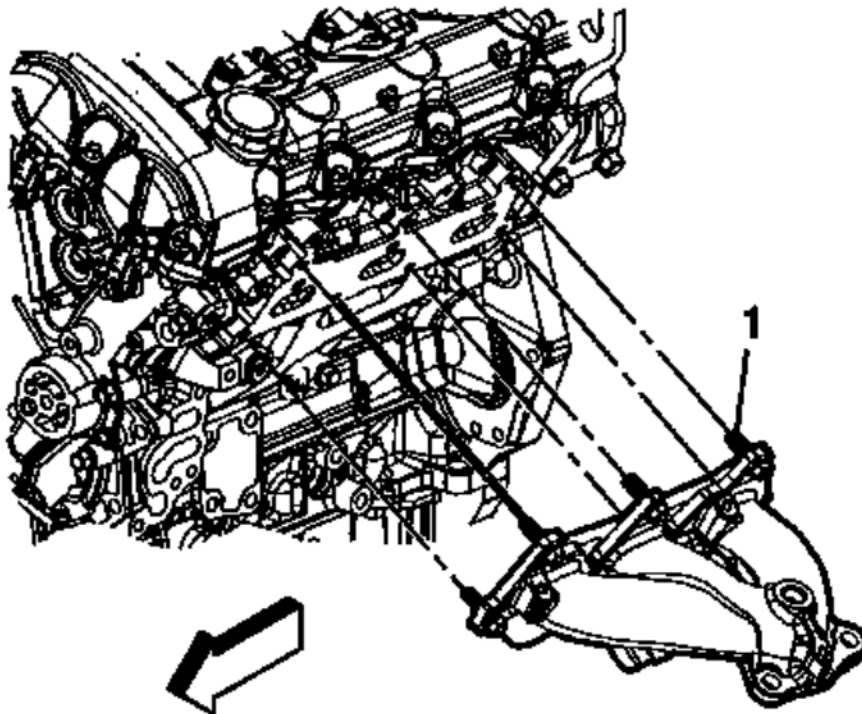


Fig. 1: Identifying Left Side Exhaust Manifold Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the oil level indicator. Refer to [Oil Level Indicator Tube Replacement](#) .
3. Remove the catalytic converter. Refer to [Catalytic Converter Replacement - Left Side](#).
4. Remove the exhaust manifold bolts (1).
5. Remove the exhaust manifold and gasket. Discard the gasket.

NOTE: Do not reuse the gasket.

6. Remove the heated oxygen sensor (1) from the exhaust manifold.

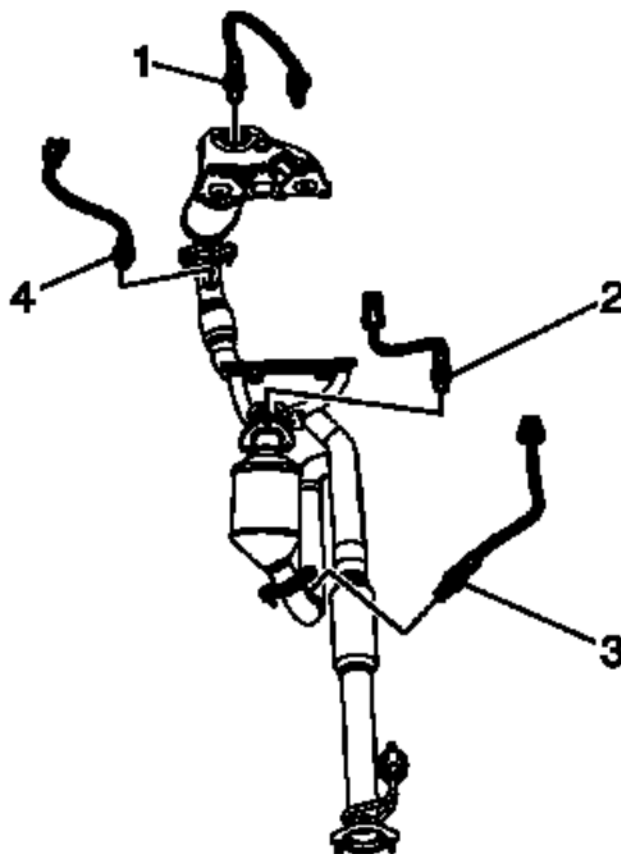


Fig. 2: Identifying Heated Oxygen Sensors & Exhaust Manifold
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

NOTE: A special anti-seize compound is used in the HO2S threads. The compound consists of liquid graphite and glass beads. The graphite tends to burn away, but the glass beads remain, making the sensor easier to remove. New or service replacement sensors have the compound applied to the threads. If the sensor is removed from an exhaust component and if for any reason the sensor is to be reinstalled, the threads must have anti-seize compound applied before

the reinstallation.

1. If reinstalling the old sensor, coat the threads with anti-seize compound GM P/N 12377953 or equivalent.

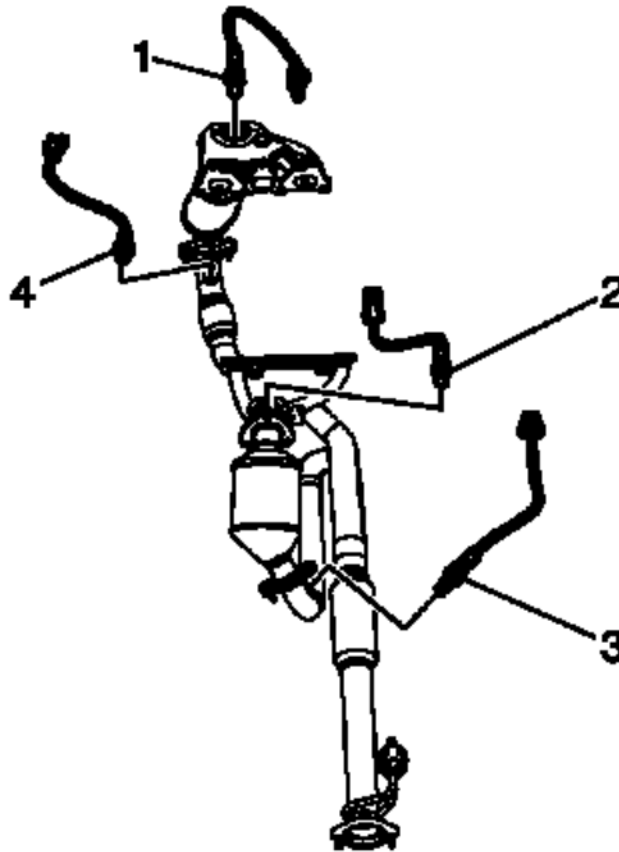


Fig. 3: Identifying Heated Oxygen Sensors & Exhaust Manifold
Courtesy of GENERAL MOTORS COMPANY

2. Install the HO2S (1) to the exhaust manifold.

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the sensor to 42 N.m (31 lb ft).

3. Install one exhaust manifold bolt (1) to the exhaust manifold.

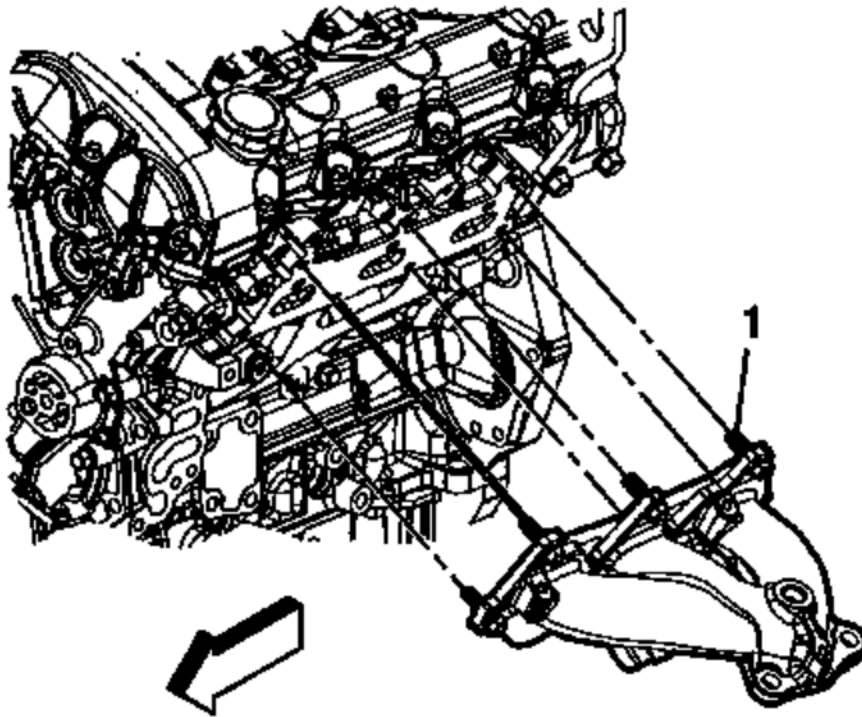


Fig. 4: Identifying Left Side Exhaust Manifold Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Install the NEW exhaust manifold gasket onto the exhaust manifold and bolt.
5. Install the exhaust manifold (with gasket) to the cylinder head and the catalytic converter.
6. Install the remaining exhaust manifold bolts.

Tighten

Tighten the bolts to 20 N.m (15 lb ft).

7. Install the catalytic converter. Refer to **Catalytic Converter Replacement - Left Side**.
8. Install the oil level indicator. Refer to **Oil Level Indicator Tube Replacement**.
9. Install the exhaust manifold heat shield. Refer to **Exhaust Manifold Heat Shield Replacement - Left Side**.

EXHAUST MANIFOLD REPLACEMENT - RIGHT SIDE

Removal Procedure

WARNING: Refer to Exhaust Service Warning .

WARNING: Refer to Protective Goggles and Glove Warning .

