

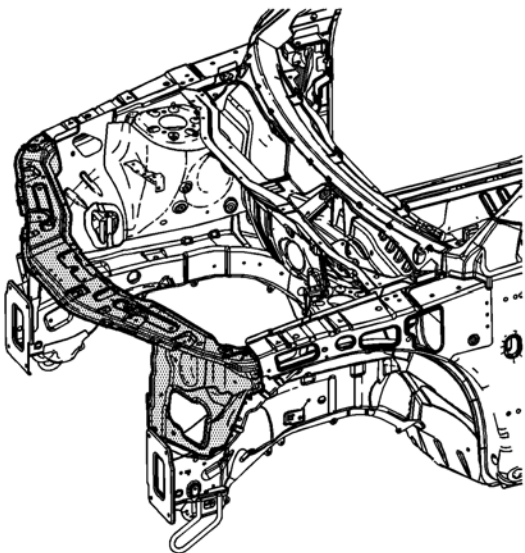
Collision Repair

- Tie Bar Replacement
- Front Wheelhouse Replacement
- Front Compartment Upper Side Rail Replacement
- Plenum Upper Panel Replacement
- Front Compartment Front Rail Replacement
- Front Hinge Pillar Body Sectioning
- Roof Outer Panel Replacement
- Floor Panel Replacement - Center
- Rear Floor Panel Replacement
- Body Rear End Panel Replacement
- Center Pillar Sectioning
- Quarter Panel Replacement
- Rear Rail Replacement
- Specifications:
- Dimensions C100 long body
- Dimensions C105 short body

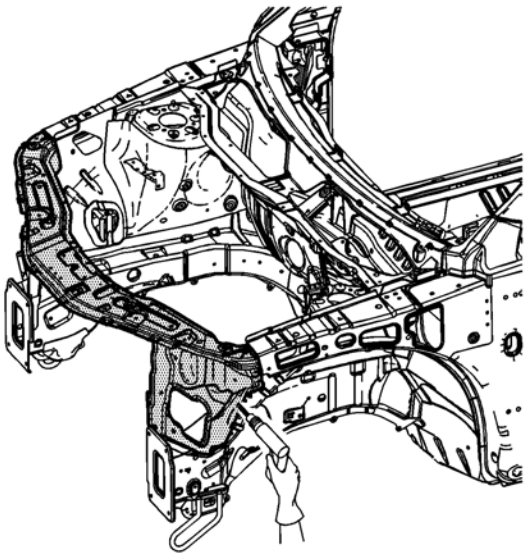
Tie Bar Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

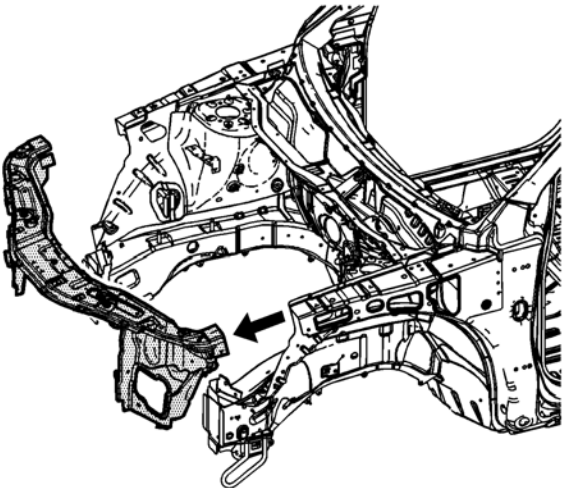


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



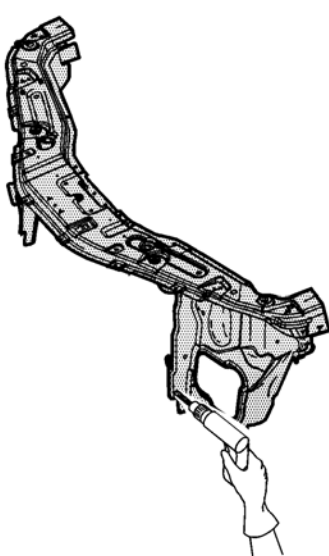
Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the tie bar assembly.



7. Remove the damaged tie bar assembly.

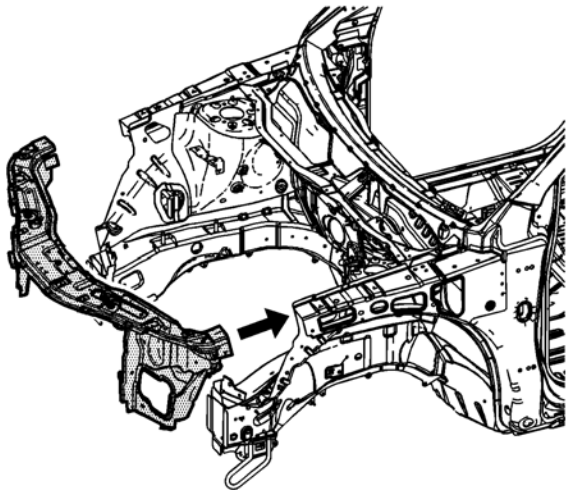
Installation Procedure



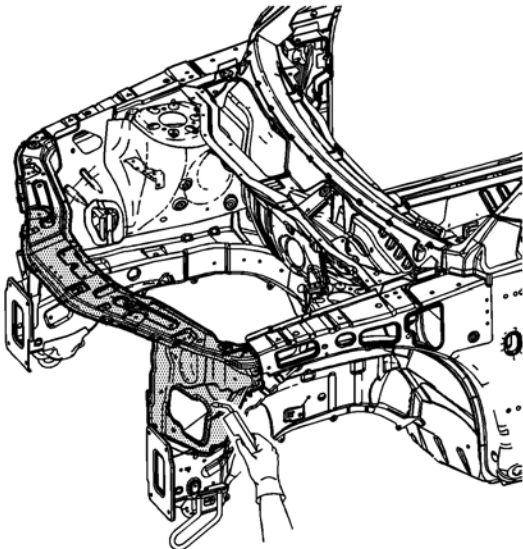
Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



4. Position the tie bar assembly to the vehicle using 3-dimensional measuring equipment. Clamp the tie bar assembly into place.

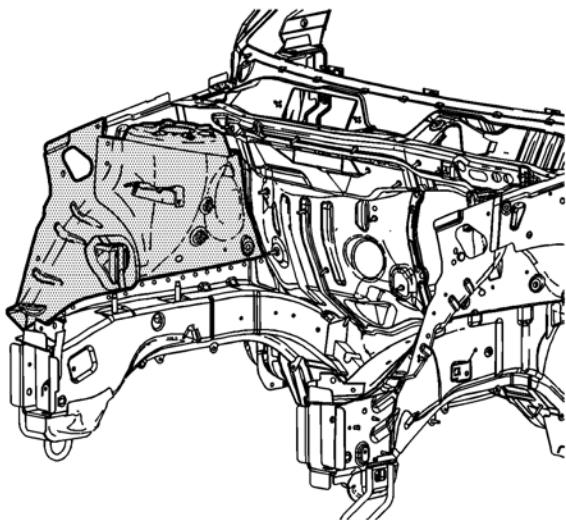


5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

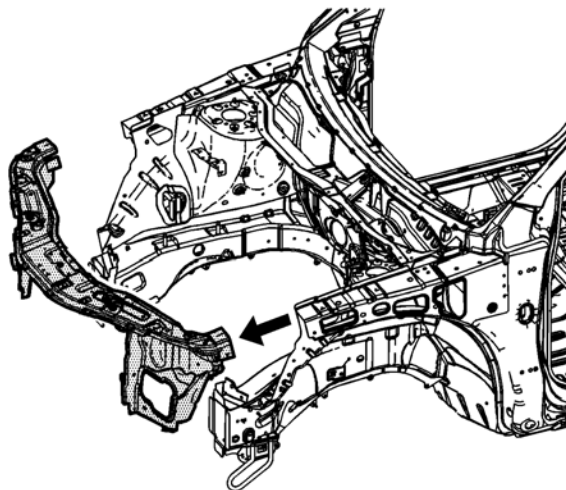
Front Wheelhouse Replacement

Removal Procedure

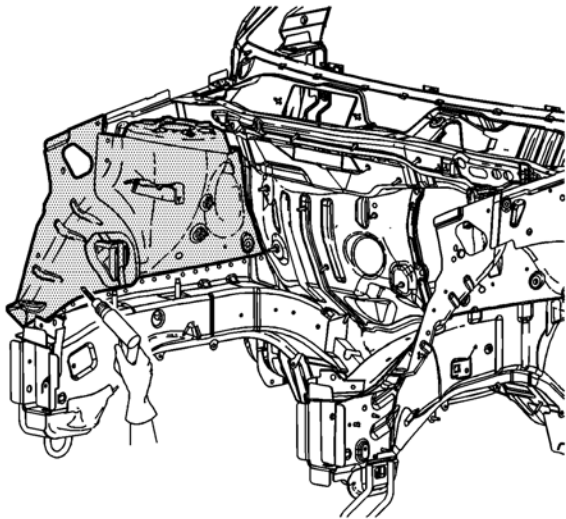
Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.



1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .

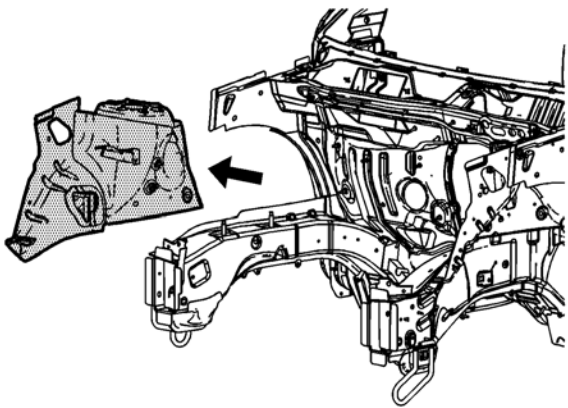


6. Remove the front tie bar. Refer to [Tie Bar Replacement](#) .



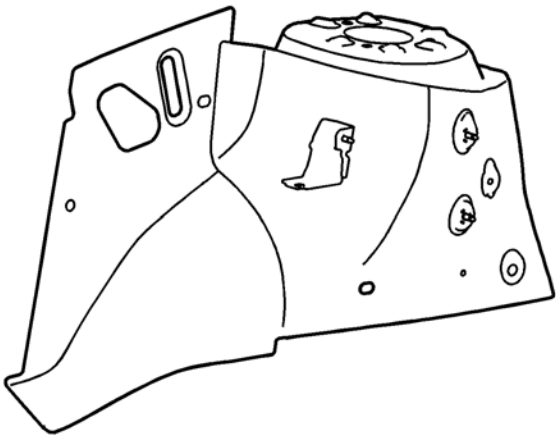
Important: Do not damage any inner panels or reinforcements.

7. Locate and drill out all factory welds. Note the number and location of the welds for installation of the front wheelhouse.



8. Remove the damaged front wheelhouse.

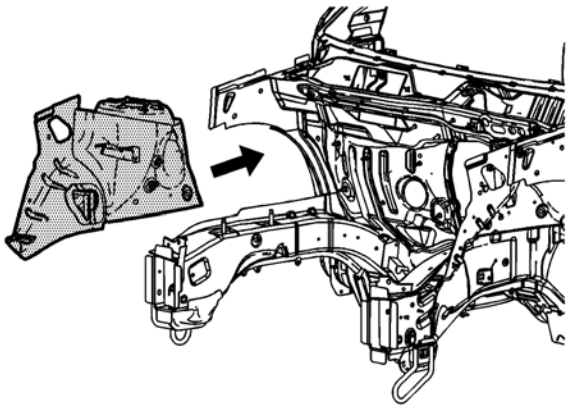
Installation Procedure



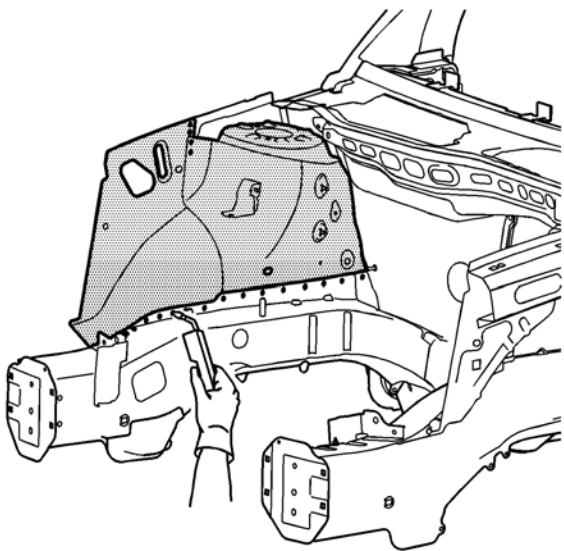
Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

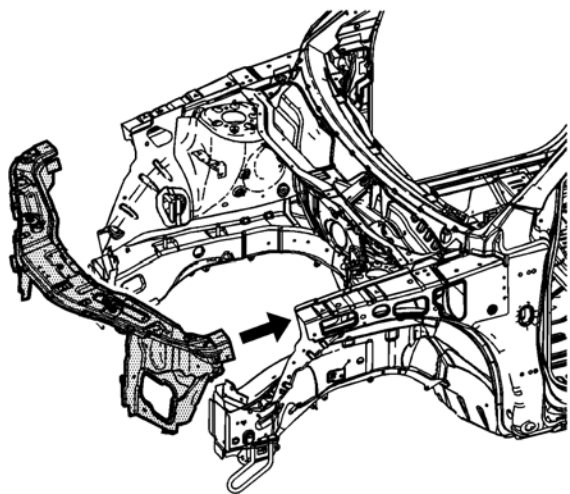
1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



4. Position the front wheelhouse to the vehicle using 3-dimensional measuring equipment. Clamp the front wheelhouse into place.



5. Plug weld accordingly.

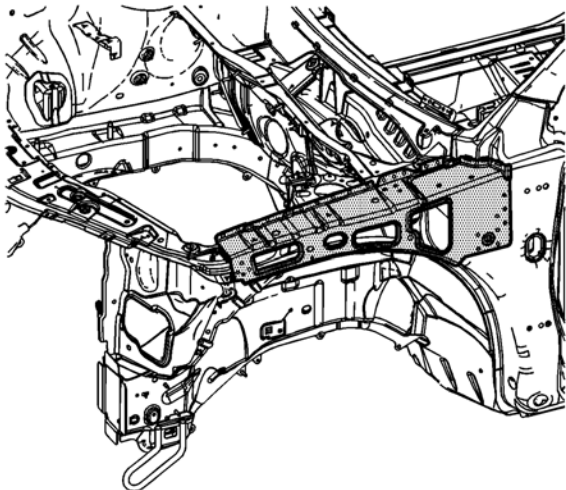


6. Replace the tie bar. Refer to [Tie Bar Replacement](#) .
7. Clean and prepare all welded surfaces.
8. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
9. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
10. Install all related panels and components.
11. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
12. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

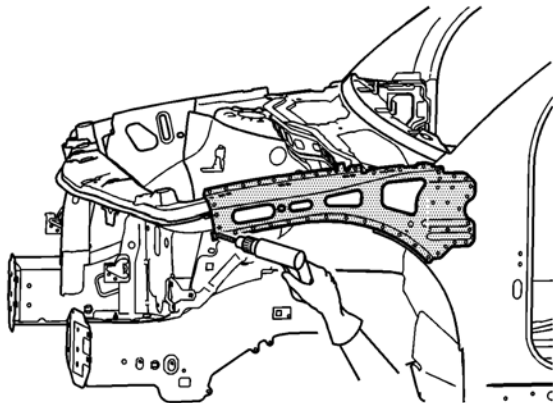
Front Compartment Upper Side Rail Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

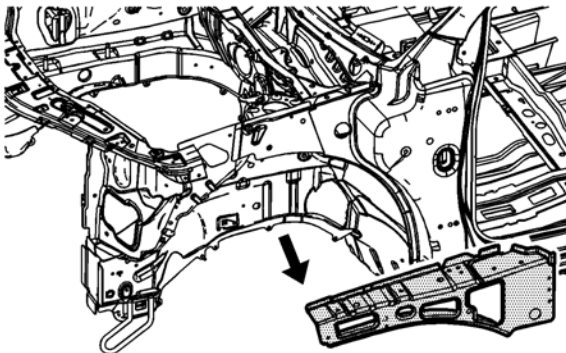


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



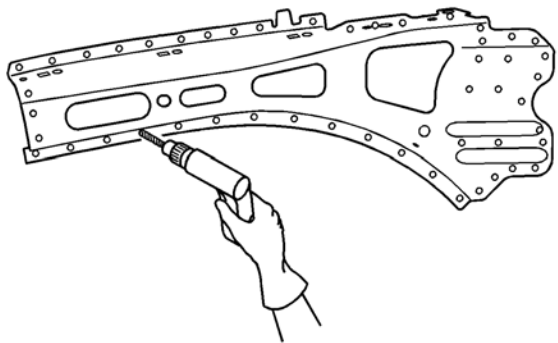
Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the front upper outer rail.