1. Remove the catalytic converter. Refer to Catalytic Converter Replacement - Right Side.

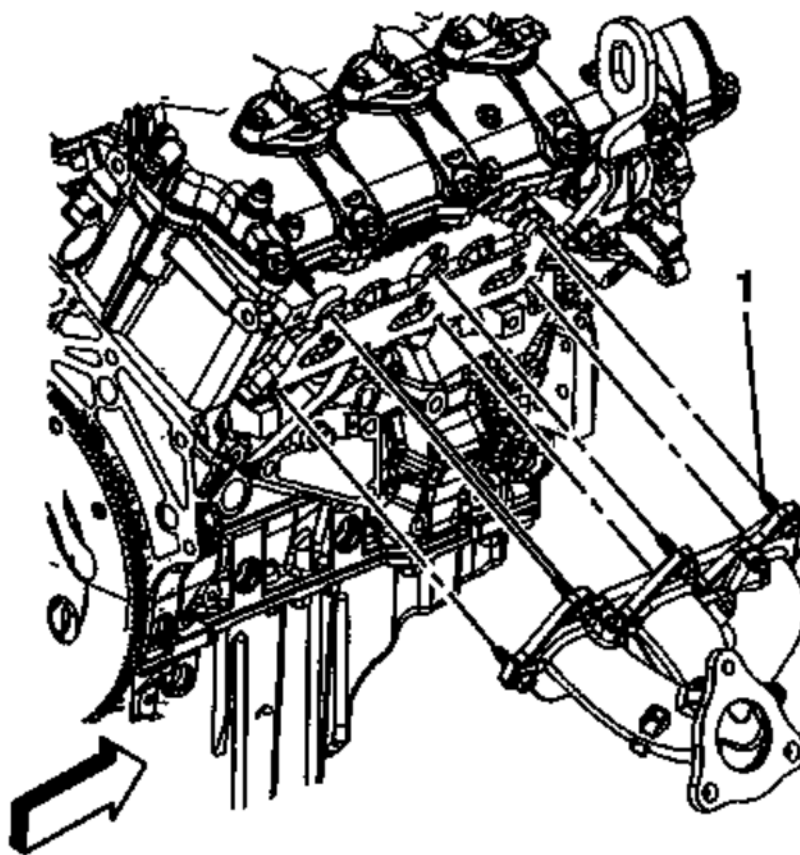


Fig. 5: Identifying Exhaust Manifold Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the exhaust manifold heat shield. Refer to Exhaust Manifold Heat Shield Replacement - Right Side.
3. Remove the exhaust manifold bolts (1).
4. Remove the exhaust manifold and gasket out from vehicle. Discard the gasket.

NOTE: Do not reuse the gasket.

Installation Procedure

1. Install one exhaust manifold bolt (1) to the exhaust manifold.

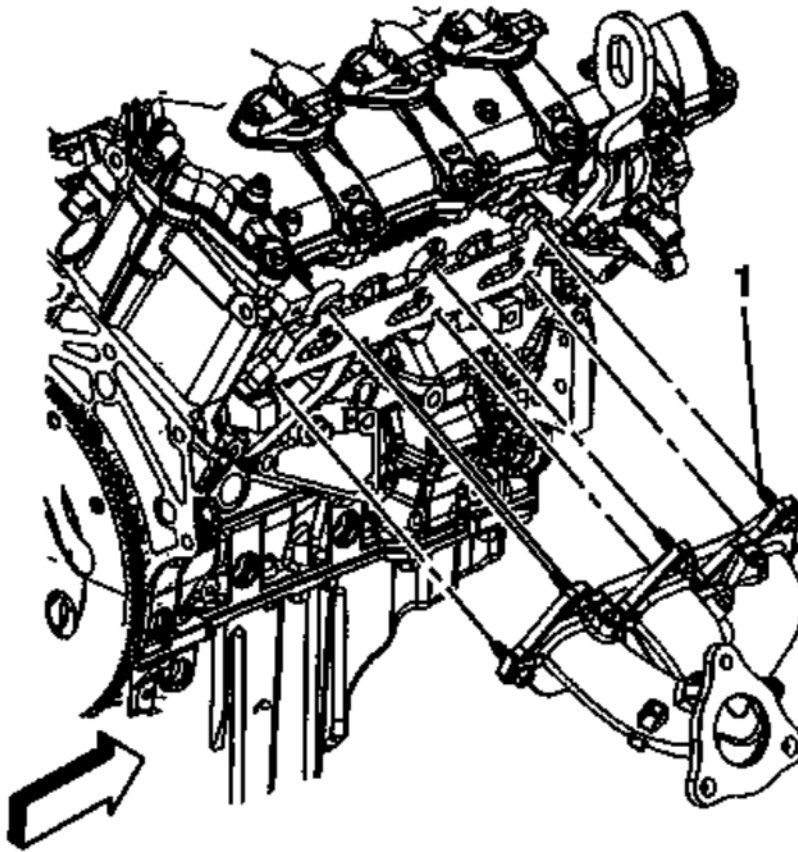


Fig. 6: Identifying Exhaust Manifold Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Install the NEW exhaust manifold gasket onto the cylinder head and bolt.
3. Install the exhaust manifold (with gasket) to the catalytic converter and the cylinder head.
4. Install the exhaust manifold bolts.

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the bolts to 20 N.m (15 lb ft).

5. Install the exhaust manifold heat shield. Refer to Exhaust Manifold Heat Shield Replacement - Right Side.
6. Install the catalytic converter. Refer to Catalytic Converter Replacement - Right Side.

CATALYTIC CONVERTER REPLACEMENT - LEFT SIDE**Removal Procedure**

WARNING: Refer to Exhaust Service Warning .

WARNING: Refer to Protective Goggles and Glove Warning .

1. Remove the exhaust manifold heat shield. Refer to Exhaust Manifold Heat Shield Replacement - Left Side.

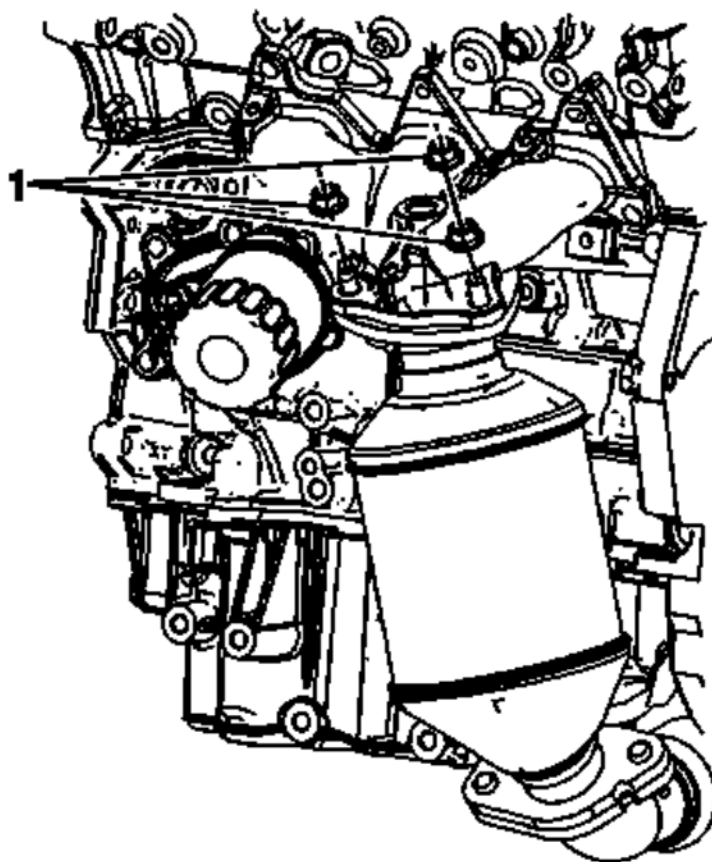


Fig. 7: Identifying Catalytic Converter Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the catalytic converter to exhaust manifold nuts (1).
3. Remove the exhaust flexible pipe. Refer to Exhaust Flexible Pipe Replacement.
4. Remove the catalytic converter brace bolt (2).

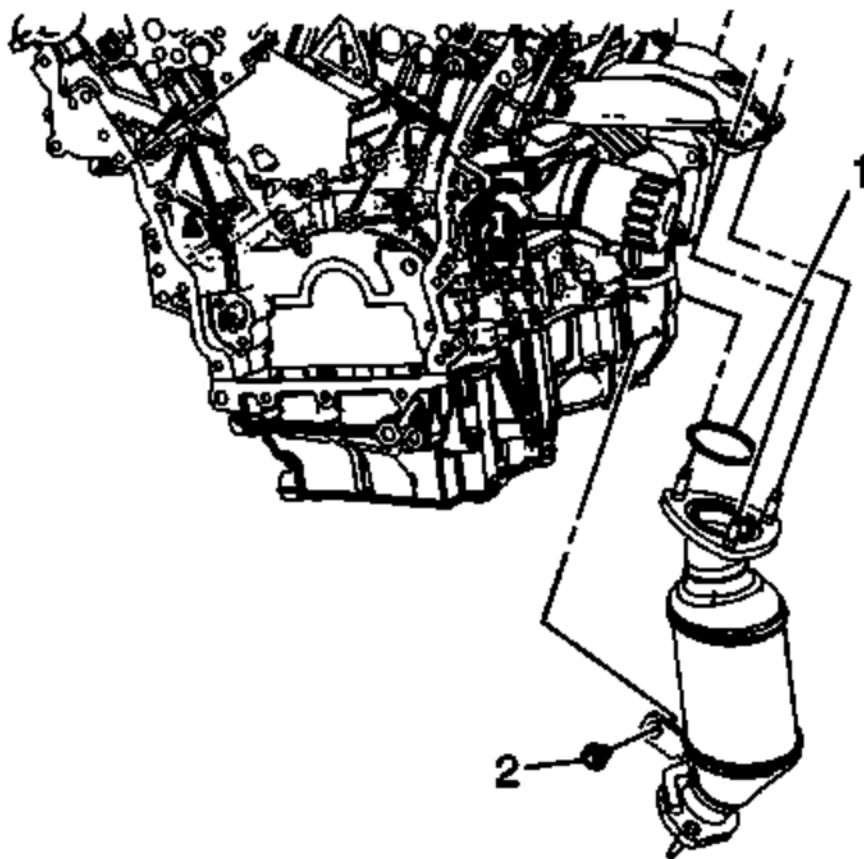


Fig. 8: Identifying Catalytic Converter Brace Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Remove the catalytic converter from the exhaust manifold.
6. Remove and discard the catalytic converter to exhaust manifold seal (1).

Installation Procedure

1. Install a NEW exhaust manifold seal (1) onto the catalytic converter.

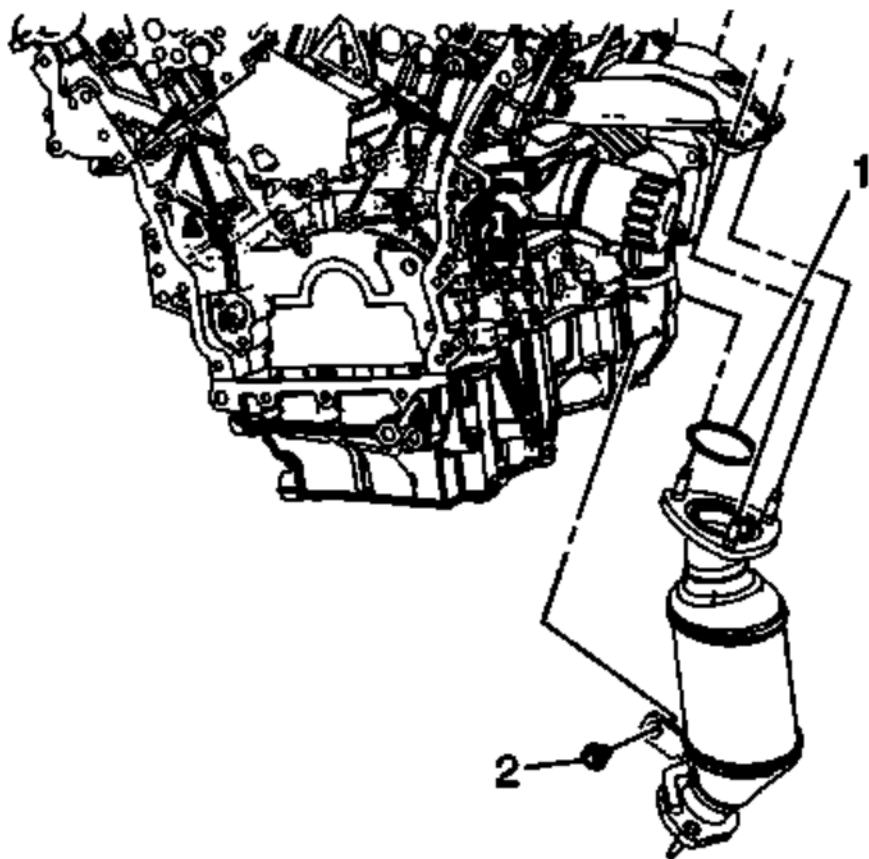


Fig. 9: Identifying Catalytic Converter Brace Bolt
Courtesy of GENERAL MOTORS COMPANY

2. Install the catalytic converter to the exhaust manifold.
3. Install the catalytic converter brace bolt (2).

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the bolt to 50 N.m (37 lb ft).