7. Remove the damaged front upper outer rail.

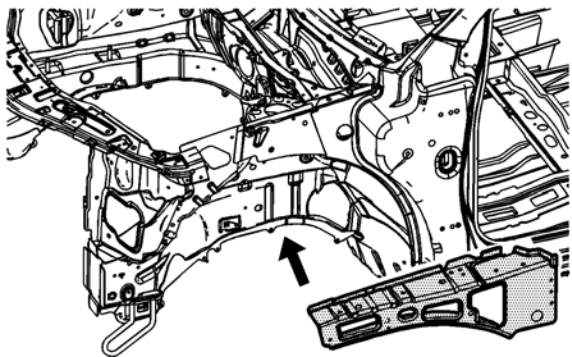
Installation Procedure



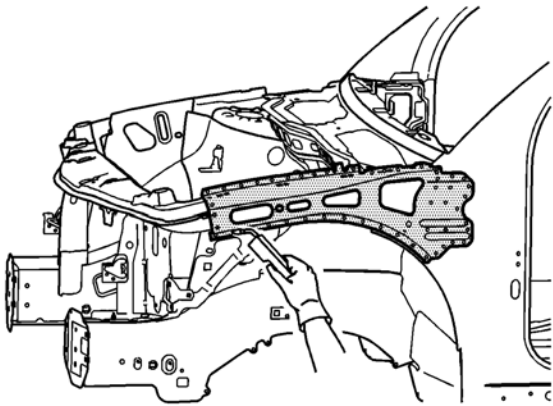
Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



4. Position the front upper outer rail to the vehicle using 3-dimensional measuring equipment. Clamp the front upper outer rail into place.

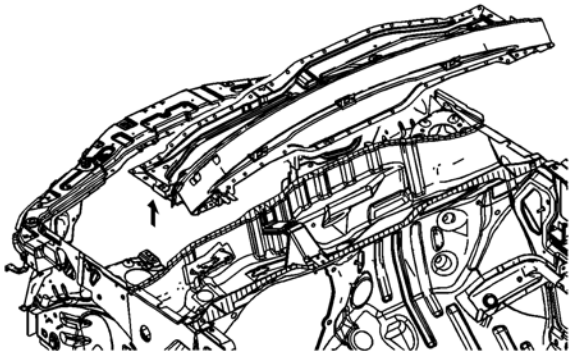


5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

Plenum Upper Panel Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

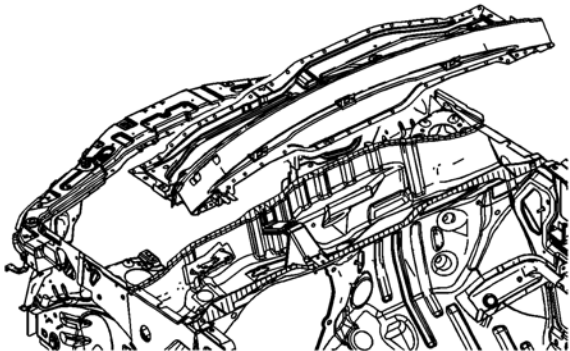


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .

Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the plenum top panel.
7. Remove the damaged plenum top panel.

Installation Procedure



Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

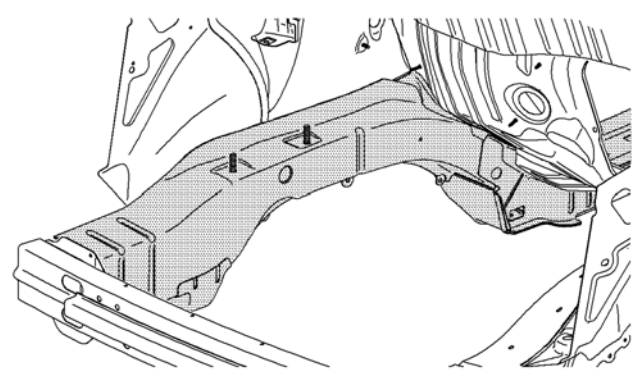
Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.
4. Position the plenum top panel to the vehicle using 3-dimensional measuring equipment. Clamp the plenum top panel into place.
5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

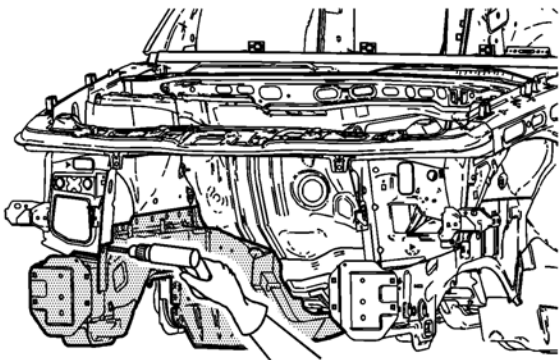
Front Compartment Front Rail Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

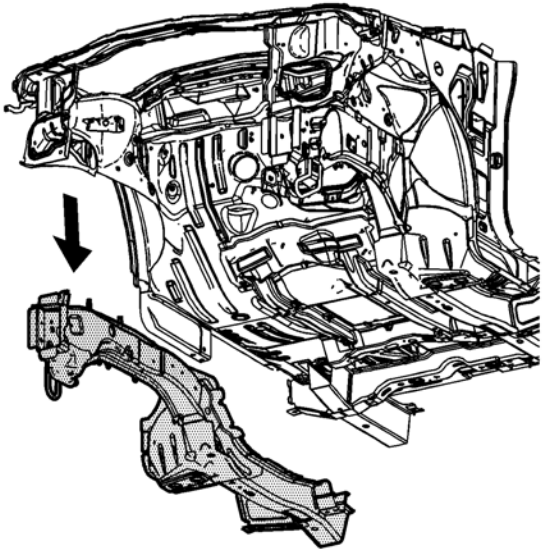


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#)
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the front lower rail.



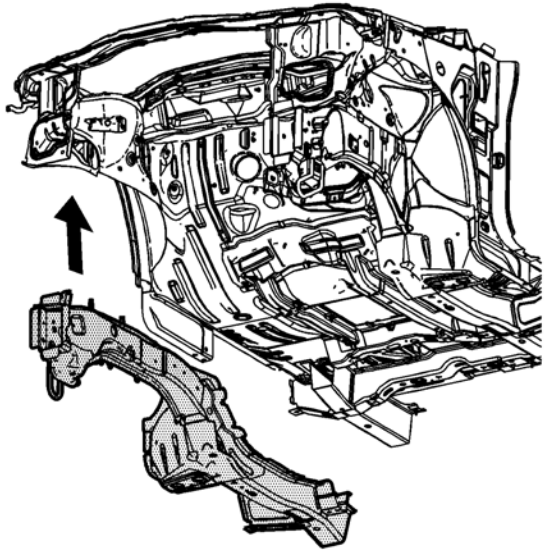
7. Remove the damaged front lower rail.

Installation Procedure

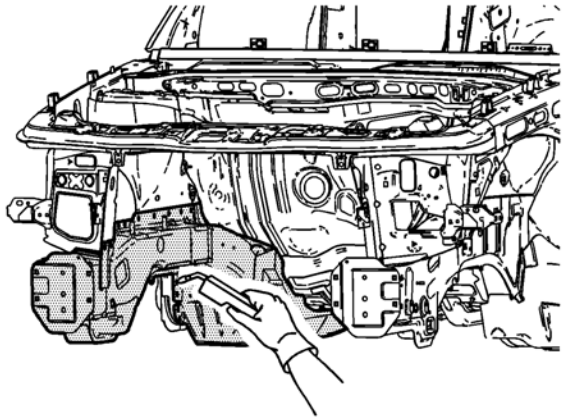
Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



4. Position the front lower rail to the vehicle using 3-dimensional measuring equipment. Clamp the front lower rail into place.



5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

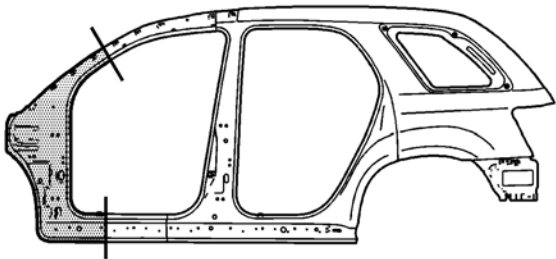
Front Hinge Pillar Body Sectioning

Removal Procedure

Important: Section in specified areas only. Sectioning outside of these areas may compromise the structural integrity of the vehicle. The door frame can be replaced at factory seams, but requires the removal of the windshield and the roof. The sectioning procedures have been developed as a more cost-effective alternative to complete replacement. The specific area to be sectioned is determined by the extent of the damage to the vehicle.

Important: When replacing panels that involve servicing of stationary glass, refer to [Urethane Adhesive Installation of Stationary Windows](#) before performing any priming or refinishing.

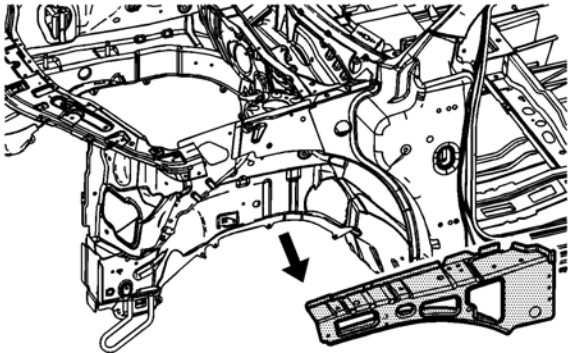
1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .



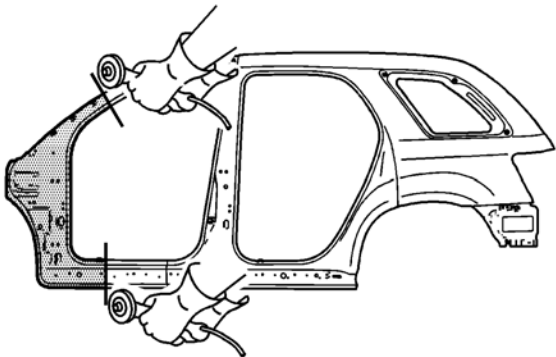
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .

Caution: Foam sound deadeners must be removed from areas within 152.4 mm (6 in) of where flame is to be used for body repairs. When reinstalling foam sound deadeners, avoid inhaling fumes as bodily injury may result.

5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .

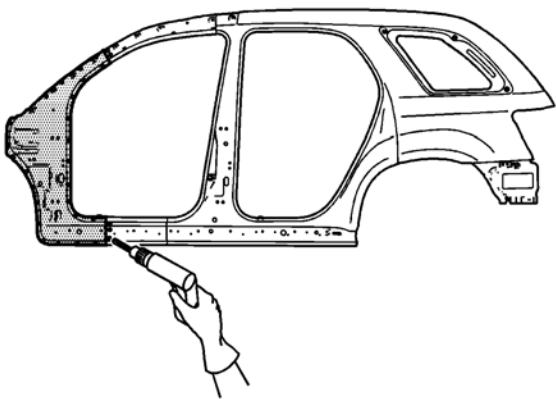


6. Remove the front upper rail. Refer to [Front Compartment Upper Side Rail Replacement](#) .



Important: Do NOT damage any inner panels or reinforcements.

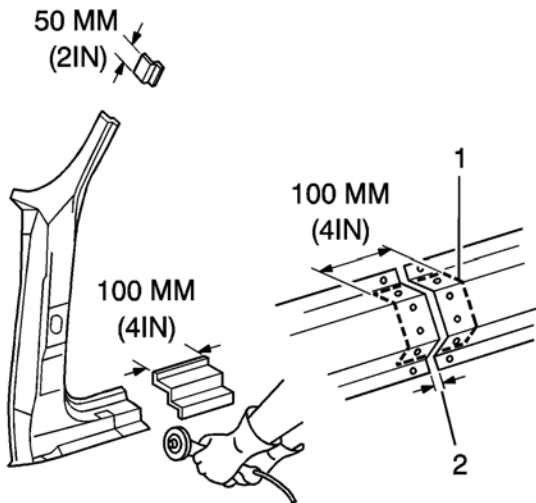
7. Cut the panel where sectioning is to be performed.



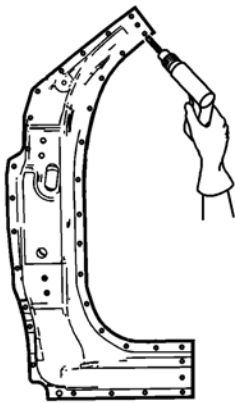
- 8. Locate and drill out all factory welds. Note the number and location of the welds for installations of the service part.
- 9. Remove the damaged windshield pillar section.

Installation Procedure

- 1. Cut the replacement windshield pillar section in corresponding locations to fit the original panel. The sectioning joint should be trimmed to allow 1½ times the metal thickness at the sectioning joint.

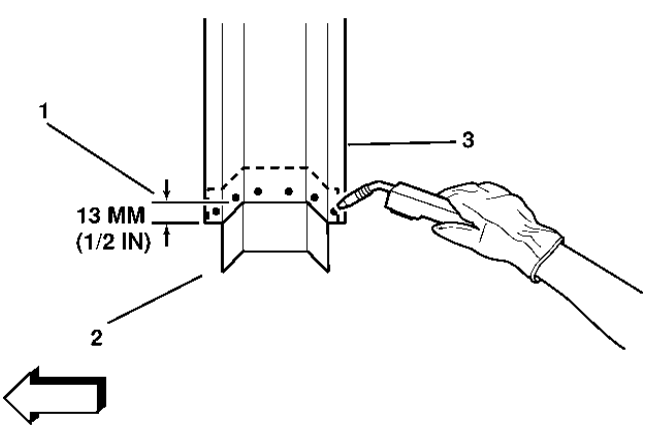


- 2. Create a 50-mm (2-in) backing plate (1) from the unused portion of the service part. Trim the backing plate as necessary to fit behind the sectioning joint where there is no reinforcement.
- 3. Drill 8-mm (5/16-in) plug weld holes along the sectioning cut on the remaining original part. Locate these holes 13 mm (1/2 in) from the edge and spaced 40 mm (1½ in) apart.

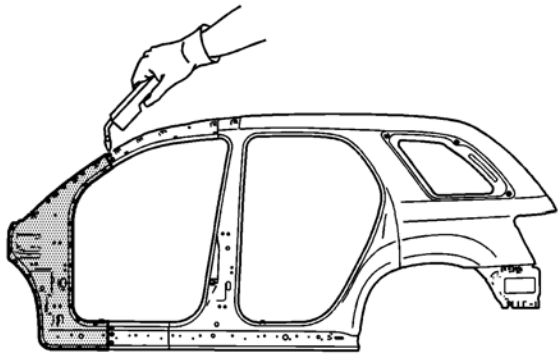


Important: In any area damaged beyond recognition, or if structural Weld-Thru adhesive is present, space the plug weld holes 40 mm (1½ in) apart.

- 4. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel and along the sectioning cut.
- 5. Prepare all mating surfaces, as necessary.
- 6. Apply 3M® Weld-Thru coating P/N 05916 or equivalent, to all mating surfaces.



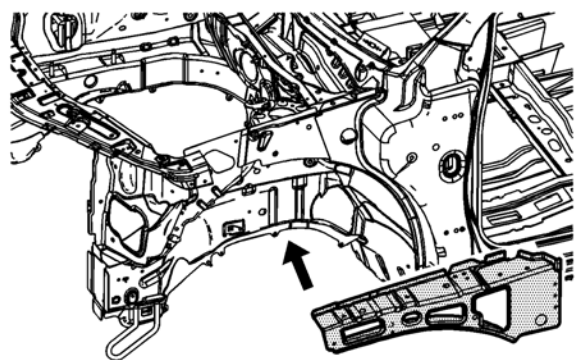
- 7. Fit the backing plate (2) halfway into the sectioning joint, clamp and plug weld to the vehicle.
- 8. Position the service part.



- 9. Plug weld accordingly.

Important: To create a solid weld with minimum heat distortion make 25-mm (1-in) stitch welds along the seam with 25-mm (1-in) gaps between. Then go back and complete the stitch weld.

- 10. Stitch weld the sectioning joint.
- 11. Clean and prepare all welded surfaces.



- 12. Install the front upper rail. Refer to [Front Compartment Upper Side Rail Replacement](#) .
- 13. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
- 14. Paint and repair the area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
- 15. Install all related panels and components.
- 16. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
- 17. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

Roof Outer Panel Replacement

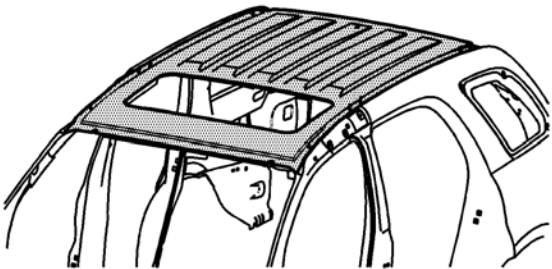
Removal Procedure

This repair procedure includes an installation procedure for either metal-inert gas welding or adhesive bonding.

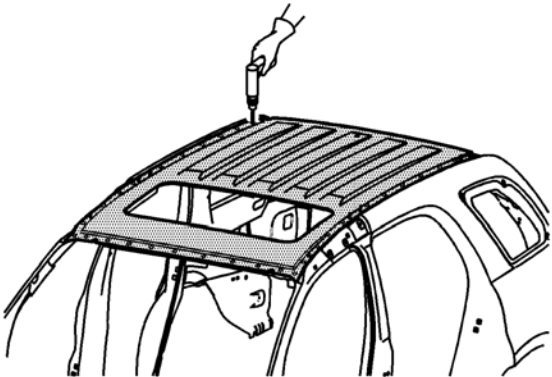
Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

Important: When replacing panels that involve servicing of stationary windows, refer to [Urethane Adhesive Installation of Stationary Windows](#) before performing any priming or refinishing.

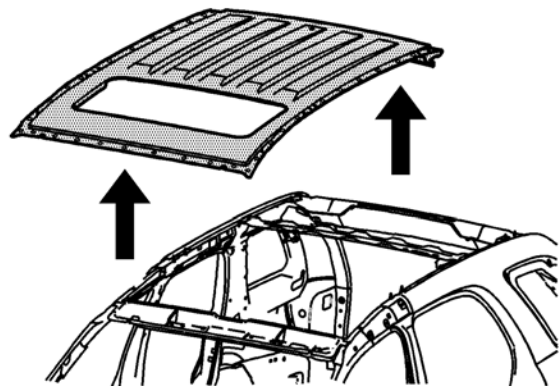
1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .



3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
6. Remove the windshield. Refer to [Windshield Replacement](#) .
7. Remove the liftgate. Refer to [Liftgate Replacement](#) .

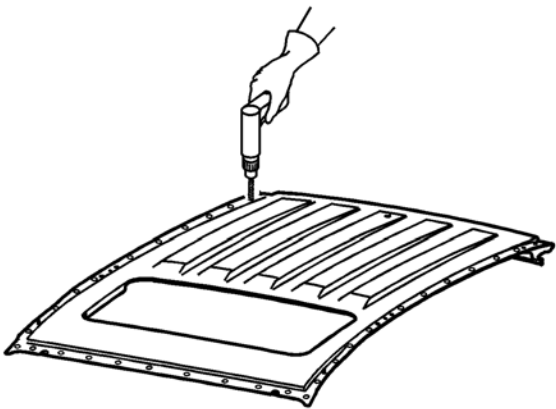


8. Locate and drill out all factory welds. Note the number and location of welds for installation of the roof panel.



9. With the aid of an assistant, remove the roof panel.

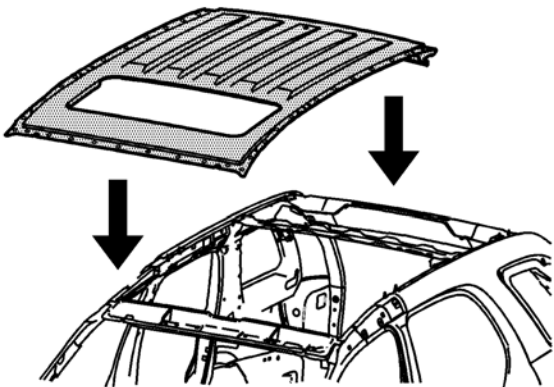
Installation Procedure



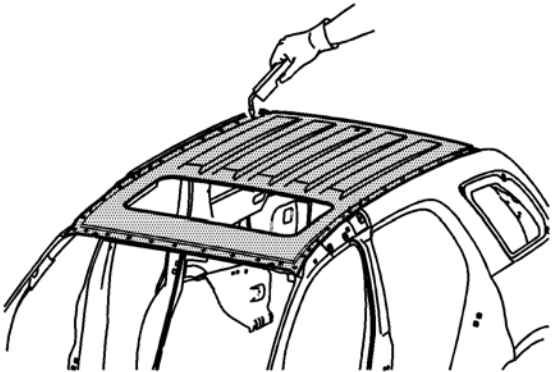
- 1. Drill 8-mm (5/16-in) plug weld holes as necessary in locations noted from the original panel.

Important: If the location of the original plug weld holes can not be determined, or if structural weld-thru adhesive is present, space the plug weld holes every 40 mm (1½ in) apart.

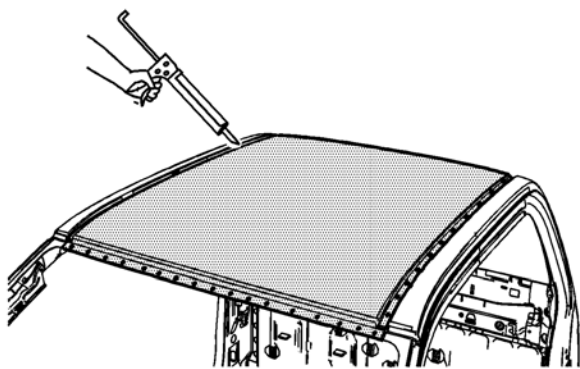
- 2. Prepare all mating surfaces as necessary.
- 3. Apply 3M® Weld-Thru coating P/N 05916 or equivalent to all mating surfaces



- 4. With the aid of an assistant, position the roof panel to the body.



- 5. Plug weld accordingly.
- 6. Clean and prepare all welded surfaces.

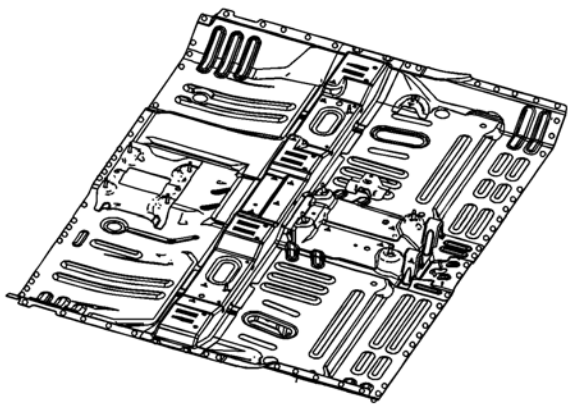


7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install the windshield. Refer to [Windshield Replacement](#) .
10. Install the liftgate. Refer to [Liftgate Replacement](#) .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
13. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

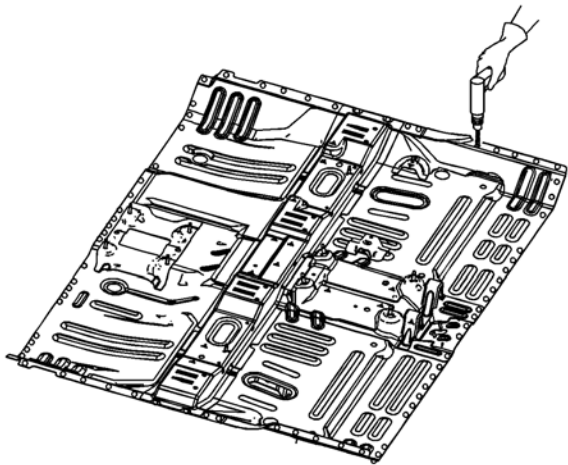
Floor Panel Replacement - Center

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

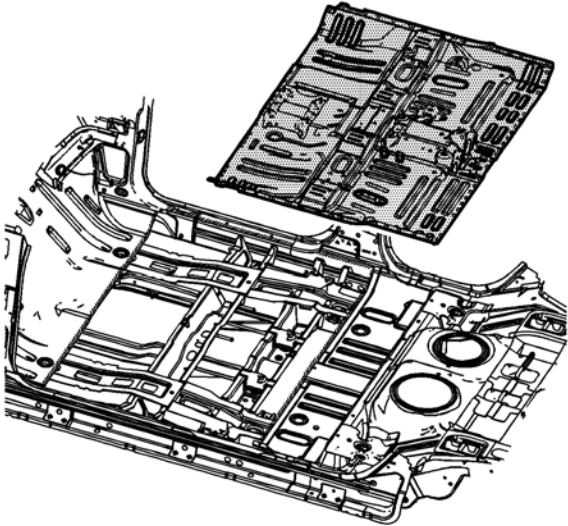


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the center floor panel .



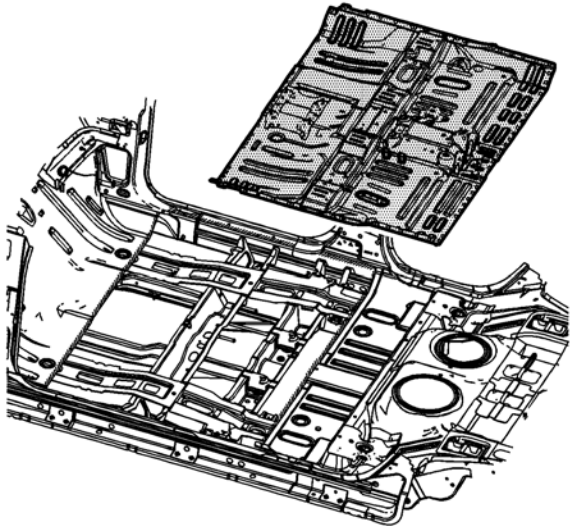
7. Remove the damaged center floor panel .

Installation Procedure

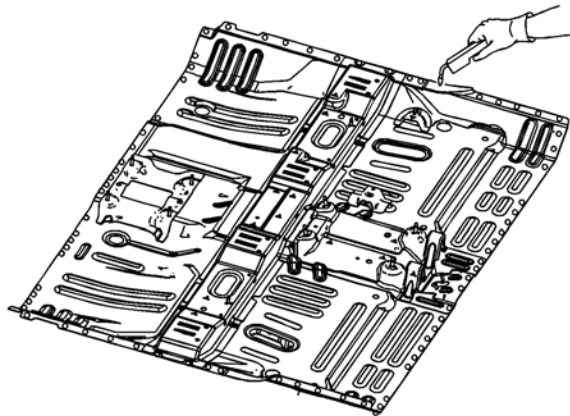
Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



4. Position the center floor panel to the vehicle using 3-dimensional measuring equipment. Clamp the center floor panel into place.

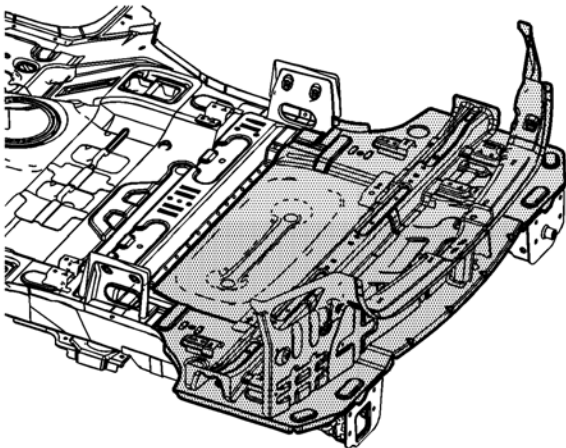


5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#).
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#).
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#).

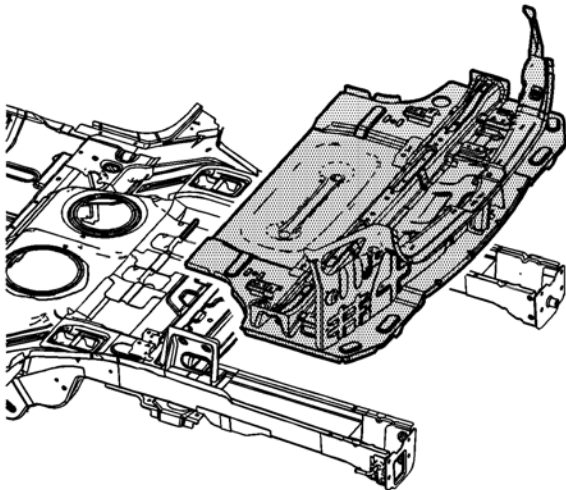
Rear Floor Panel Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.



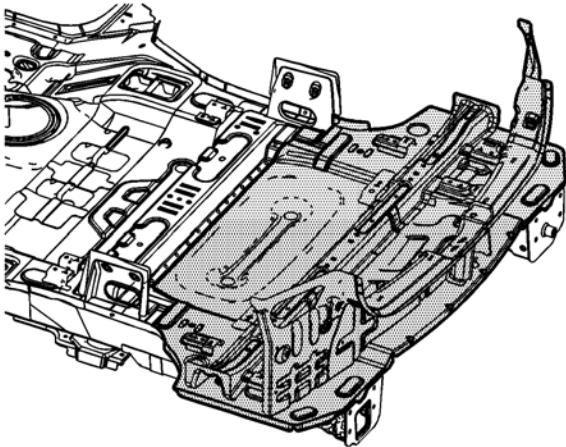
1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the rear floor panel .
7. Remove the damaged rear floor panel .

Installation Procedure



Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

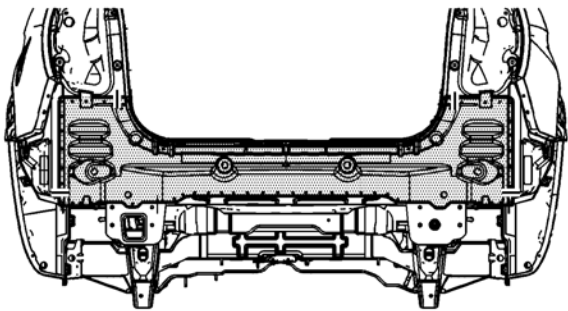
Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.
4. Position the rear floor panel to the vehicle using 3-dimensional measuring equipment. Clamp the rear floor panel into place.
5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

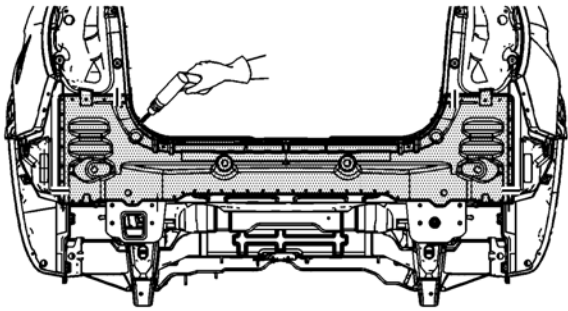
Body Rear End Panel Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

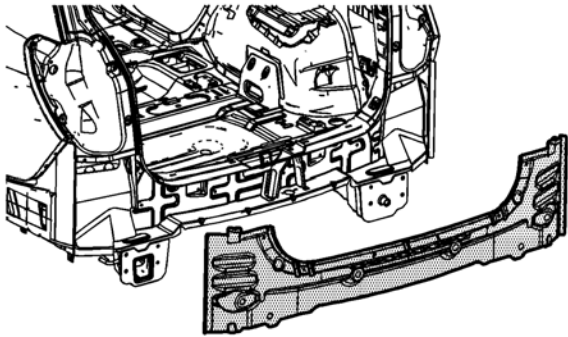


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



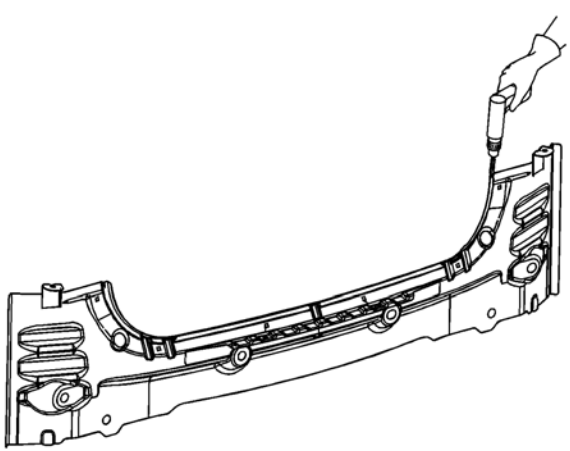
Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the rear end panel.