4. Install the exhaust flexible pipe. Refer to Exhaust Flexible Pipe Replacement.

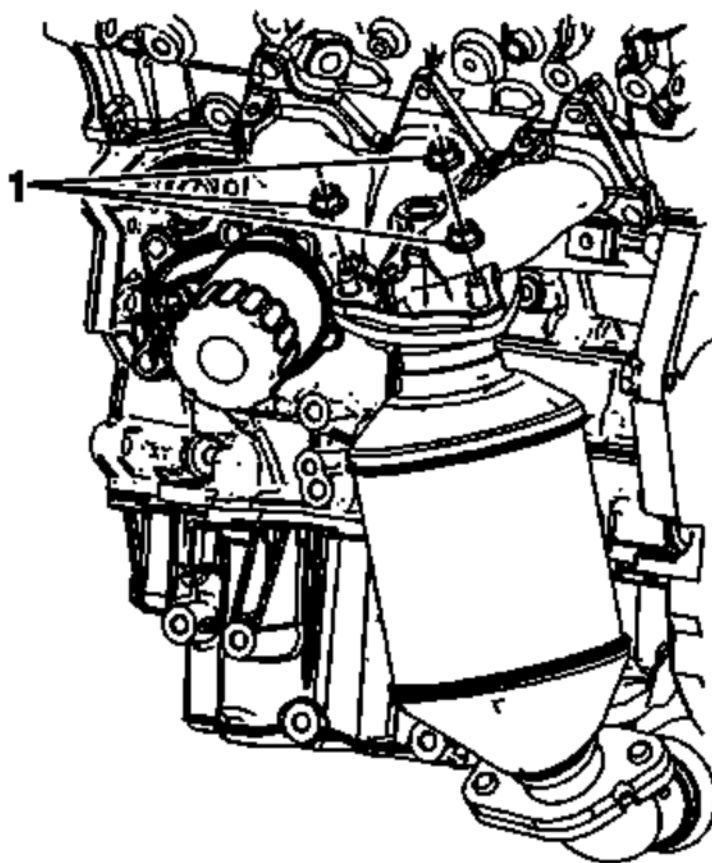


Fig. 10: Identifying Catalytic Converter Bolts
Courtesy of GENERAL MOTORS COMPANY

5. Install the catalytic converter to exhaust manifold nuts (1).

Tighten

Tighten the nuts to 50 N.m (37 lb ft).

6. Install the exhaust manifold heat shield. Refer to **Exhaust Manifold Heat Shield Replacement - Left Side**.

CATALYTIC CONVERTER REPLACEMENT - RIGHT SIDE

Removal Procedure

WARNING: Refer to **Exhaust Service Warning** .

WARNING: Refer to **Protective Goggles and Glove Warning** .

1. If equipped with all wheel drive (AWD), remove the transfer case. Refer to **Transfer Case Assembly Replacement**.
2. Remove the exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement**.

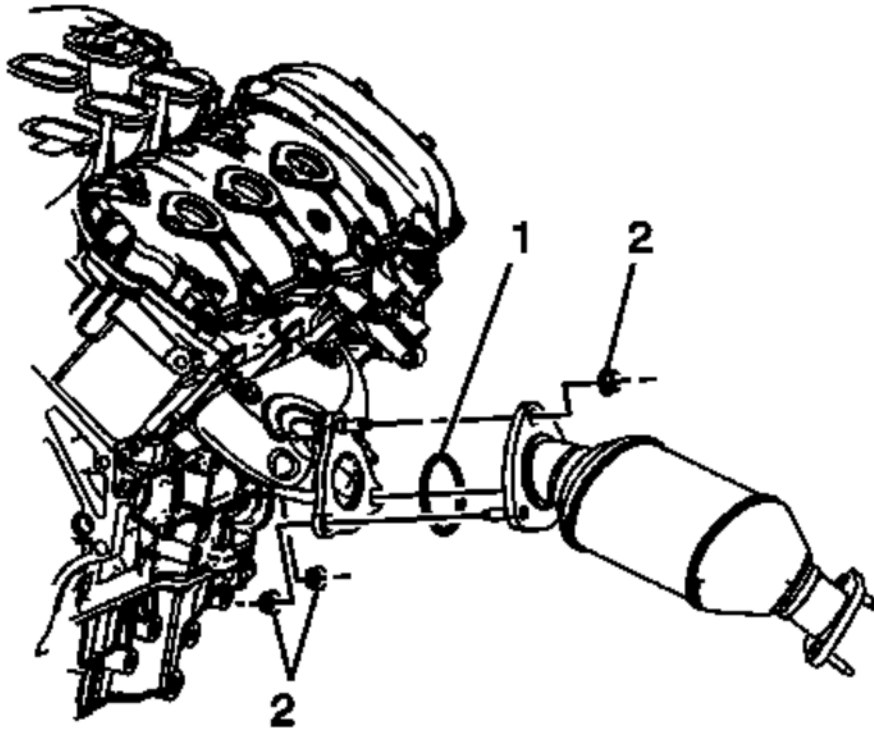


Fig. 11: Identifying Catalytic Converter To Exhaust Manifold Nuts
Courtesy of GENERAL MOTORS COMPANY

3. Remove the catalytic converter to exhaust manifold nuts (2).
4. Remove the catalytic converter from the exhaust manifold.
5. Remove and discard the catalytic converter to exhaust manifold seal (1).

Installation Procedure

1. Install a NEW catalytic converter to exhaust manifold seal (1) onto the catalytic converter.

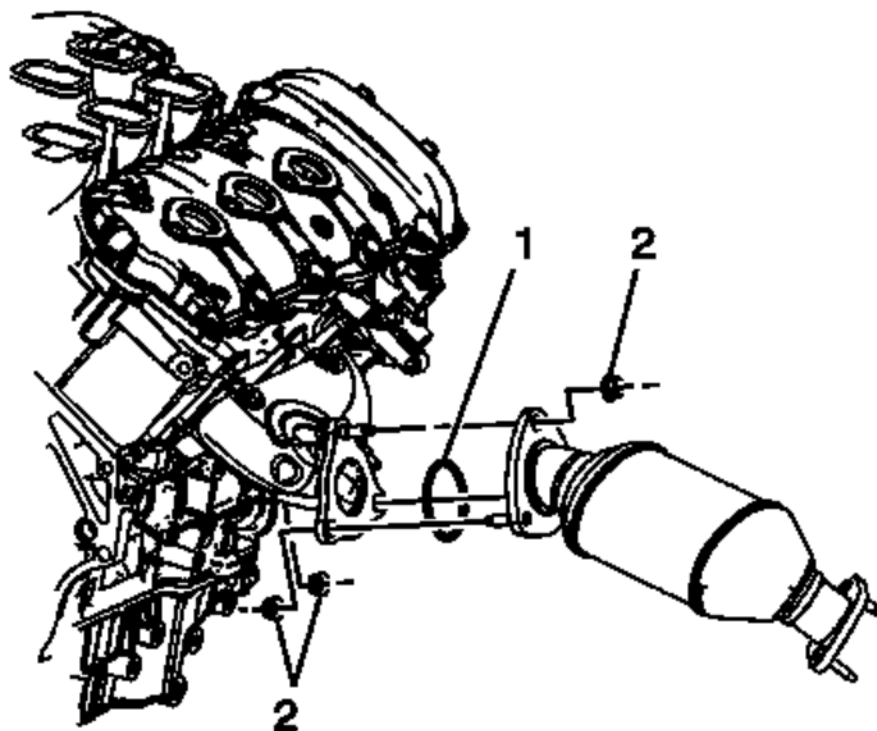


Fig. 12: Identifying Catalytic Converter To Exhaust Manifold Nuts
Courtesy of GENERAL MOTORS COMPANY

2. Install the catalytic converter to the exhaust manifold.
3. Install the catalytic converter to exhaust manifold nuts (2).

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the nuts to 50 N.m (37 lb ft).

4. If equipped with all wheel drive (AWD), install the transfer case. Refer to Transfer Case Assembly Replacement .
5. Install the exhaust flexible pipe. Refer to Exhaust Flexible Pipe Replacement.

THREE-WAY CATALYTIC CONVERTER REPLACEMENT (LLT)

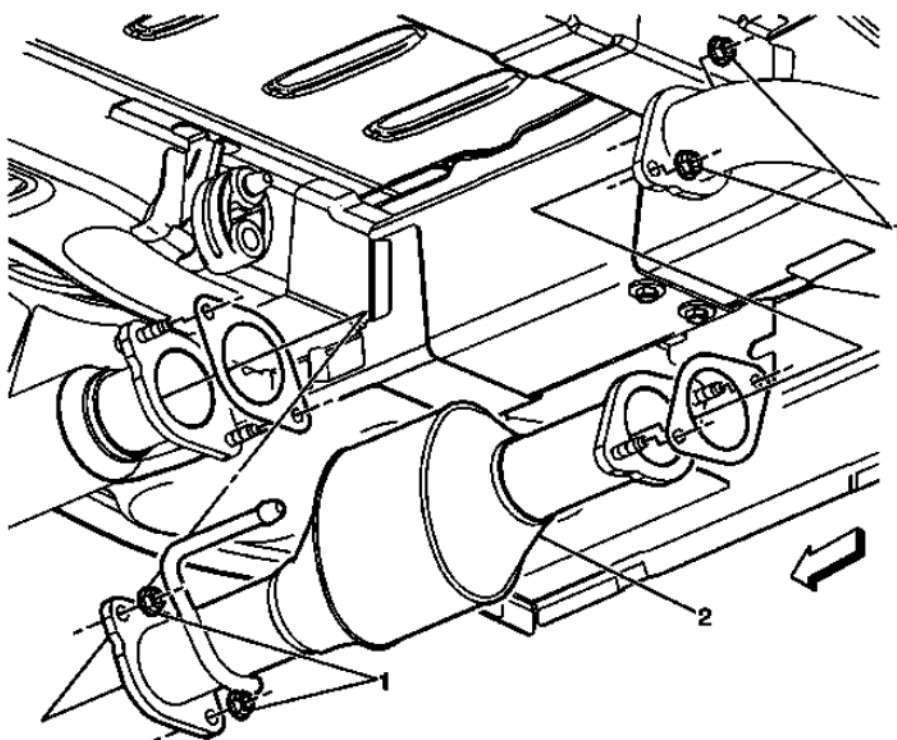


Fig. 13: View Of Three-Way Catalytic Converter (With LLT)
 Courtesy of GENERAL MOTORS COMPANY

Three-Way Catalytic Converter Replacement (LLT)

Callout	Component Name
Preliminary Procedure Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Nut (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 50 N.m (37 lb ft)
2	Three-Way Catalytic Converter Procedure 1. Disengage the hanger. 2. Remove and discard the gaskets.

EXHAUST MUFFLER REPLACEMENT (NB5)

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the three way catalytic converter to muffler pipe nuts (1).

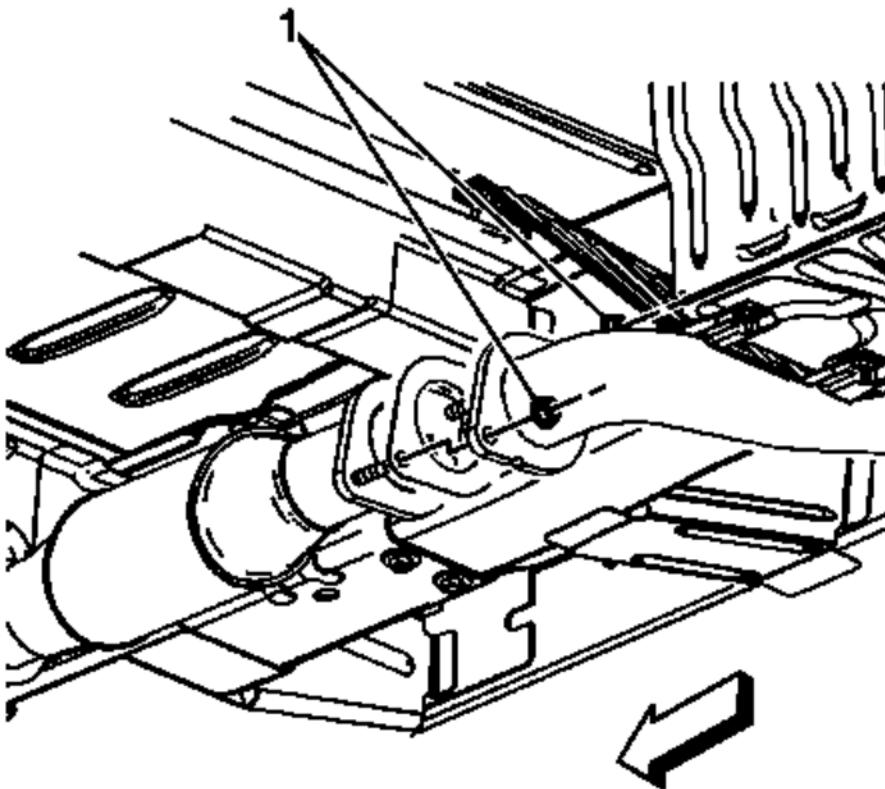


Fig. 14: Identifying Three Way Catalytic Converter-To-Muffler Pipe Nuts
Courtesy of GENERAL MOTORS COMPANY

3. With the aid of an assistant, separate the rubber insulators from the exhaust underbody hangers (1).

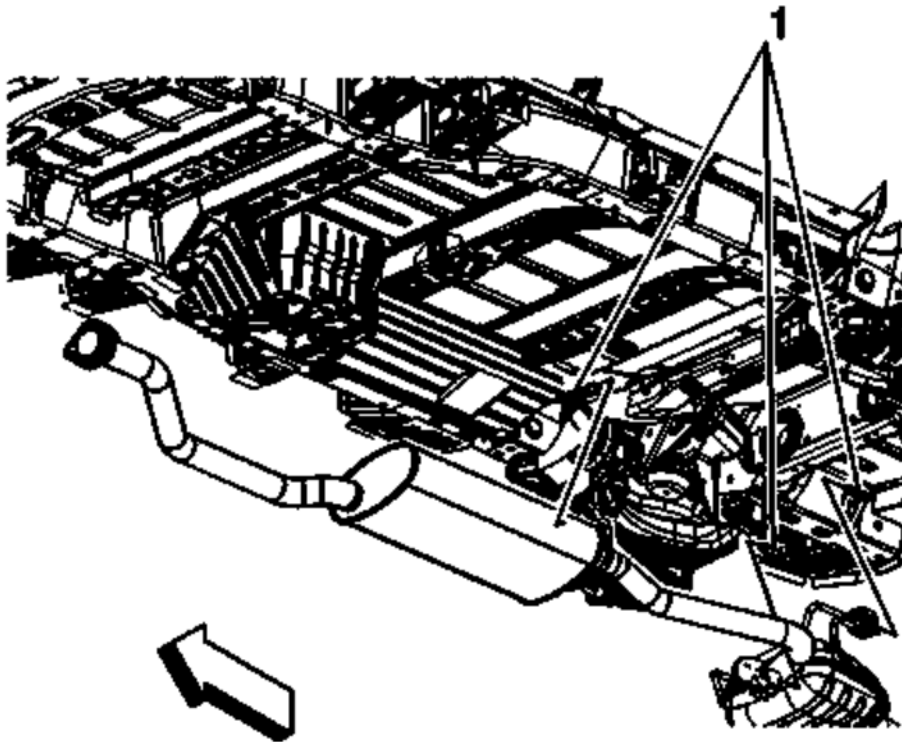


Fig. 15: Identifying Exhaust Underbody Hangers
Courtesy of GENERAL MOTORS COMPANY

4. With the aid of an assistant, remove the muffler assembly from exhaust flexible pipe and the vehicle.

Installation Procedure

1. With the aid of an assistant, install the muffler assembly to the vehicle and the exhaust flexible pipe.

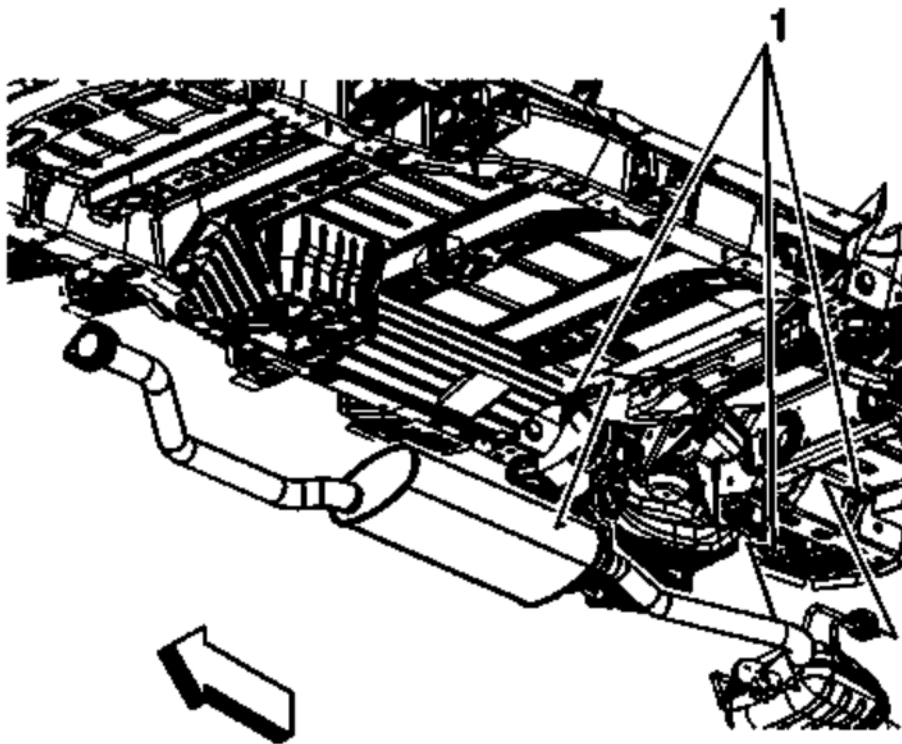


Fig. 16: Identifying Exhaust Underbody Hangers
Courtesy of GENERAL MOTORS COMPANY

2. With the aid of an assistant, install the rubber insulators to the exhaust underbody hangers (1).
3. Install the three way catalytic converter to muffler piper nuts (1) and tighten to 50 N.m (37 lb ft).

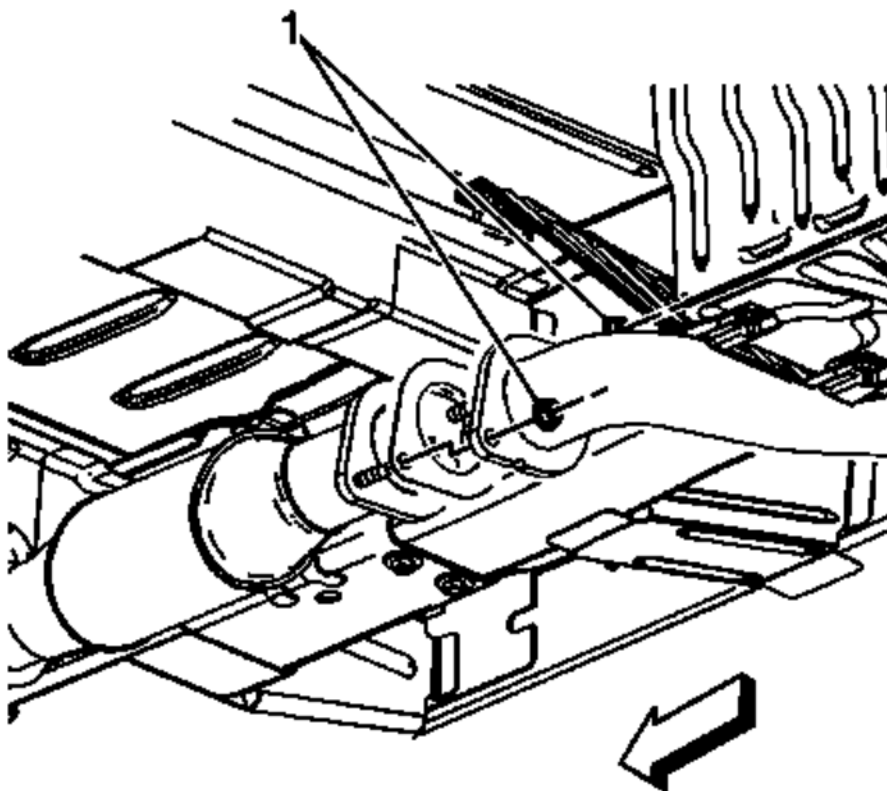


Fig. 17: Identifying Three Way Catalytic Converter-To-Muffler Pipe Nuts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

4. Lower the vehicle.

EXHAUST MUFFLER REPLACEMENT (NEA/NED OR N10)

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the three way catalytic converter to muffler pipe nuts (1).