7. Remove the damaged rear end panel.

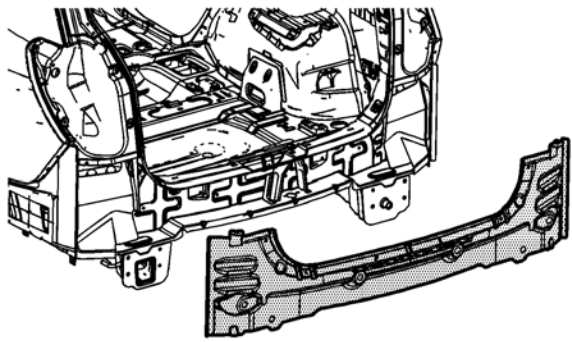
Installation Procedure



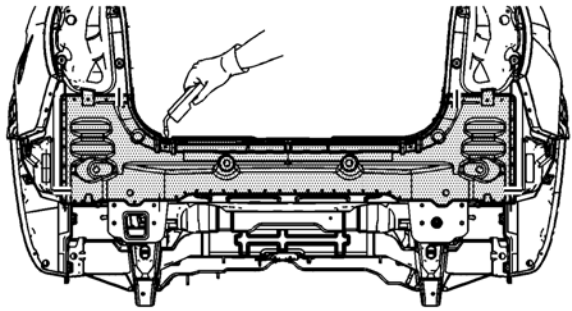
Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



4. Position the rear end panel to the vehicle using 3-dimensional measuring equipment. Clamp the rear end panel into place.



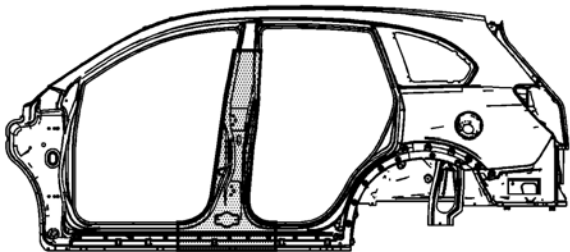
5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

Center Pillar Sectioning

Removal Procedure

Important: Section in specified areas only. Sectioning outside of these areas may compromise the structural integrity of the vehicle. The door frame can be replaced at factory seams, but requires the removal of the windshield and the roof. The sectioning procedures have been developed as a more cost-effective alternative to complete replacement. The specific area to be sectioned is determined by the extent of the damage to the vehicle.

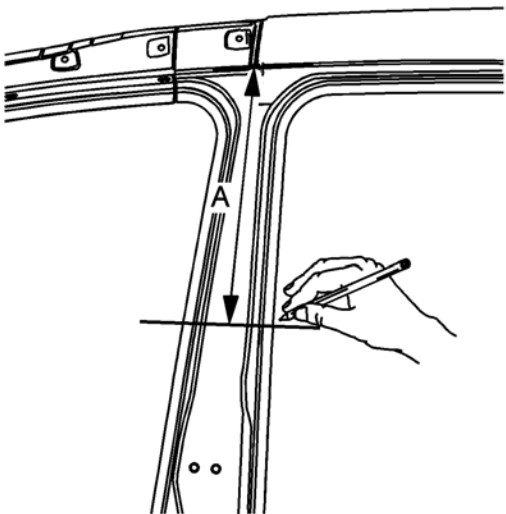
1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .



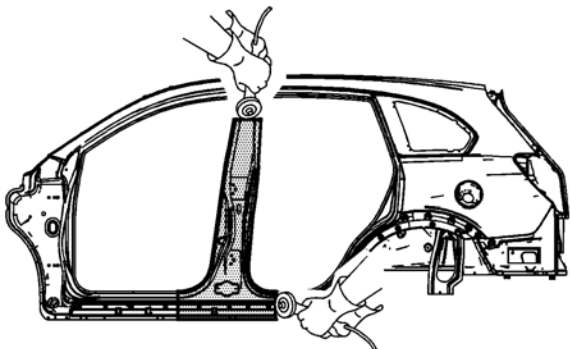
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .

Caution: Foam sound deadeners must be removed from areas within 152.4 mm (6 in) of where flame is to be used for body repairs. When reinstalling foam sound deadeners, avoid inhaling fumes as bodily injury may result.

5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .

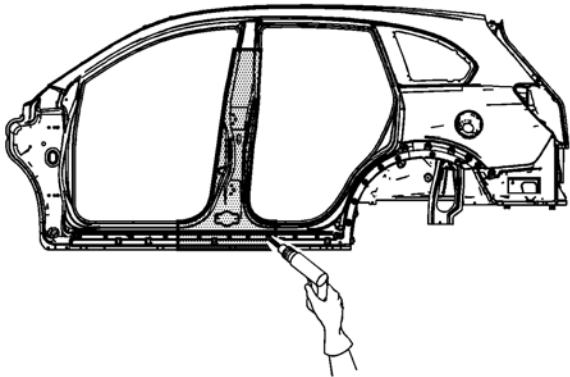


6. On the original outer door frame, measure down from the lower edge of the door opening 135 mm (5.3 in) (A) and mark a horizontal line.



Important: Do NOT damage any inner panels or reinforcements.

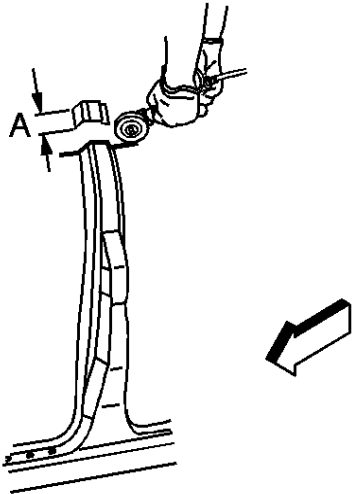
7. Cut the panel where sectioning is to be performed.



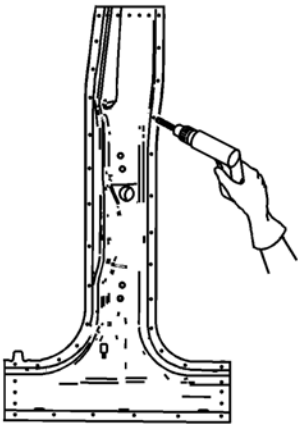
8. Locate and drill out all factory welds. Note the number and location of the welds for installations of the service part.
9. Remove the damaged center pillar section.

Installation Procedure

1. Cut the replacement center pillar section in corresponding locations to fit the original panel. The sectioning joint should be trimmed to allow 1½ times the metal thickness at the sectioning joint.

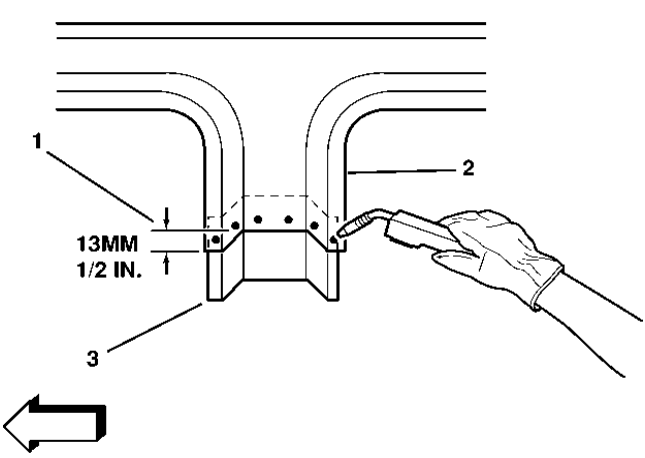


2. Create a 50-mm (2-in) backing plate (A) from the unused portion of the service part. Trim the backing plate as necessary to fit behind the sectioning joint where there is no reinforcement.
3. Drill 8-mm (5/16-in) plug weld holes along the sectioning cut on the remaining original part. Locate these holes 13 mm (1/2 in) from the edge and spaced 40 mm (1½ in) apart.

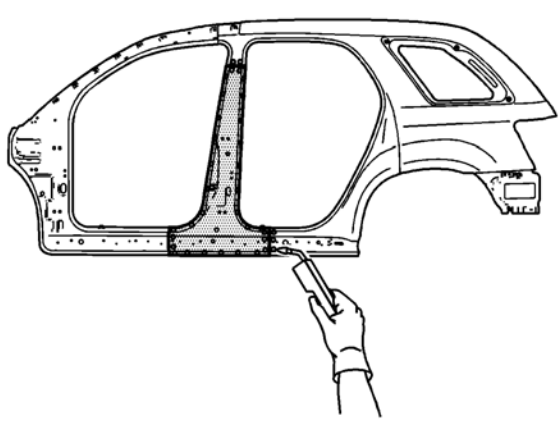


Important: In any area damaged beyond recognition, or if structural Weld-Thru adhesive is present, space the plug weld holes 40 mm (1½ in) apart.

4. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel and along the sectioning cut.
5. Prepare all mating surfaces as necessary.
6. Apply 3M® Weld-Thru coating P/N 05916 or equivalent, to all mating surfaces.



- 7. Fit the backing plate halfway into the sectioning joint, clamp and plug weld to the vehicle.
- 8. Position the center pillar.



- 9. Plug weld accordingly.

Important: To create a solid weld with minimum heat distortion make 25-mm (1-in) stitch welds along the seam with 25-mm (1-in) gaps between. Then go back and complete the stitch weld.

- 10. Stitch the weld sectioning joint.
- 11. Clean and prepare all welded surfaces.
- 12. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
- 13. Paint and repair the area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
- 14. Install all related panels and components.
- 15. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
- 16. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

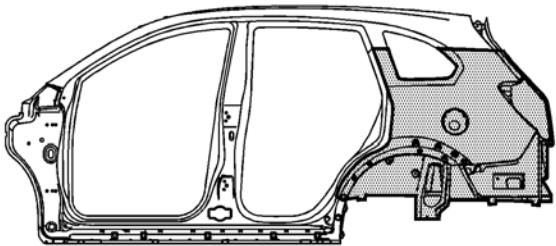
Quarter Panel Replacement

Removal Procedure

Important: Section in specified areas only. Sectioning outside of these areas may compromise the structural integrity of the vehicle. The door frame can be replaced at factory seams, but requires the removal of the windshield and the roof. The sectioning procedures have been developed as a more cost-effective alternative to complete replacement. The specific area to be sectioned is determined by the extent of the damage to the vehicle.

Important: When replacing panels that involve servicing of stationary glass, refer to [Urethane Adhesive Installation of Stationary Windows](#) before performing any priming or refinishing.

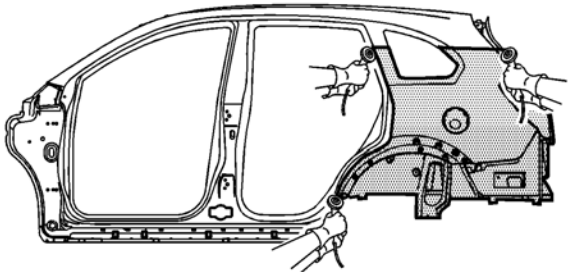
1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .



3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .

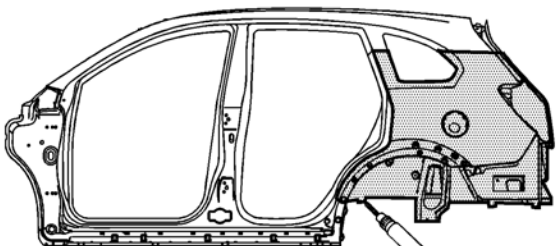
Caution: Foam sound deadeners must be removed from areas within 152.4 mm (6 in) of where flame is to be used for body repairs. When reinstalling foam sound deadeners, avoid inhaling fumes as bodily injury may result.

5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .



Important: Do NOT damage any inner panels or reinforcements.

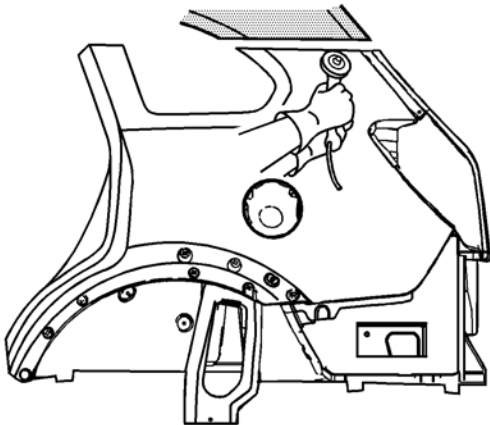
6. Cut the panel where sectioning is to be performed.



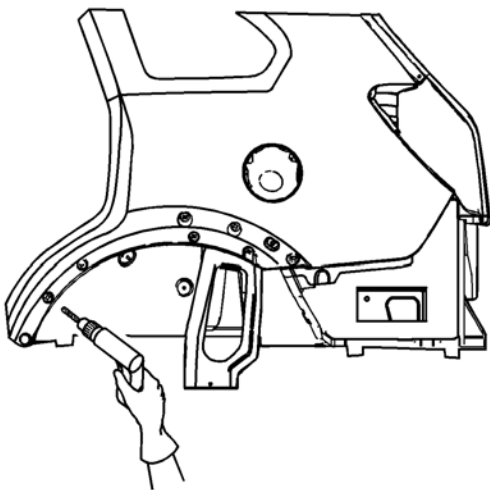
7. Locate and drill out all factory welds. Note the number and location of the welds for installations of the service part.
8. Remove the damaged quarter panel.

Installation Procedure

- 1. Cut the replacement quarter panel in corresponding locations to fit the original panel. The sectioning joint should be trimmed to allow 1½ times the metal thickness at the sectioning joint.

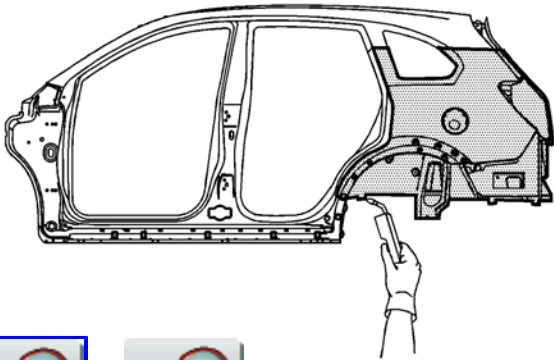


- 2. Create two 50-mm (2-in) backing plates and one 100-mm (4-in) backing plate from the unused portion of the service part. Trim the backing plates as necessary to fit behind the sectioning joints where no reinforcements exist.
- 3. Drill 8-mm (5/16-in) plug weld holes along the sectioning cut on the remaining original part. Locate these holes 13 mm (1/2 in) from the edge and spaced 40 mm (1½ in) apart.



Important: In any area damaged beyond recognition, or if structural Weld-Thru adhesive is present, space the plug weld holes 40 mm (1½ in) apart.

- 4. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel and along the sectioning cut.
- 5. Prepare all mating surfaces, as necessary.
- 6. Apply 3M® Weld-Thru coating P/N 05916 or equivalent, to all mating surfaces.
- 7. Fit the backing plates halfway into the sectioning joints, clamp and plug weld to the vehicle.
- 8. Position the quarter panel.