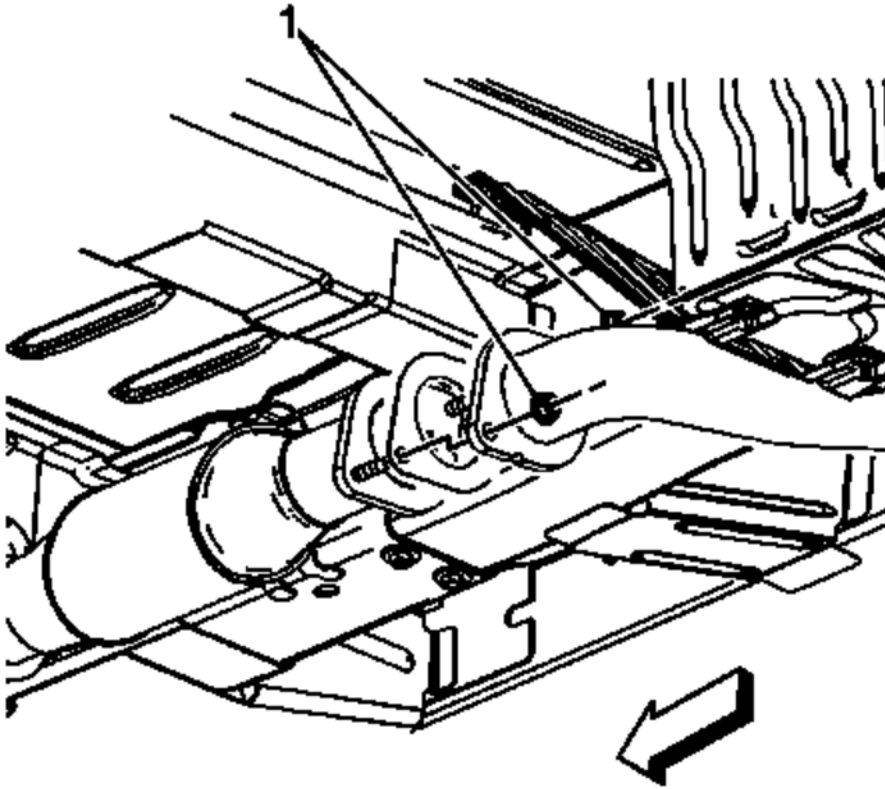


Fig. 18: Identifying Three Way Catalytic Converter-To-Muffler Pipe Nuts
Courtesy of GENERAL MOTORS COMPANY

3. With the aid of an assistant, separate the rubber insulators from the exhaust underbody hangers (1, 2 and 3).

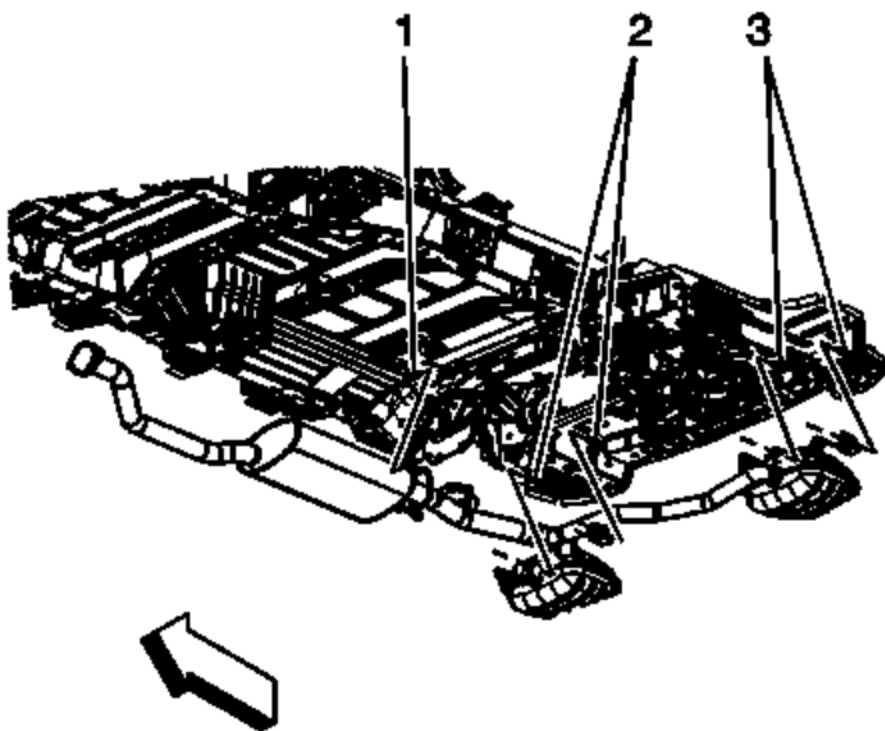


Fig. 19: Identifying Exhaust Underbody Hangers
Courtesy of GENERAL MOTORS COMPANY

4. With the aid of an assistant, remove the muffler assembly from exhaust flexible pipe and the vehicle.

Installation Procedure

1. With the aid of an assistant, install the muffler assembly to the vehicle and the exhaust flexible pipe.

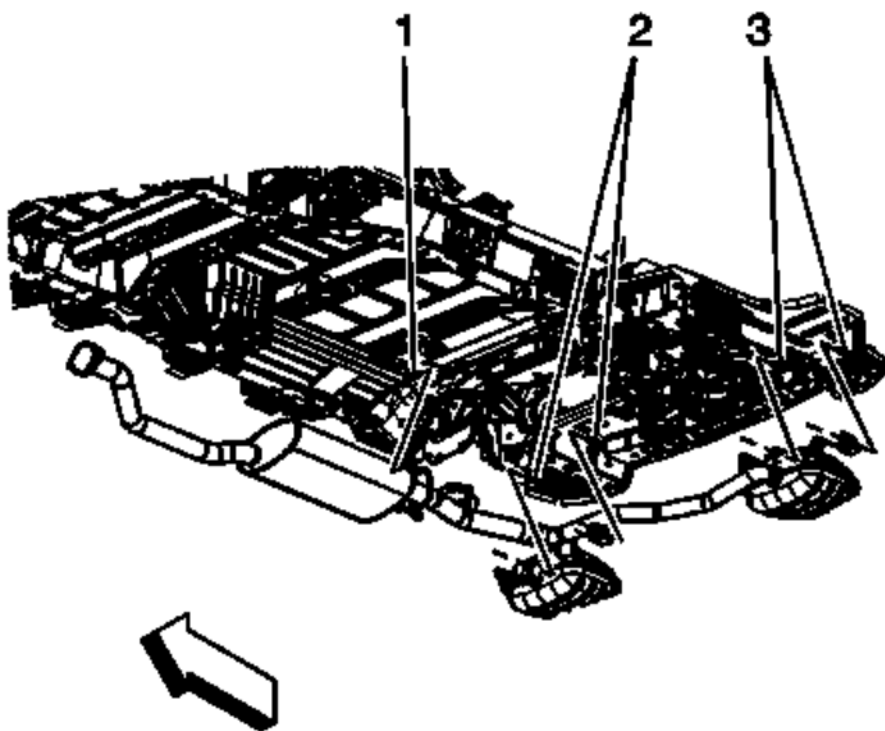


Fig. 20: Identifying Exhaust Underbody Hangers
Courtesy of GENERAL MOTORS COMPANY

2. With the aid of an assistant, install the rubber insulators to the exhaust underbody hangers (1, 2 and 3).
3. Install the three way catalytic converter to muffler pipe nuts (1) and tighten to 50 N.m (37 lb ft).

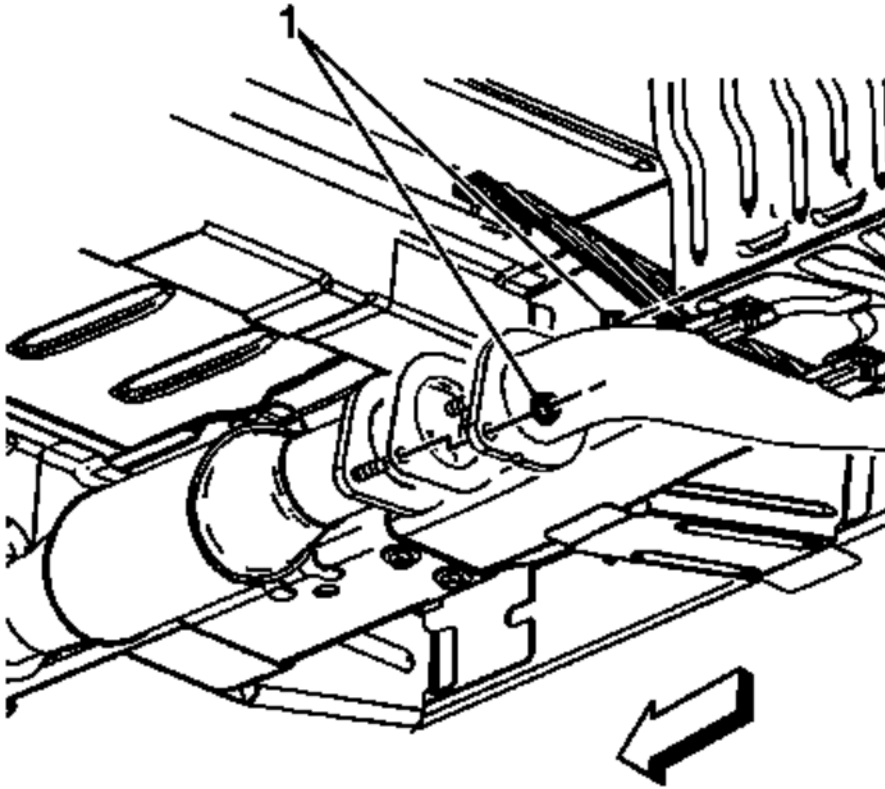


Fig. 21: Identifying Three Way Catalytic Converter-To-Muffler Pipe Nuts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

4. Lower the vehicle.

EXHAUST FLEXIBLE PIPE REPLACEMENT

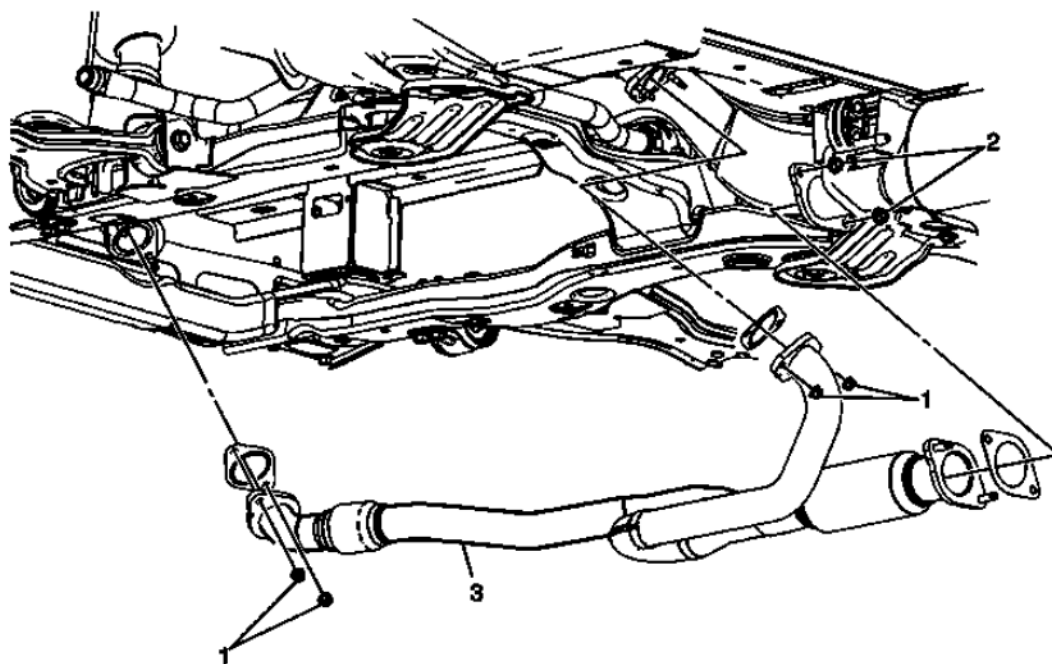


Fig. 22: Identifying Exhaust Flexible Pipe
 Courtesy of GENERAL MOTORS COMPANY

Exhaust Flexible Pipe Replacement

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the frame brace. Refer to Frame Brace Replacement . 3. Remove the heated oxygen sensors. Refer to Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 and Heated Oxygen Sensor Replacement - Bank 2 Sensor 2 .	
1	Nut (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 28 N.m (21 lb ft)
2	Nut (Qty: 2) Tighten 50 N.m (37 lb ft)
3	Exhaust Flex Pipe Assembly Procedure

Remove and discard the gaskets.

EXHAUST MANIFOLD LOWER HEAT SHIELD REPLACEMENT

Removal Procedure

1. Raise and suitably support the vehicle. Refer to Lifting and Jacking the Vehicle .

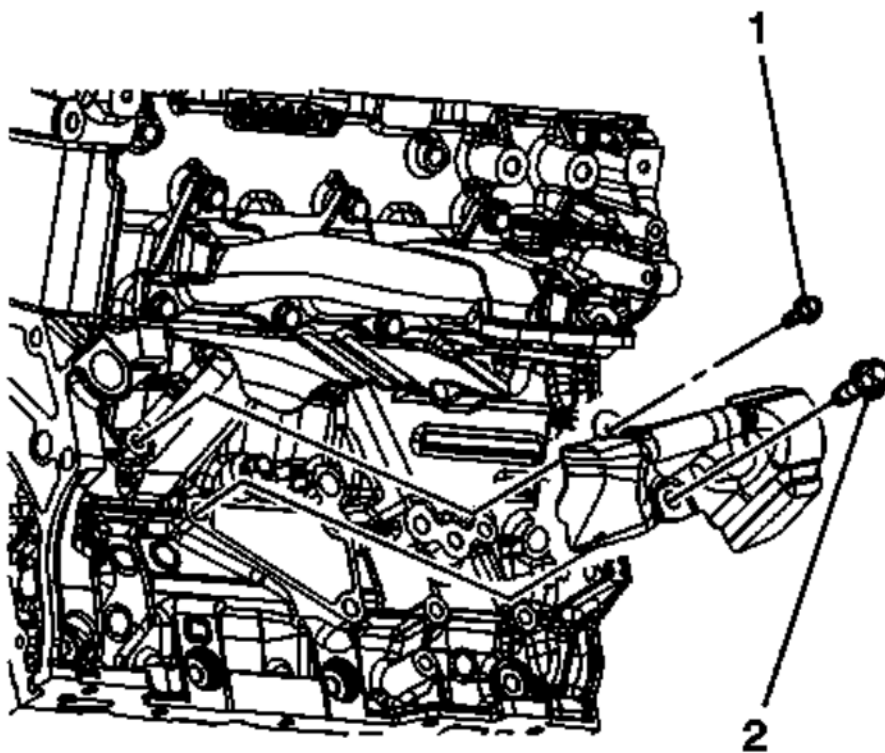


Fig. 23: Identifying Exhaust Manifold Lower Heat Shield Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the exhaust manifold lower heat shield bolts (1, 2).
3. Remove the exhaust manifold lower heat shield.

Installation Procedure

1. Position the exhaust manifold lower heat shield to the engine.

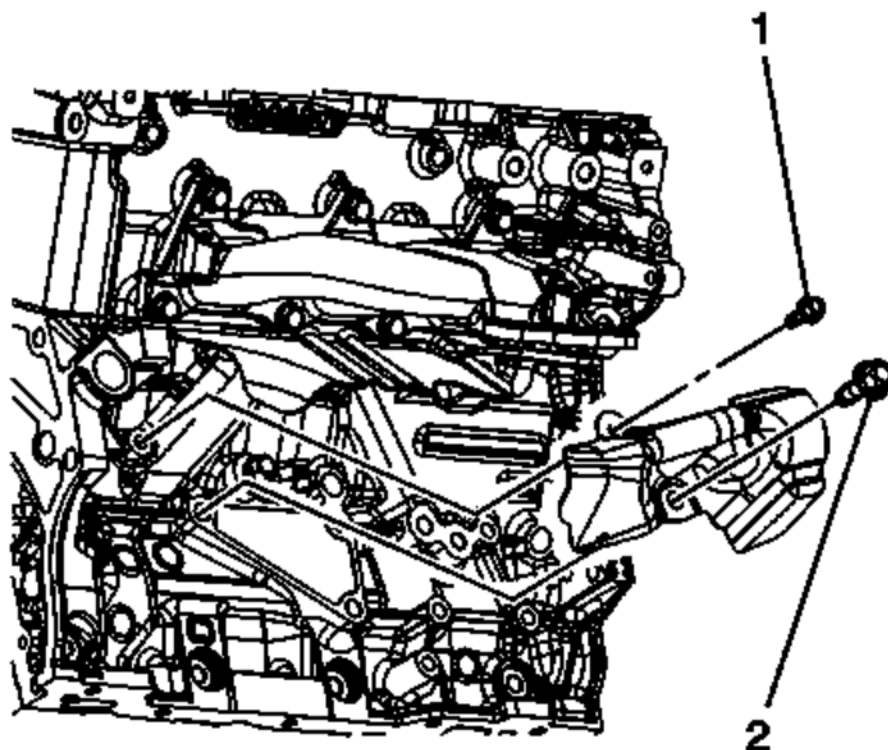


Fig. 24: Identifying Exhaust Manifold Lower Heat Shield Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Install the exhaust manifold lower heat shield bolts (1, 2). Tighten bolt (1) to 10 N.m (89 lb in) and tighten bolt (2) to 50 N.m (37 lb ft).

CAUTION: Refer to Fastener Caution .

3. Lower the vehicle.

EXHAUST MANIFOLD HEAT SHIELD REPLACEMENT - RIGHT SIDE

Removal Procedure

WARNING: Refer to Protective Goggles and Glove Warning .

WARNING: Refer to Exhaust Service Warning .

1. Remove the heated oxygen sensor (HO2S). Refer to **Heated Oxygen Sensor Replacement - Bank 1 Sensor 1**.

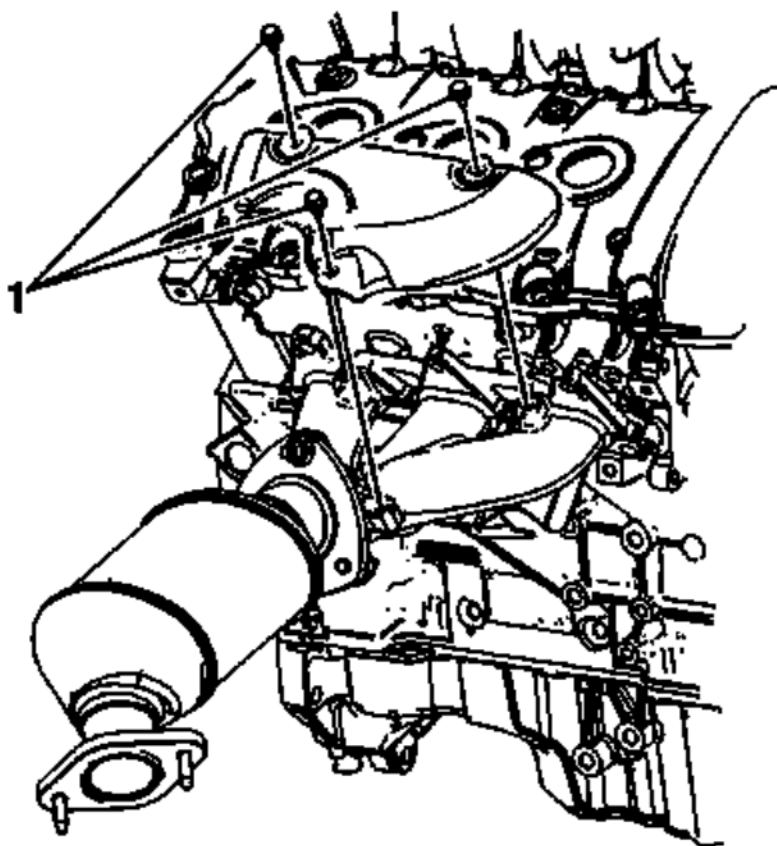


Fig. 25: Identifying Exhaust Manifold Heat Shield Bolts - Right Side
Courtesy of GENERAL MOTORS COMPANY

2. Remove the exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement**.
3. Remove the exhaust manifold heat shield bolts (1).
4. Remove the exhaust manifold heat shield.