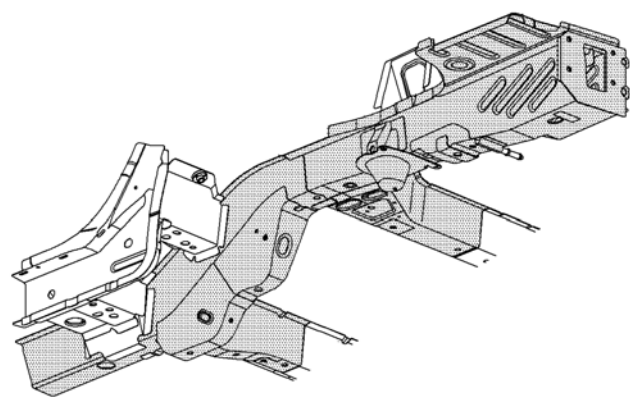


- 9. **Important:** To create a solid weld with minimum heat distortion make 25-mm (1-in) stitch welds along the seam with 25-mm (1-in) gaps between. Then go back and complete the stitch weld.
- 10. Stitch the weld sectioning joint.
- 11. Clean and prepare all welded surfaces.
- 12. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
- 13. Paint and repair the area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
- 14. Install all related panels and components.
- 15. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
- 16. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

Rear Rail Replacement

Removal Procedure

Caution: Refer to [Approved Equipment for Collision Repair Caution](#) in Cautions and Notices.

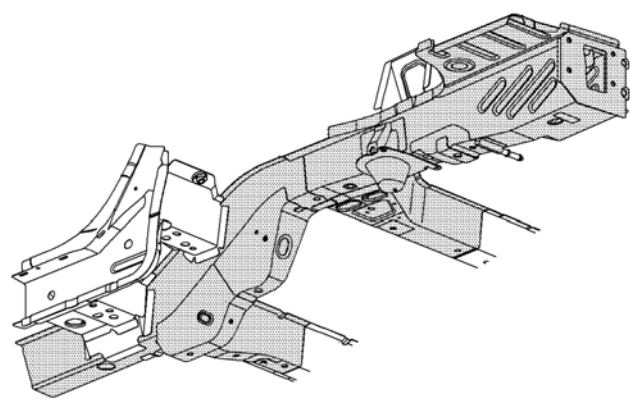


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#) .
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications. Refer to [Dimensions - Body](#) .
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .

Important: Do not damage any inner panels or reinforcements.

6. Locate and drill out all factory welds. Note the number and location of the welds for installation of the rear rail lower.
7. Remove the damaged rear rail.

Installation Procedure



Important: If the location of the original plug weld holes can not be determined, space the plug weld holes every 40 mm (1 1/2 in) apart.

Some panels may have structural weld-thru adhesive. It is necessary to replace the weld-thru adhesive with an additional spot weld between each factory spot weld.

1. Drill 8-mm (5/16-in) plug weld holes in the service part as necessary in the locations noted from the original panel.
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.
4. Position the rear rail lower to the vehicle using 3-dimensional measuring equipment. Clamp the rear rail lower into place.
5. Plug weld accordingly.
6. Clean and prepare all welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to [Anti-Corrosion Treatment and Repair](#) .
8. Paint the repair area. Refer to [Basecoat/Clearcoat Paint Systems](#) .
9. Install all related panels and components.
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
11. Enable the SIR system. Refer to [SIR Disabling and Enabling](#) .

Dimensions - Body (C 100/Long Body)

- Table 1:
Table 2:
Table 3:
- [Front Compartment Dimensions](#)
[Body Dimensions \(Long Body\)](#)
[Underbody Dimensions](#)

Three Dimensional Distance -- X, Y, Z

This universal measuring system is capable of simultaneously dimensioning the length, width, and height of a datum plane. Three dimensional distances are used for both underbody and upperbody measuring.

X = Fore and aft measurements along the center line of the vehicle. An O plane is located forward of the master gage hole at the front of the vehicle. All measurements are made from this plane toward the rear of the vehicle.

Y = Cross car dimensions. Positive values are measured from the center of the vehicle to the right side of the vehicle. Negative values are measured from the center of the vehicle to the left side. When values are not listed separately to change the side of the vehicle, you need only to change the Y dimensions to the opposite value, + or -, from what is listed.

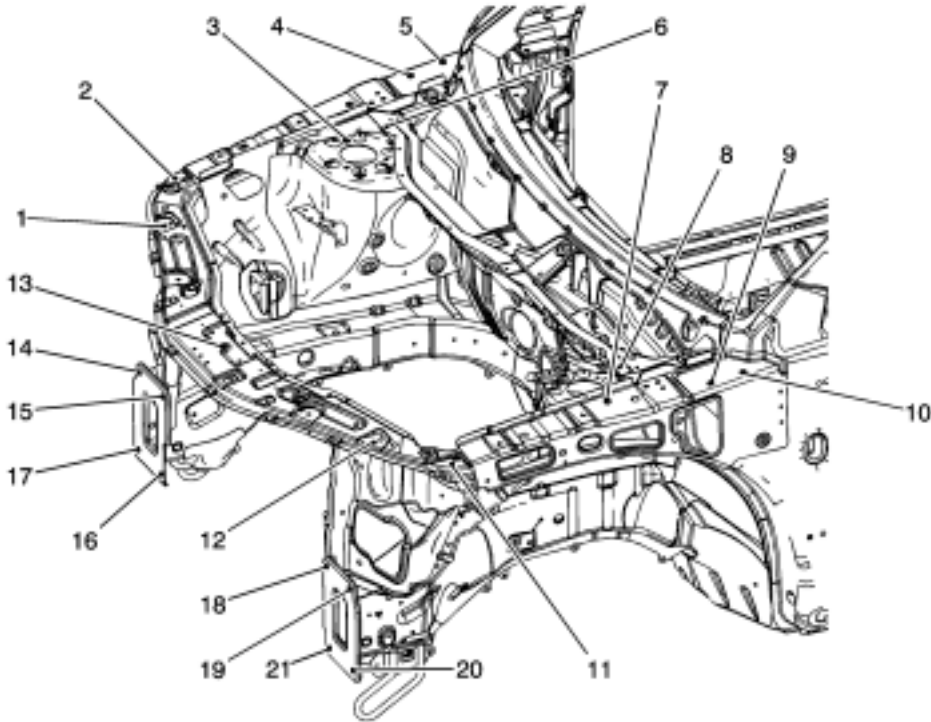
Z = Vertical measurement from the datum plane below the rocker panel lower flange edge (O plane).

All dimensions are symmetrical, unless otherwise noted.

In order to properly repair the spaceframe, restore the vehicle to the XYZ dimensions, as originally built. Relational (linear) dimensions are for reference only. Use relational dimensions for diagnosis or inspection only. Relational dimensions are not as accurate as XYZ dimensions and measuring systems.

The gage holes shown are the actual fixture locations that are used to build the vehicle.

Front Compartment

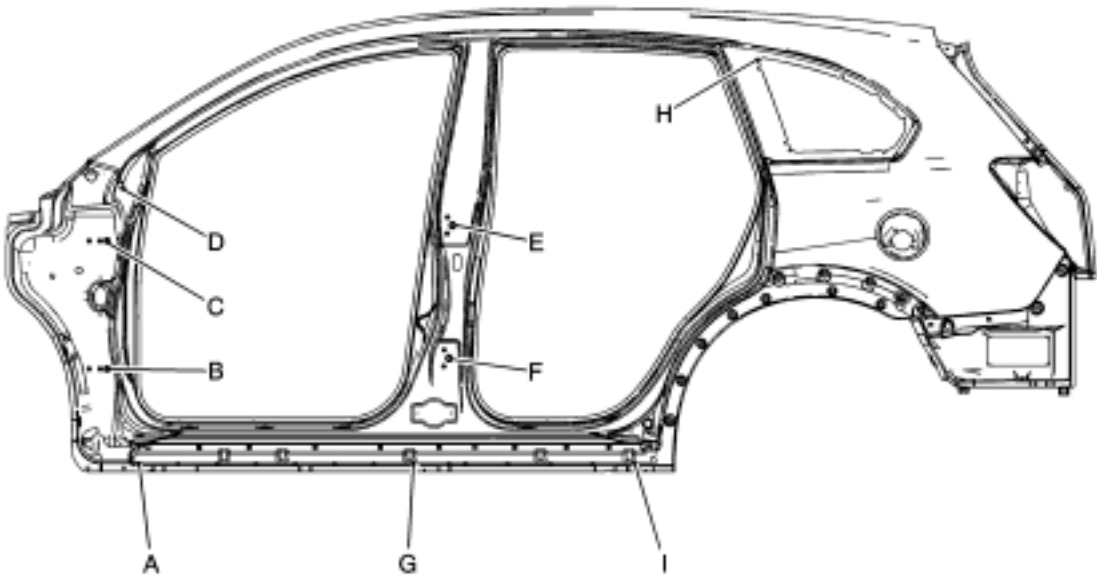


Front Compartment Dimensions

Location	Description	Length = x	Width = y	Height = z	Point to Point
1	Hole	1187	540	904	x
2	Hole	1299	713	9080	x
3	Strut Attachment Hole	1698	648	934	x
4	Hood Hinge Hole	1919	760	987	x
5	Hood Hinge Hole	2003	773	996	x
6	Air Inlet Grille Attachment Hole	1776	600	977	x
7	Hole	1698	648	934	x
8	Air Inlet Grille Attachment Hole	1776	600	977	x
9	Hood Hinge Hole	1919	760	987	x
10	Hood Hinge Hole	2003	773	996	x
11	Hole	1299	713	908	x
12	Hole	1187	540	904	x
13	Hood Striker Attachment Hole	1071	0	903	x
14	Impact Bar Attachment Hole	1122	540	533	x
15	Impact Bar Attachment Hole	1122	423	531	x
16	Impact Bar Attachment Hole	1122	434	320	x
17	Impact Bar Attachment Hole	1122	554	324	x
18	Impact Bar Attachment Hole	1122	423	531	x
19	Impact Bar Attachment Hole	1122	540	533	x

20	Impact Bar Attachment Hole	1122	554	324	x
21	Impact Bar Attachment Hole	1122	534	320	x
14 to 19	x	x	x	x	1080
15 to 18	x	x	x	x	846
2 to 11	x	x	x	x	1426
4 to 11	x	x	x	x	1600
2 to 9	x	x	x	x	1600
16 to 21	x	x	x	x	868
All dimensions are measured from a zero line, a center line, and a common datum. All dimensions are symmetrical unless otherwise specified.					

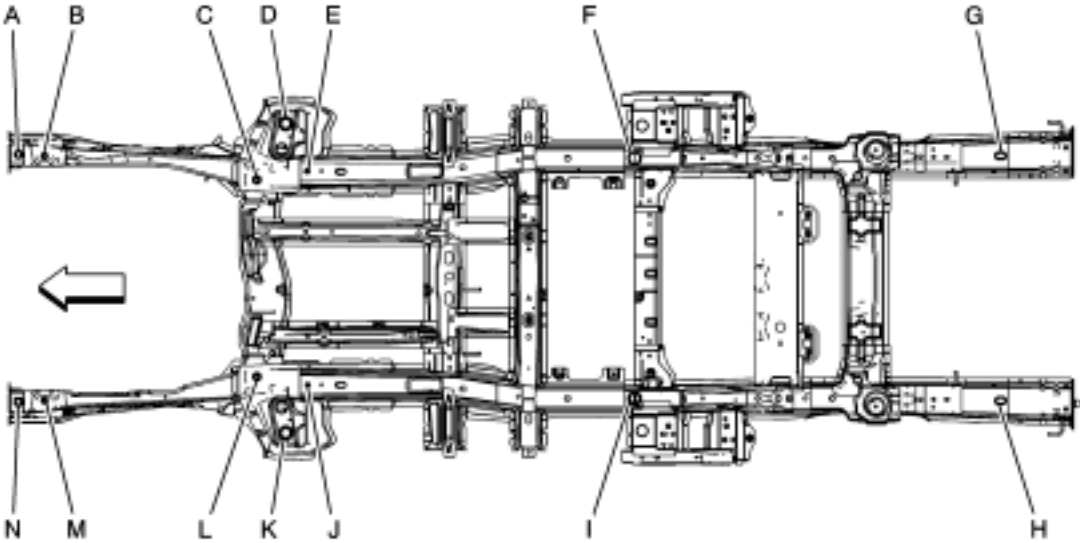
Body Side



Body Dimensions (Long Body)

Location	Length
A-G	840 mm
A-I	1520 mm
B-F	1049 mm
B-E	1145 mm
B-C	392 mm
C-E	1059 mm
C-F	1108 mm
D-H	1956 mm
E-F	407 mm
F-H	1323 mm

Underbody



Location	Description	Length = x	Width = y	Height = z	Point to Point
A	Hole	1162	480	341	x
B	Hole	1261	474	287	x
C	Hole	2081	382	230	x
D	Hole	2192	600	193	x
F	Hole	3538	466	206	x
G	Hole	4955	475	404	x
H	Hole	4955	475	404	x
I	Hole	3538	466	206	x
J	Hole	2275	415	197	x
K	Hole	2192	600	193	x
L	Hole	2081	382	230	x
M	Hole	1261	474	287	x
N	Hole	1162	480	341	x
A to G	x	x	x	x	3794 mm
A to E	x	x	x	x	1124 mm
A to J	x	x	x	x	1435 mm
B to L	x	x	x	x	1187 mm
C to N	x	x	x	x	1266 mm
D to F	x	x	x	x	1353 mm
D to I	x	x	x	x	1717 mm
E to I	x	x	x	x	1540 mm
E to N	x	x	x	x	1126 mm
F to G	x	x	x	x	1431 mm
F to J	x	x	x	x	1540 mm
F to K	x	x	x	x	1717 mm
F to H	x	x	x	x	1712 mm
G to I	x	x	x	x	1712 mm
H to I	x	x	x	x	1431 mm
H to N	x	x	x	x	3794 mm
I to K	x	x	x	x	1353 mm
I to N	x	x	x	x	1124 mm

Dimensions - Body (C 105/Short Body)

- Table 1:
Table 2:
Table 3:
- [Front Compartment Dimensions](#)
[Body Dimensions \(Short Body\)](#)
[Underbody Dimensions](#)

Three Dimensional Distance -- X, Y, Z

This universal measuring system is capable of simultaneously dimensioning the length, width, and height of a datum plane. Three dimensional distances are used for both underbody and upperbody measuring.

X = Fore and aft measurements along the center line of the vehicle. An O plane is located forward of the master gage hole at the front of the vehicle. All measurements are made from this plane toward the rear of the vehicle.

Y = Cross car dimensions. Positive values are measured from the center of the vehicle to the right side of the vehicle. Negative values are measured from the center of the vehicle to the left side. When values are not listed separately to change the side of the vehicle, you need only to change the Y dimensions to the opposite value, + or -, from what is listed.

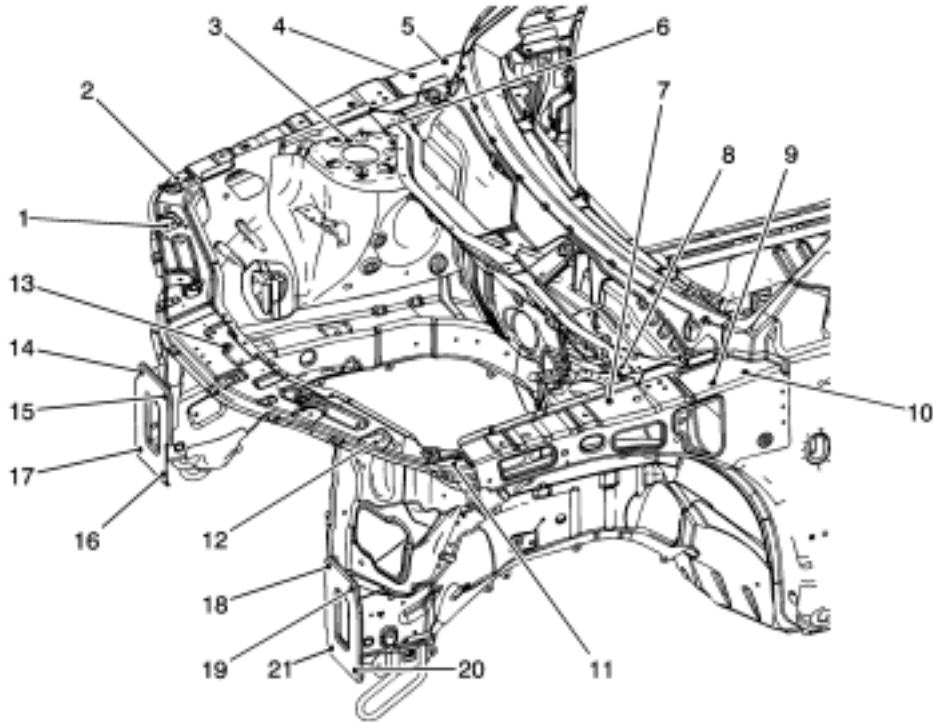
Z = Vertical measurement from the datum plane below the rocker panel lower flange edge (O plane).