Installation Procedure

1. Install the exhaust manifold heat shield.

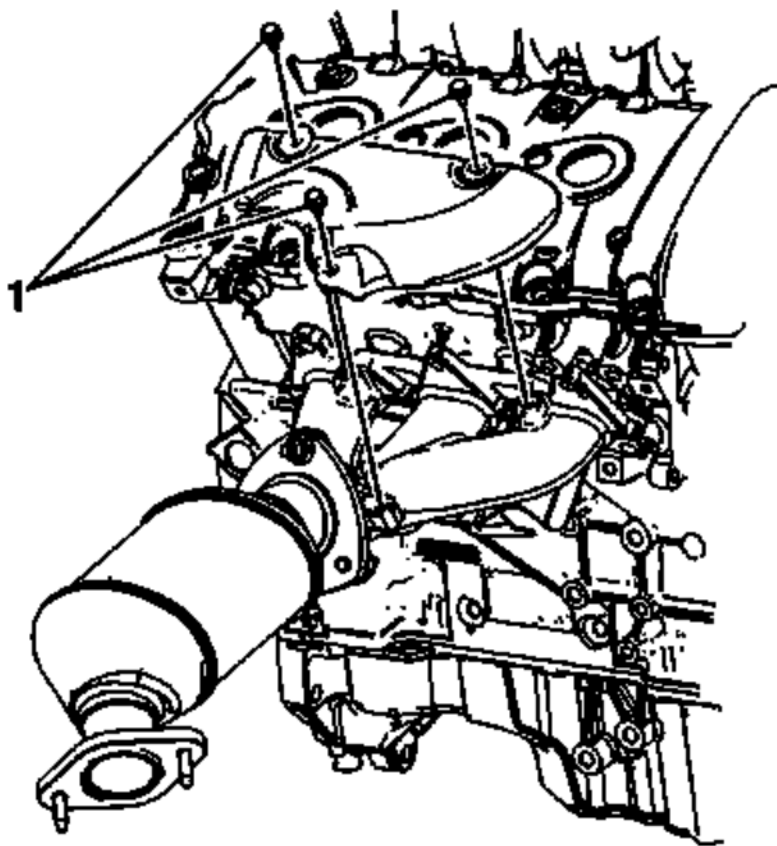


Fig. 26: Identifying Exhaust Manifold Heat Shield Bolts - Right Side
Courtesy of GENERAL MOTORS COMPANY

2. Install the exhaust manifold heat shield bolts (1) and tighten to 10 N.m (89 lb in).

CAUTION: Refer to Fastener Caution .

3. Install the exhaust flexible pipe. Refer to Exhaust Flexible Pipe Replacement.
4. Install the HO2S. Refer to Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 .

EXHAUST MANIFOLD HEAT SHIELD REPLACEMENT - LEFT SIDE

Removal Procedure

WARNING: Refer to Protective Goggles and Glove Warning .

WARNING: Refer to Exhaust Service Warning .

1. Remove the fuel injector sight shield. Refer to **Fuel Injector Sight Shield Replacement** .

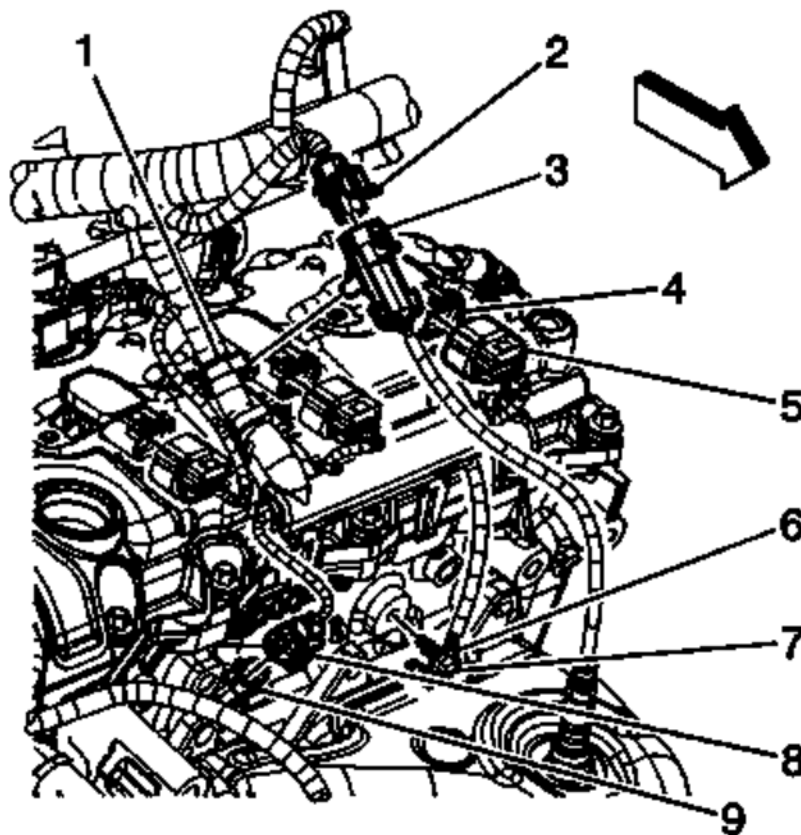


Fig. 27: Identifying Engine Wiring Harness Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

2. Disconnect the engine wiring harness electrical connector (2) from the heated oxygen sensor (HO2S) electrical connector (3).
3. Remove the HO2S electrical connector retainer from the engine wiring harness clip (1).
4. Remove the exhaust manifold heat shield bolts (1).

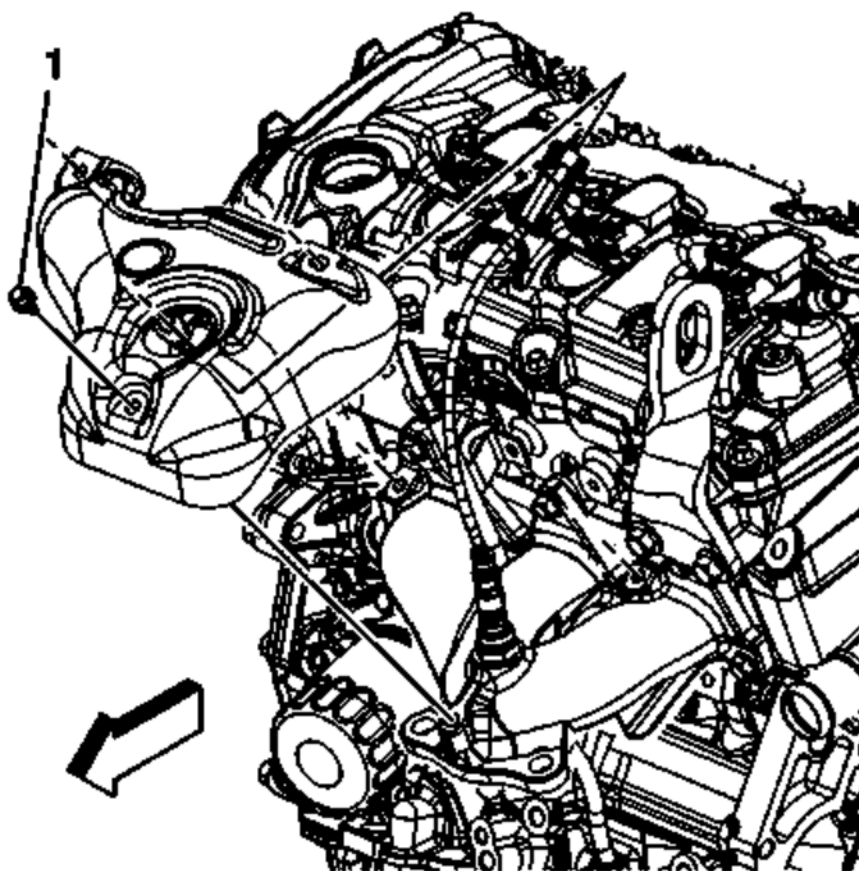


Fig. 28: Identifying Exhaust Manifold Heat Shield Bolts - Left Side
Courtesy of GENERAL MOTORS COMPANY

5. Remove the exhaust manifold heat shield, sliding the shield up over the HO2S pigtail.

Installation Procedure

1. Install the exhaust manifold heat shield, sliding the shield down over the HO2S pigtail.

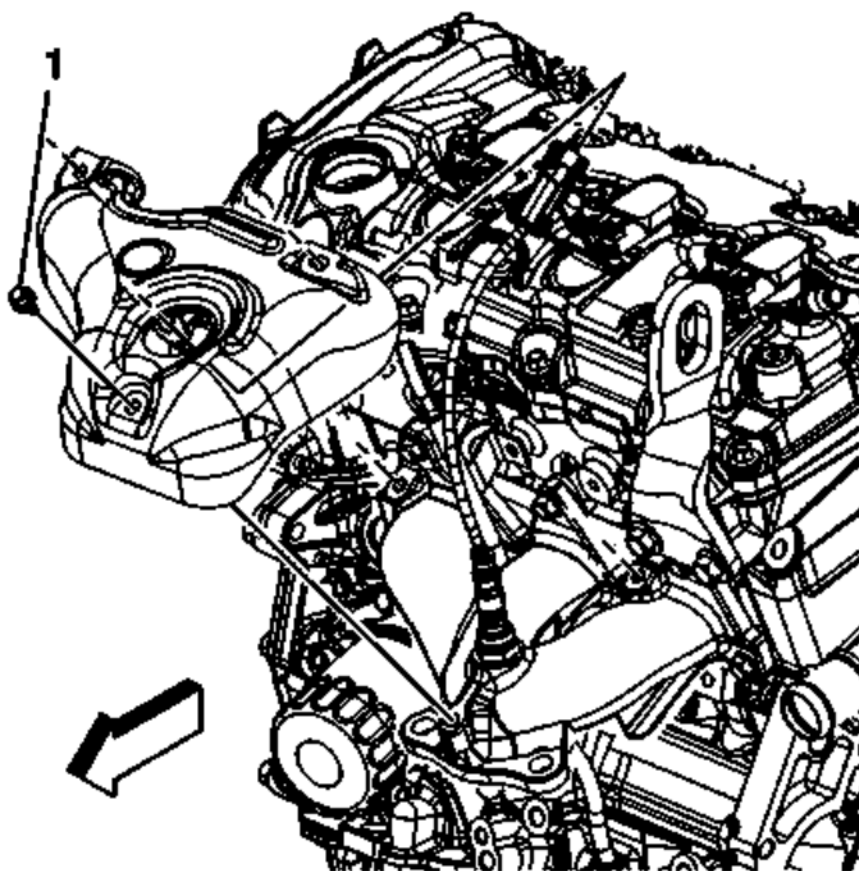


Fig. 29: Identifying Exhaust Manifold Heat Shield Bolts - Left Side
Courtesy of GENERAL MOTORS COMPANY

2. Install the exhaust manifold heat shield bolts (1) and tighten to 10 N.m (89 lb in).

CAUTION: Refer to Fastener Caution .

3. Connect the engine wiring harness electrical connector (2) to the HO2S electrical connector (3).

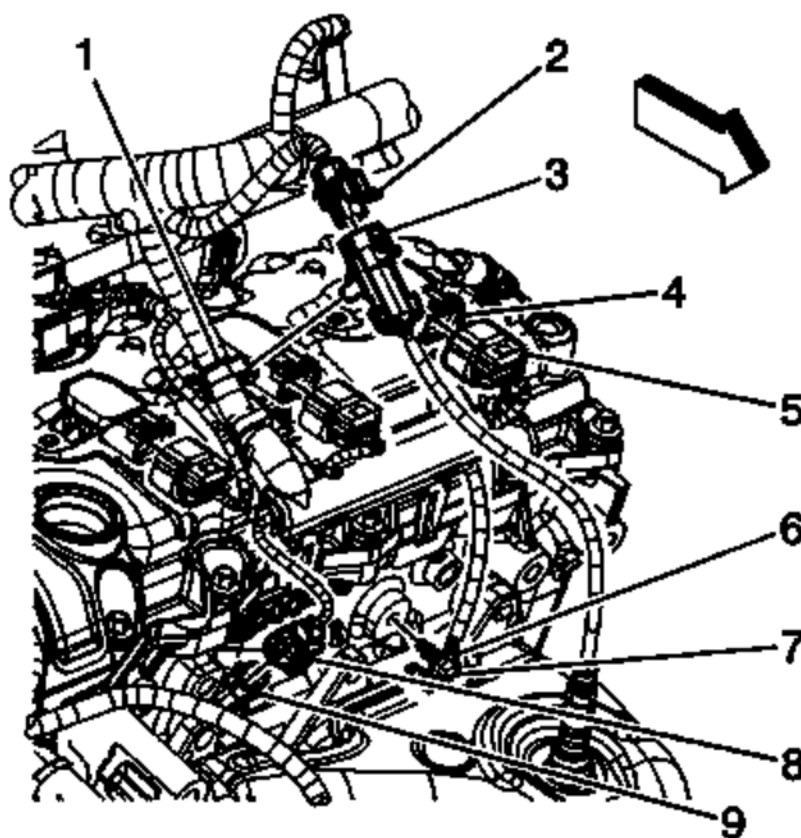


Fig. 30: Identifying Engine Wiring Harness Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

4. Install the HO2S electrical connector retainer to the wiring harness clip (1).
5. Install the fuel injector sight shield. Refer to **Fuel Injector Sight Shield Replacement** .

EXHAUST MUFFLER HEAT SHIELD REPLACEMENT

Removal Procedure

1. Remove the muffler assembly. Refer to **Exhaust Muffler Replacement (NB5)** and **Exhaust Muffler Replacement (NEA/NED or N10)**.

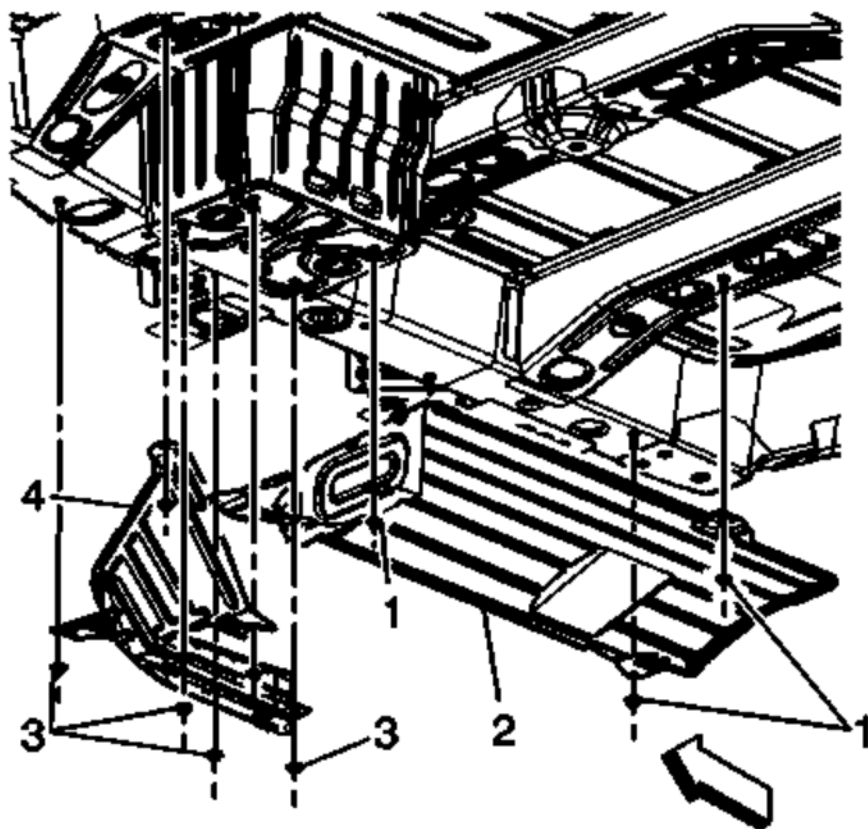


Fig. 31: Identifying Exhaust Muffler Heat Shield
Courtesy of GENERAL MOTORS COMPANY

2. Remove the exhaust muffler front heat shield nuts (3).
3. Remove the exhaust muffler front heat shield (4).
4. Remove the exhaust muffler heat shield nuts (1).
5. Remove the exhaust muffler heat shield (2).

Installation Procedure

1. Position the exhaust muffler heat shield (2) to the floor panel.

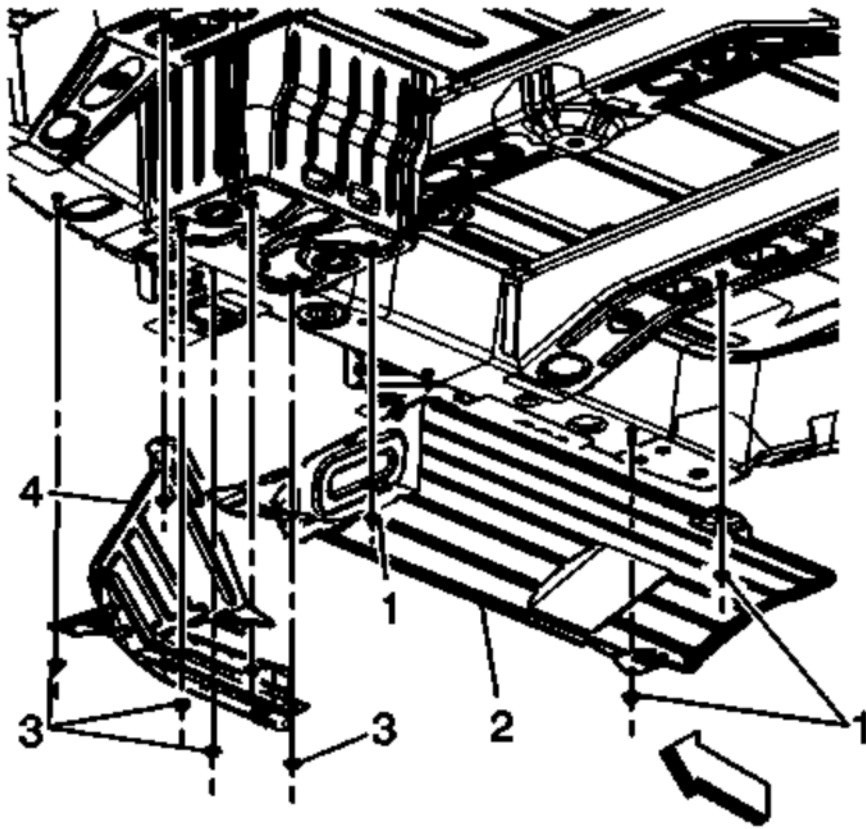


Fig. 32: Identifying Exhaust Muffler Heat Shield
Courtesy of GENERAL MOTORS COMPANY

2. Install the exhaust muffler heat shield nuts (1).

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the nuts to 9 N.m (80 lb in).

3. Position the exhaust muffler front heat shield (4) to the floor panel.
4. Install the exhaust muffler front heat shield nuts (3).

Tighten

Tighten the nuts to 9 N.m (80 lb in).

5. Install the muffler assembly. Refer to Exhaust Muffler Replacement (NB5) and Exhaust Muffler

Replacement (NEA/NED or N10).

DESCRIPTION AND OPERATION

EXHAUST SYSTEM DESCRIPTION

IMPORTANT: Use of non-OEM parts may cause driveability concerns.

The exhaust system carries exhaust gases, treated by the catalytic converter, through a resonator, if applicable and into the exhaust muffler where exhaust noise is lessened.

In order to secure the exhaust pipe to the exhaust manifold, a flange and seal-joint coupling is utilized. The exhaust system may utilize a slip-joint coupling design with a clamp and a U-bolt or a flange connection with a gasket.

Exhaust hangers and rubber insulators help to support the weight of the exhaust pipe along with insulating any exhaust system vibration, rattle or noise.

Exhaust hangers also space the exhaust system away from the underbody of the vehicle and allows the exhaust system to expand as the exhaust system warms up.

Exhaust heat shields are used to protect the body and other components from damage due to the heat from the exhaust system.

The exhaust system may be comprised of the following components:

- Exhaust manifold
- Exhaust pipes
- Catalytic converters
- Exhaust muffler
- Exhaust resonator, if equipped
- Exhaust tail pipe, if equipped
- Exhaust hangers
- Exhaust heat shields

Resonator

Some exhaust systems are equipped with a resonator. The resonator, located either before or after the muffler, allows the use of mufflers with less back pressure. Resonators are used when vehicle characteristics require specific exhaust tuning.

Catalytic Converter

The catalytic converter is an emission control device used to reduce hydrocarbons (HC), carbon monoxide (CO)

and oxides of nitrogen (NOx) pollutants from the exhaust gas.

The catalytic converter is comprised of a ceramic monolith substrate, supported in insulation and housed within a sheet metal shell. The substrate may be washcoated with 3 noble metals:

- Platinum (Pt)
- Palladium (Pd)
- Rhodium (Rh)

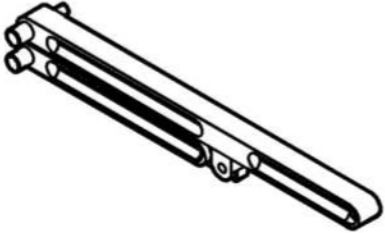
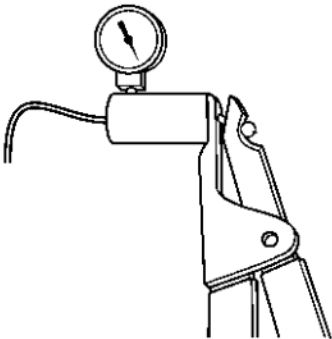
The catalyst in the catalytic converter is not serviceable.

Muffler

The exhaust muffler reduces the noise levels of the engine exhaust by the use of tuning tubes. The tuning tubes create channels inside the exhaust muffler that lower the sound levels created by the combustion of the engine.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	EN 35314-A J 35314-A Exhaust Back Pressure Gauge
	J 35555 Vacuum Pump