All dimensions are symmetrical, unless otherwise noted.

In order to properly repair the spaceframe, restore the vehicle to the XYZ dimensions, as originally built. Relational (linear) dimensions are for reference only. Use relational dimensions for diagnosis or inspection only. Relational dimensions are not as accurate as XYZ dimensions and measuring systems.

The gage holes shown are the actual fixture locations that are used to build the vehicle.

Front Compartment

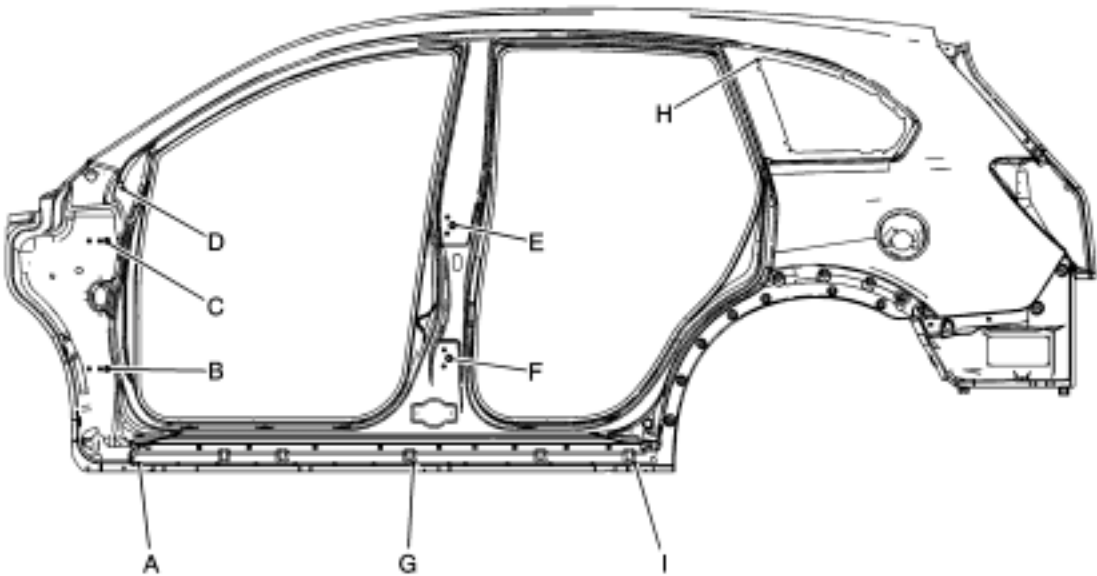


Front Compartment Dimensions

Location	Description	Length = x	Width = y	Height = z	Point to Point
1	Hole	1170	488	904	x
2	Hole	1299	713	912	x
3	Strut Attachment Hole	1698	648	934	x
4	Hood Hinge Hole	1919	760	987	x
5	Hood Hinge Hole	2003	773	996	x
6	Air Inlet Grille Attachment Hole	1776	600	977	x
7	Hole	1698	648	934	x
8	Air Inlet Grille Attachment Hole	1776	600	977	x
9	Hood Hinge Hole	1919	760	987	x
10	Hood Hinge Hole	2003	773	996	x
11	Hole	1299	713	912	x
12	Hole	1170	488	904	x
13	Hood Striker Attachment Hole	1071	0	903	x
14	Impact Bar Attachment Hole	1122	540	533	x
15	Impact Bar Attachment Hole	1122	423	531	x
16	Impact Bar Attachment Hole	1122	434	320	x
17	Impact Bar Attachment Hole	1122	554	324	x
18	Impact Bar Attachment Hole	1122	423	531	x
19	Impact Bar Attachment Hole	1122	540	533	x

20	Impact Bar Attachment Hole	1122	554	324	x
21	Impact Bar Attachment Hole	1122	534	320	x
14 to 19	x	x	x	x	1080
15 to 18	x	x	x	x	846
2 to 11	x	x	x	x	1426
4 to 11	x	x	x	x	1600
2 to 9	x	x	x	x	1600
16 to 21	x	x	x	x	868
All dimensions are measured from a zero line, a center line, and a common datum. All dimensions are symmetrical unless otherwise specified.					

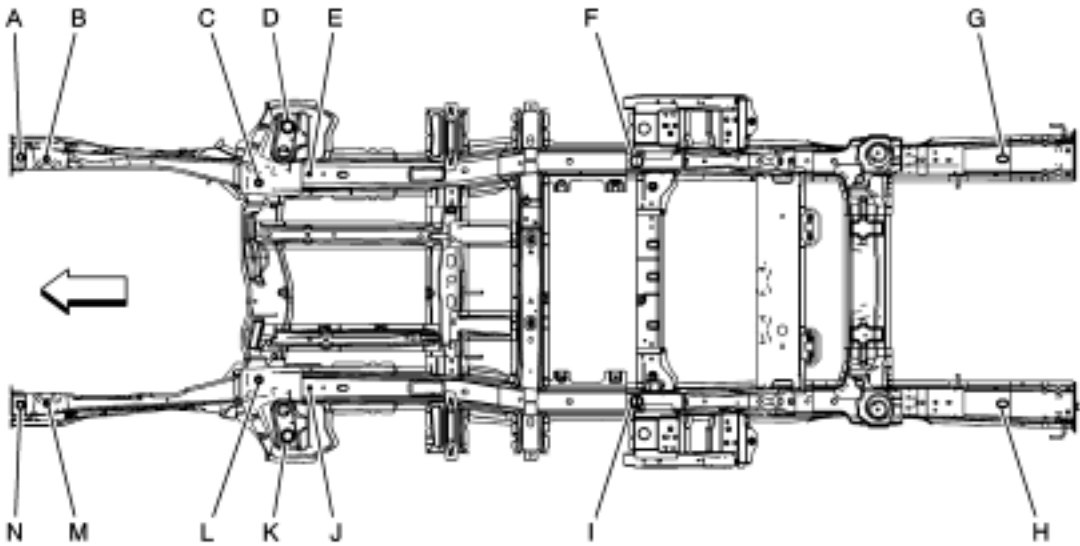
Body Side



Body Dimensions (Short Body)

Location	Length
A-G	840 mm
A-I	1520 mm
B-F	1049 mm
B-E	1145 mm
B-C	392 mm
C-E	1059 mm
C-F	1108 mm
D-H	1992 mm
E-F	407 mm
F-H	1331 mm

Underbody



Underbody Dimensions

Location	Description	Length = x	Width = y	Height = z	Point to Point
A	Hole	1162	480	341	x
B	Hole	1261	474	287	x
C	Hole	2081	382	230	x
D	Hole	2192	600	193	x
F	Hole	3538	466	206	x
G	Hole	4950	475	404	x
H	Hole	4950	475	404	x
I	Hole	3538	466	206	x
J	Hole	2275	415	197	x
K	Hole	2192	600	193	x
L	Hole	2081	382	230	x
M	Hole	1261	474	287	x
N	Hole	1162	480	341	x
A to G	x	x	x	x	3789 mm
A to E	x	x	x	x	1124 mm
A to J	x	x	x	x	1435 mm
B to j	x	x	x	x	1187 mm
C to N	x	x	x	x	1266 mm
D to F	x	x	x	x	1353 mm
D to I	x	x	x	x	1717 mm
E to I	x	x	x	x	1540 mm
E to N	x	x	x	x	1126 mm
F to G	x	x	x	x	1426 mm
F to J	x	x	x	x	1540 mm
F to K	x	x	x	x	1717 mm
F to H	x	x	x	x	1708 mm
G to I	x	x	x	x	1708 mm
H to I	x	x	x	x	1426 mm
H to N	x	x	x	x	3789 mm
I to K	x	x	x	x	1353 mm
J to N	x	x	x	x	1124 mm



Frame and Underbody

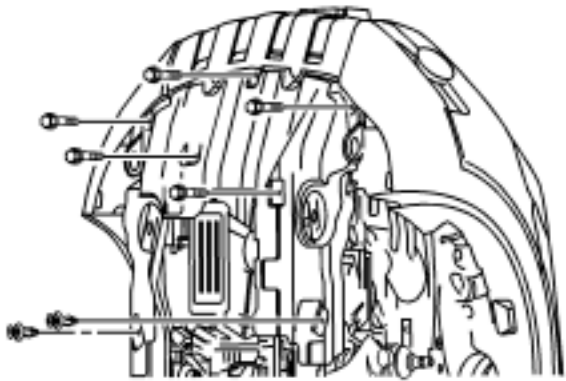


- Engine Shield Replacement
- Engine Protection Shield Replacement
- Frame Replacement
- Fender Liner Replacement
- Rear Mud Flap Guard Replacement
- Muffler Replacement 2.4L
- Muffler Replacement 3.2L
- Muffler Replacement 2.0L Diesel
- Resonator Replacement 2.4L
- Resonator Replacement 3.2L
- Resonator Replacement 2.0L Diesel
- Fastener Tightening Specifications



Engine Shield Replacement

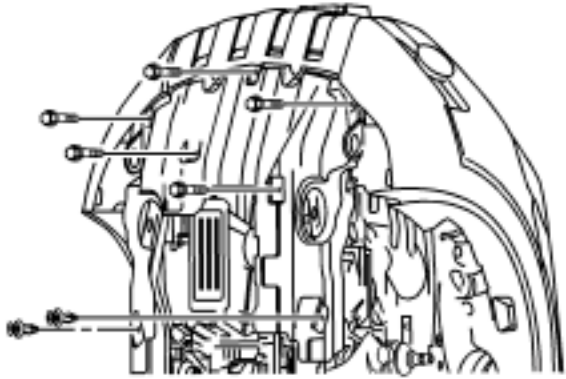
Removal Procedure



1. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the bolts and the engine shield.

Installation Procedure

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



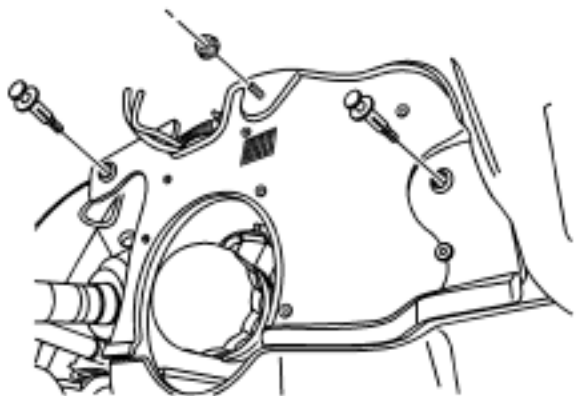
1. Install the engine shield with the bolts.

Tighten
Tighten the engine shield bolts to 10 N·m (89 lb in).

2. Lower the vehicle.

Engine Protection Shield Replacement

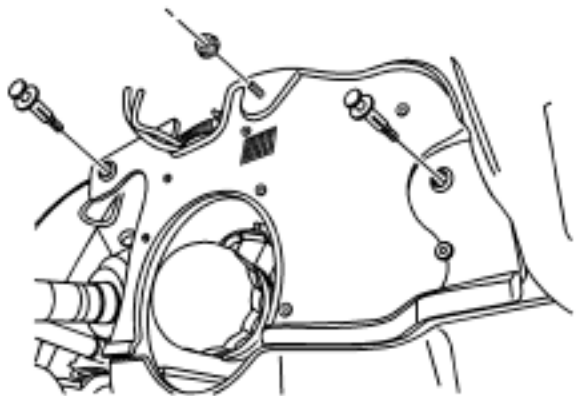
Removal Procedure



1. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the front wheel. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the nut and clips.
4. Remove the engine protection shield.

Installation Procedure

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



1. Install the engine protection shield with the nut and clips.

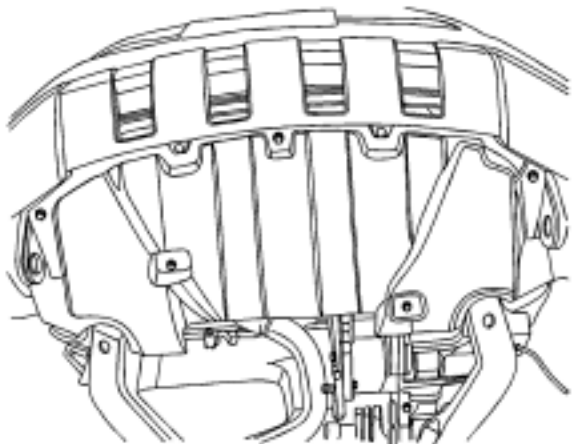
Tighten

Tighten the engine front shield nut to 10 N·m (89 lb in).

2. Install the front wheel. Refer to [Tire and Wheel Removal and Installation](#) .
3. Lower the vehicle.

Frame Replacement

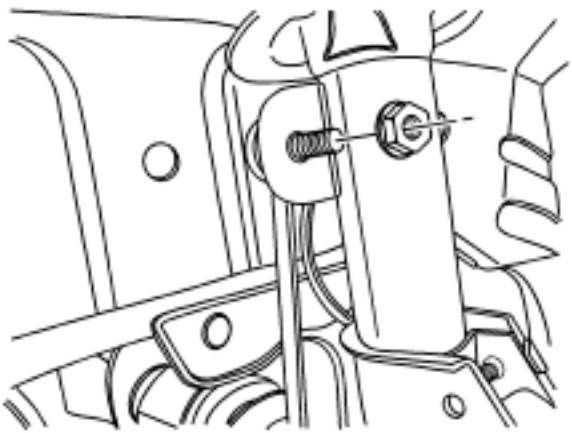
Removal Procedure



1. Raise and suitably support the vehicle and remove the wheels. Refer to [Lifting and Jacking the Vehicle](#) and [Tire and Wheel Removal and Installation](#) .
2. Remove the engine shield from the under body of the vehicle. Refer to [Engine Shield Replacement](#) .



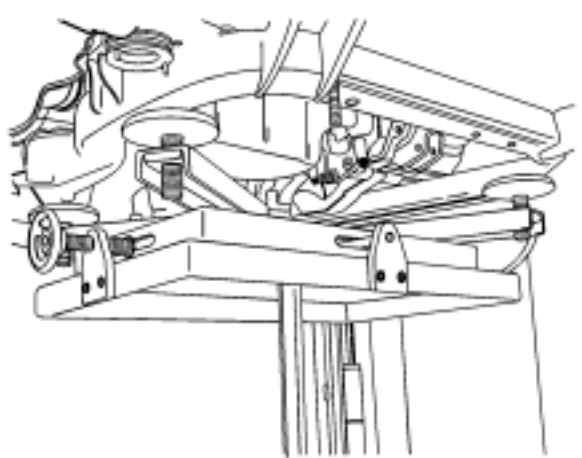
3. Remove the front control arm ball joint to knuckle nut and pin.
4. Remove the front exhaust muffler and catalytic converter. Refer to [Muffler Replacement](#) and [Resonator Replacement](#) .
5. Incase of 4-wheel drive vehicle, Remove the propeller shaft.



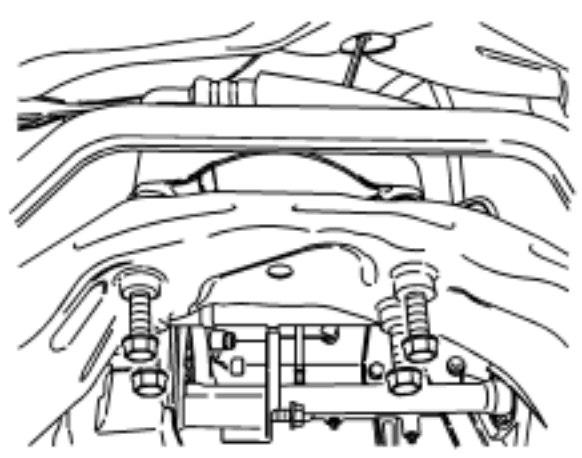
6. Remove the outer tie rod to knuckle nut.

Important: Do not allow the radiator to swing after removing the front suspension crossmember. The upper part of the radiator should be fixed using strings.

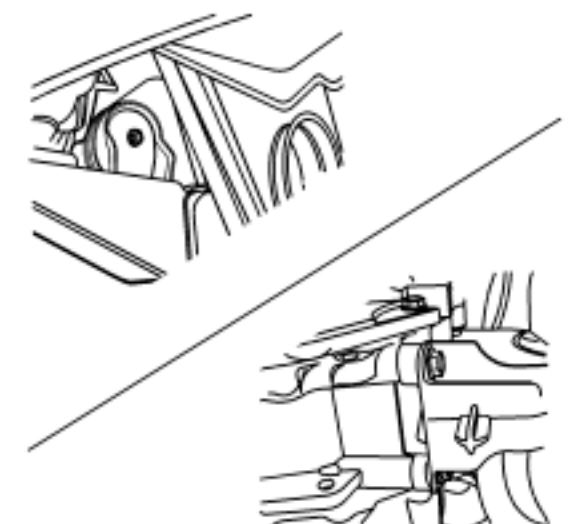
7. Remove the stabilizer shaft link to strut nut.



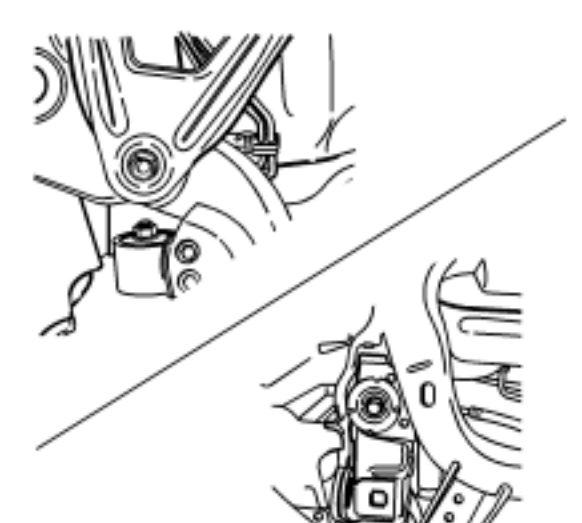
- 8. Remove the power steering gear to front suspension crossmember bolts.
- 9. Support the front suspension crossmember by a jack stand.



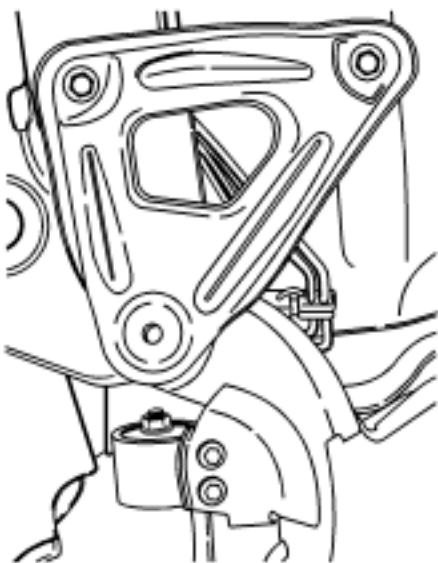
- 10. Remove the front suspension crossmember to transmission rear mount bracket bolts.



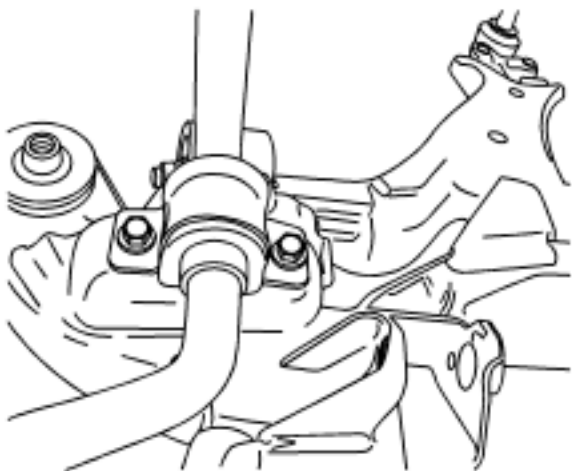
- 11. Remove the transmission front mount to front suspension crossmember bolt and remove the mount.



- 12. Remove the front suspension crossmember to body bolts.

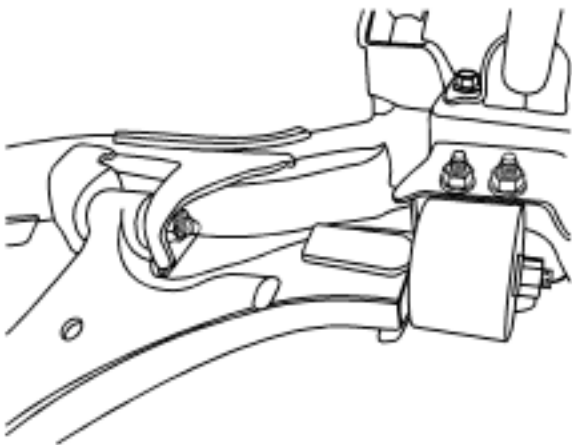


13. Remove the front suspension crossmember support bracket to body bolts.
14. Lower the front suspension crossmember slowly with care. Rotate the stabilizer shaft and tie rod properly to have enough space during lowering the cradle.



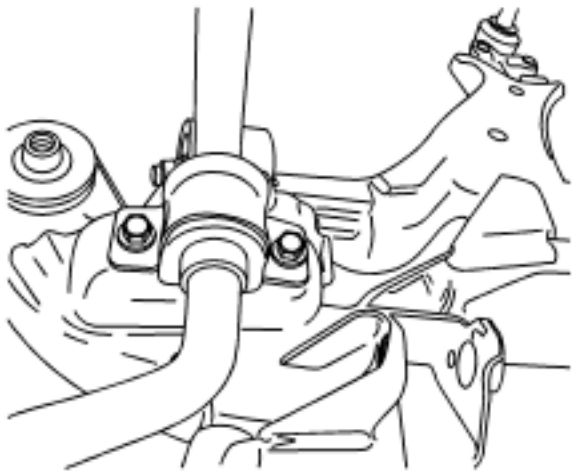
15. Remove the stabilizer shaft clamp to front suspension crossmember bolts.
16. Remove the control arm to front suspension crossmember bolts and nuts. Refer to [Lower Control Arm Replacement](#).

Installation Procedure



1. Install the front control arm to front suspension crossmember bolts and nuts. Refer to [Lower Control Arm Replacement](#).

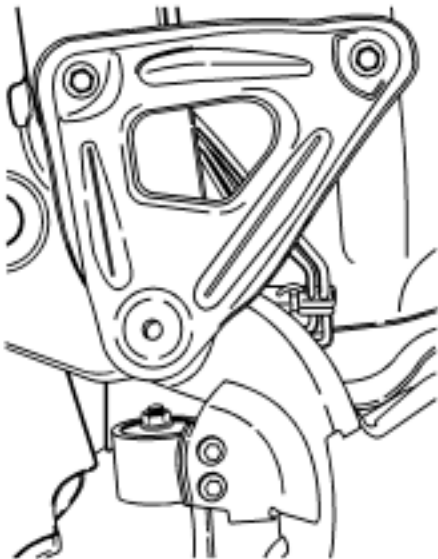
Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



2. Install the stabilizer shaft clamp to front suspension crossmember bolts.

Tighten

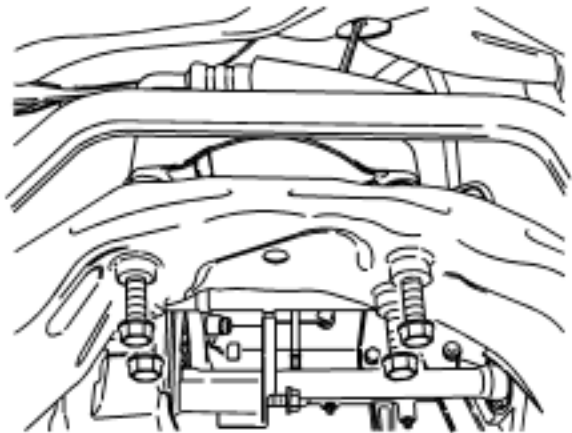
Tighten the stabilizer shaft clamp bolts to 50 N·m (37 lb ft).



3. Raise the front suspension crossmember slowly with care using a jack stand. Rotate the stabilizer shaft and tie rod properly to settle the front suspension crossmember in the correct position.
4. Install the front suspension crossmember support bracket and front suspension crossmember to body bolts.

Tighten

- Tighten the front suspension crossmember to body bolts to 155 N·m (114 lb ft).
- Tighten the front suspension crossmember support bracket to body bolts to 50 N·m (37 lb ft).



5. Install the front suspension crossmember to transmission rear mount bolts.

Tighten

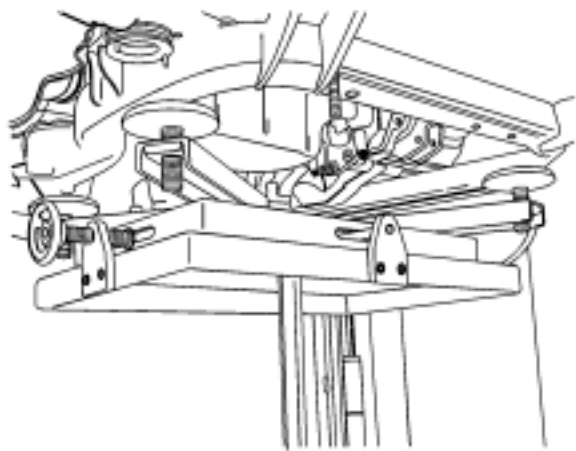
Tighten the front suspension crossmember to transmission rear mount bolts to 110 N·m (81 lb ft).



6. Install the transmission front mount and install the front suspension crossmember to transmission front mount bolt.

Tighten

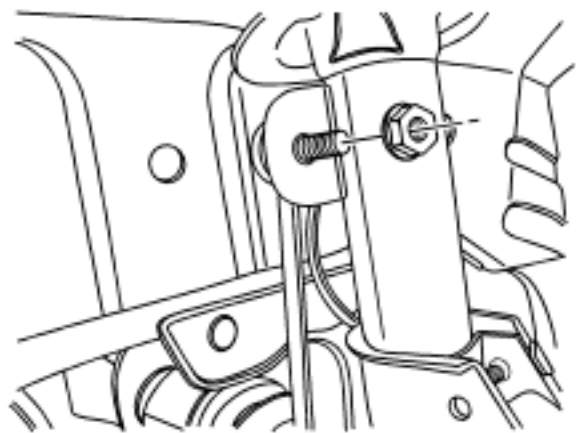
- Tighten the transmission front mount to transmission bolts to 50 N·m (37 lb ft).
- Tighten the front suspension crossmember to transmission front mount bolt to 110 N·m (81 lb ft).



7. Install the power steering gear to front suspension crossmember bolts.

Tighten

Tighten the power steering gear to front suspension crossmember bolts to 110 N·m (81 lb ft).



8. Install the stabilizer shaft link to strut nut.

Tighten

Tighten the stabilizer shaft link nut to 65 N·m (48 lb ft).

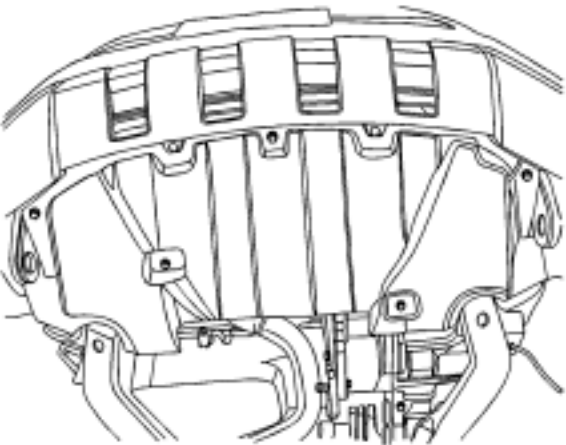
9. Install the tie rod to knuckle nut.

Tighten

Tighten the tie rod to knuckle nut to 50 N·m (37 lb ft).



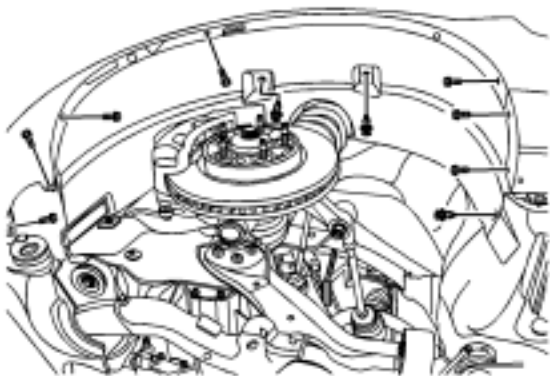
- 10. Install the front exhaust muffler and catalytic converter. Refer to [Muffler Replacement](#) and [Resonator Replacement](#) .
- 11. Install the front control arm ball joint to knuckle nut and pin. Refer to [Lower Control Arm Replacement](#) .



- 12. Install the engine shield to the under body of the vehicle. Refer to [Engine Shield Replacement](#) .
- 13. Install the wheels. Refer to [Tire and Wheel Removal and Installation](#) .
- 14. Lower the vehicle.
- 15. Check vehicle front end alignment. Refer to [Measuring Wheel Alignment](#) .

Fender Liner Replacement

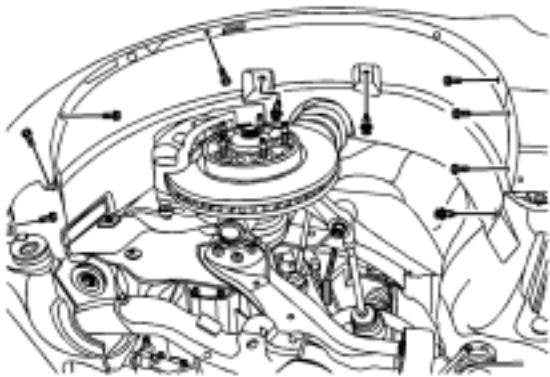
Removal Procedure



1. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the front wheel. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the front mud guard. Refer to [Guard Mud - Rear \(One or Both\) Replacement](#) .
4. Remove the engine protection shield. Refer to [Engine Protection Shield Replacement](#) .
5. Remove the screws and the front fender liner.

Installation Procedure

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



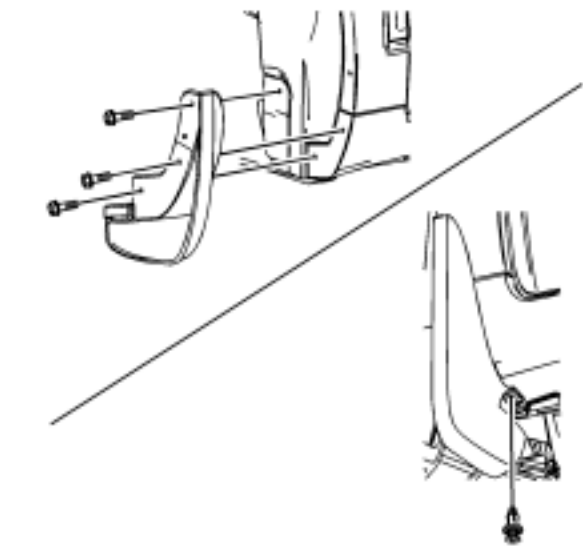
1. Install the screws and the front fender liner.

Tighten
Tighten the front fender liner screws to 4 N·m (35 lb in).

2. Install the engine protection shield. Refer to [Engine Protection Shield Replacement](#) .
3. Install the front mud guard. Refer to [Guard Mud - Rear \(One or Both\) Replacement](#) .
4. Install the front wheel. Refer to [Tire and Wheel Removal and Installation](#) .
5. Lower the vehicle.

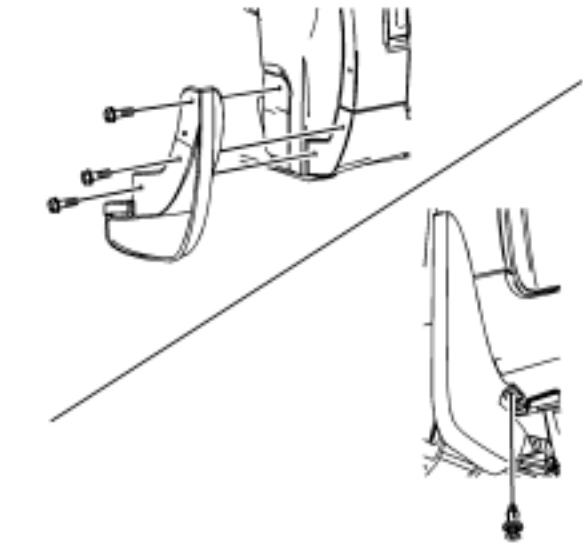
Rear Mud Flap Guard Replacement

Removal Procedure



Remove the screw and the bolts and the mud guard.

Installation Procedure



Notice: Refer to [Fastener Notice](#) in Cautions and Notices.

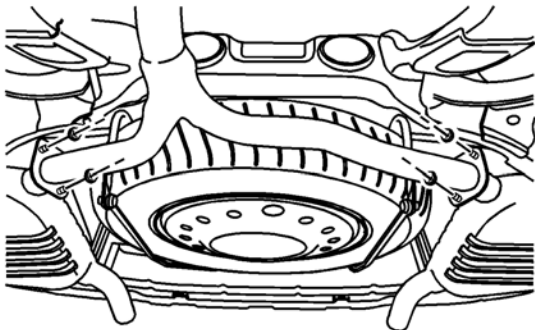
Install the mud guard with the bolts and the screw.

Tighten

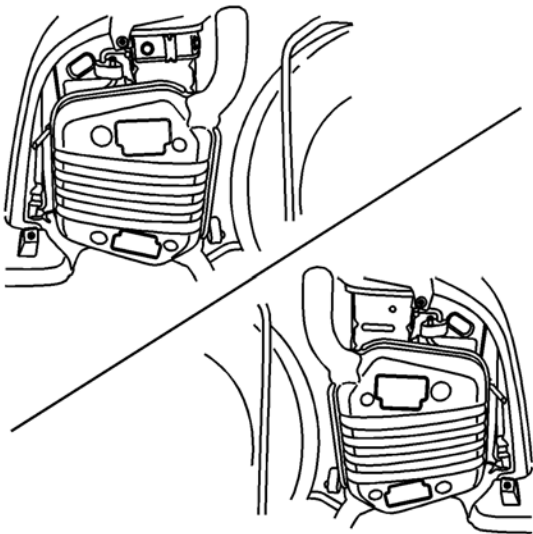
Tighten the mud guard bolts to 2 N·m (18 lb in).

Muffler Replacement (2.4L)

Removal Procedure

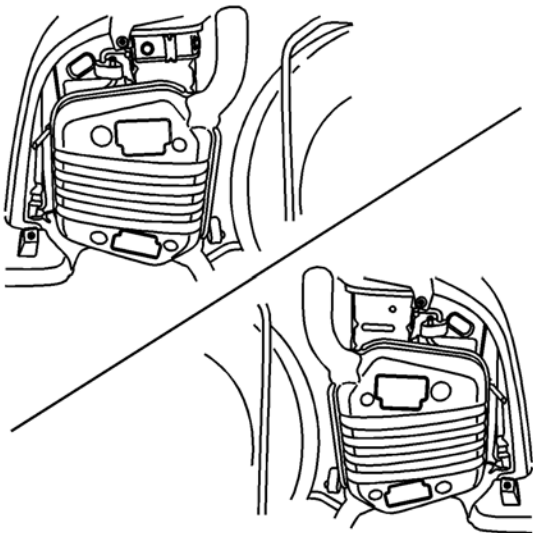


1. Remove the nuts and the gaskets from both resonator pipe flanges-to-front muffler pipe flanges.



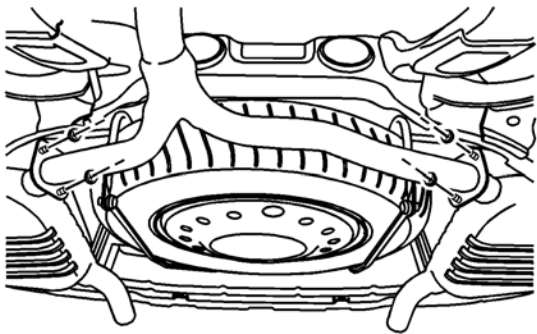
2. Detach both resonator assemblies from the rubber hangers.
3. Remove both resonators.
4. Check the rear resonator and the pipe for holes, damage, open seams and other deterioration which could permit exhaust fumes to seep into the passenger compartment or the trunk.

Installation Procedure



1. Secure both rear resonator assemblies to the rubber hangers.

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



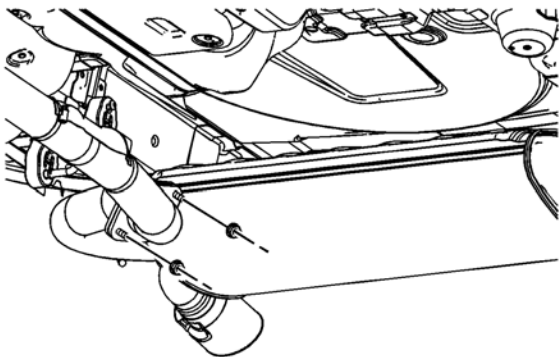
2. Install the nuts and the gaskets to both rear resonator pipe flanges-to-front muffler pipe flanges.

Tighten

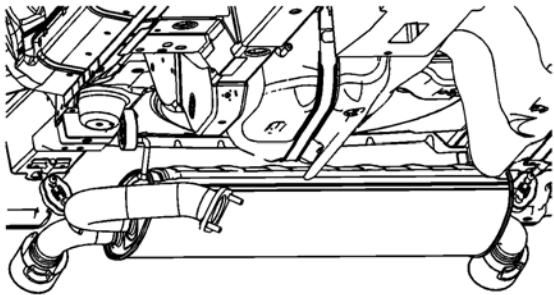
Tighten the front muffler-to-rear resonator nuts to 40 N·m (30 lb ft).

Muffler Replacement (3.2L)

Removal Procedure

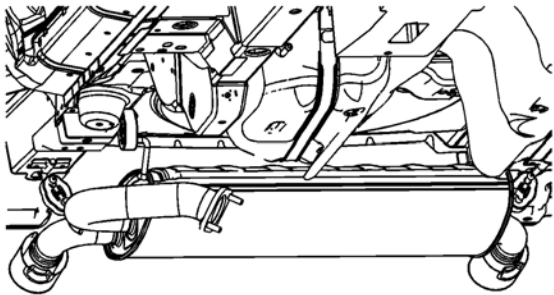


1. Remove the nuts and the gaskets from the rear muffler pipe flange-to-front muffler pipe flange.



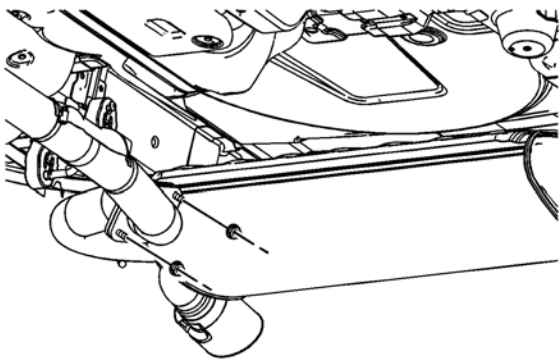
2. Detach the rear muffler assembly from the rubber hangers.
3. Remove the rear muffler.
4. Check the rear muffler and the pipe for holes, damage, open seams or other deterioration which could permit exhaust fumes to seep into the passenger compartment or the trunk.

Installation Procedure



1. Secure the rear muffler assembly to the rubber hangers.

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



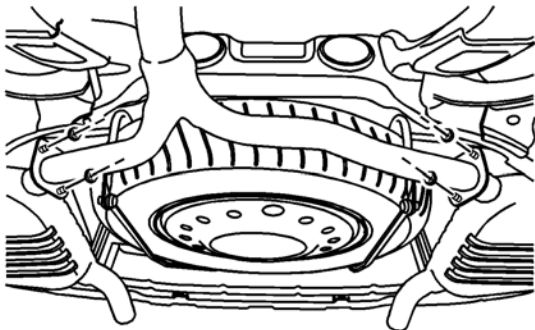
2. Install the nuts and the gaskets to the rear muffler pipe flange-to-front muffler pipe flange.

Tighten

Tighten the front muffler-to-rear muffler nuts to 40 N·m (30 lb ft).

Muffler Replacement (2.0L Diesel)

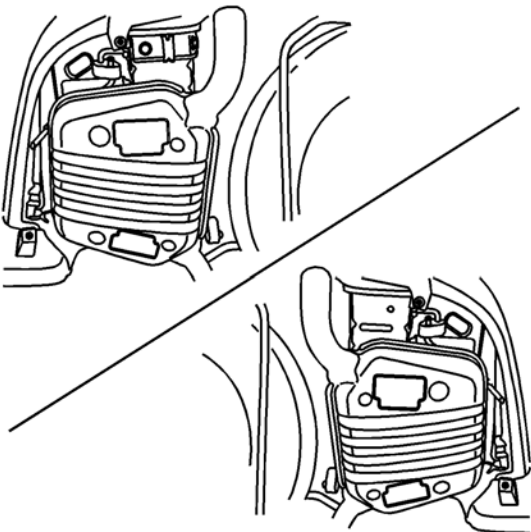
Removal Procedure



Caution: In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool.

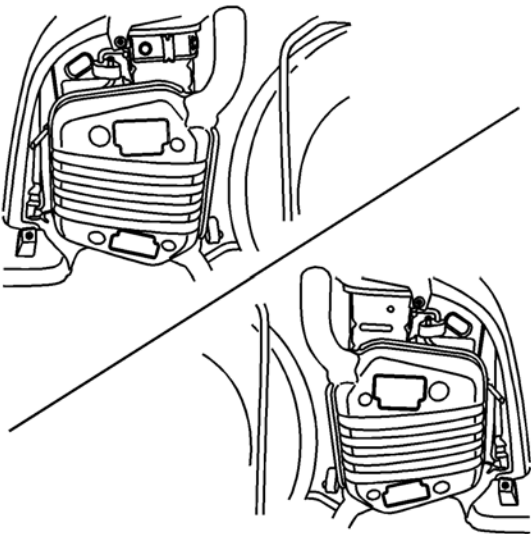
Notice: When inspecting or replacing exhaust system components, make sure there is adequate clearance from all points on the underbody to prevent overheating of the floor pan and possible damage to the passenger compartment insulation and trim materials.

1. Remove the nuts and the gaskets from the both rear muffler pipe flange-to-front muffler pipe flange.



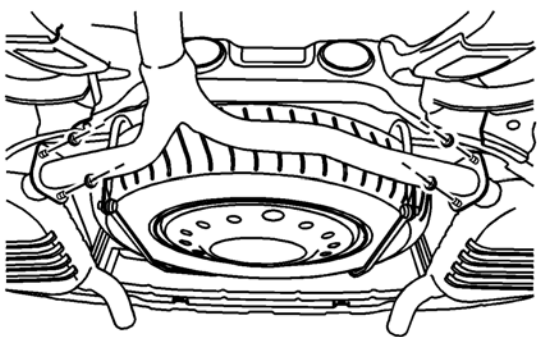
2. Detach the both rear muffler assembly from the rubber hangers.
3. Remove the both rear muffler.
4. Check the rear muffler and the pipe for holes, damage, open seams and other deterioration which could permit exhaust fumes to seep into the passenger compartment or the trunk.

Installation Procedure



1. Secure the both rear muffler assembly to the rubber hangers.

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



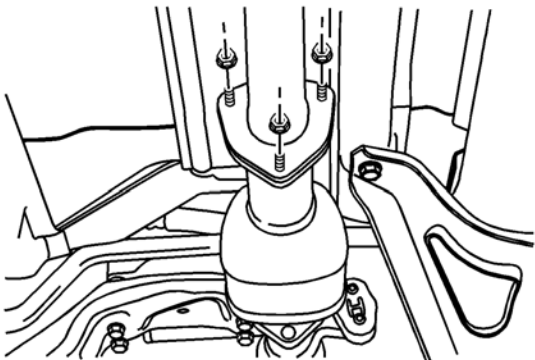
2. Install the nuts and the gaskets to the both rear muffler pipe flange-to-front muffler pipe flange.

Tighten

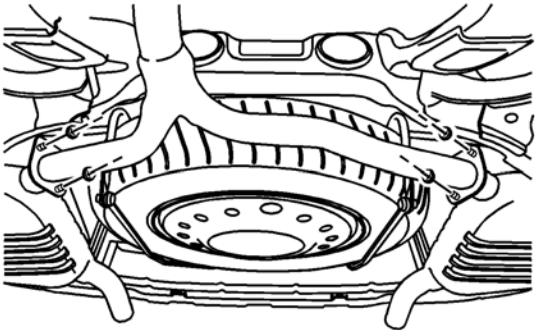
Tighten the front muffler-to-rear muffler nuts to 40 N·m (30 lb ft).

Resonator Replacement (2.4L)

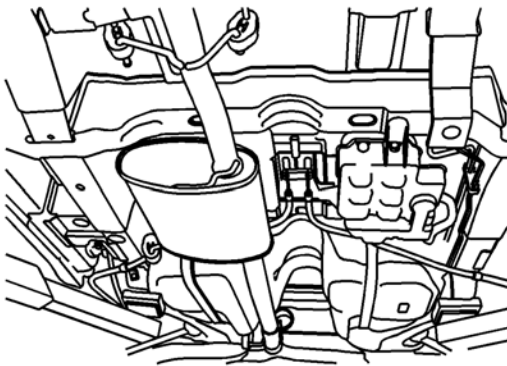
Removal Procedure



1. Remove the nuts and the gasket from the front muffler pipe-to-underbody catalytic converter (UCC).

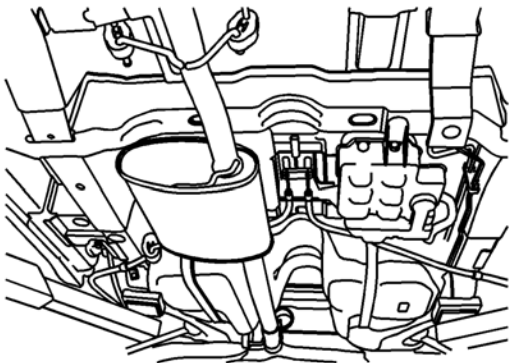


2. Remove the nuts and the gaskets from the both rear muffler pipe flange.



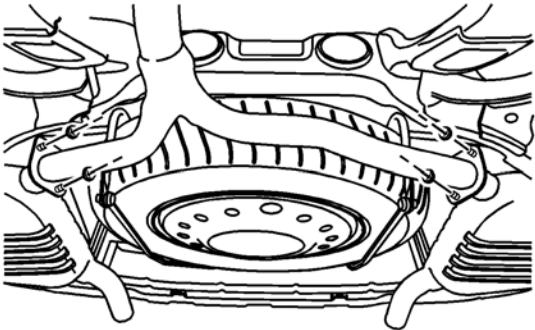
3. Disconnect the front muffler from the rubber hangers.
4. Remove the front muffler.
5. Check the UCC and the front muffler for holes, damage, open seams or other deterioration which could permit exhaust fumes to seep into the passenger compartment or the trunk.

Installation Procedure



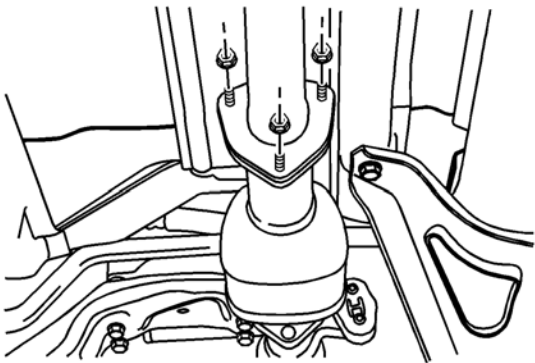
1. Secure the front muffler to the rubber hangers.

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



2. Install the nuts and the gaskets to the both rear muffler pipe flange.

Tighten
Tighten the front muffler-to-rear muffler nuts to 40 N·m (30 lb ft).

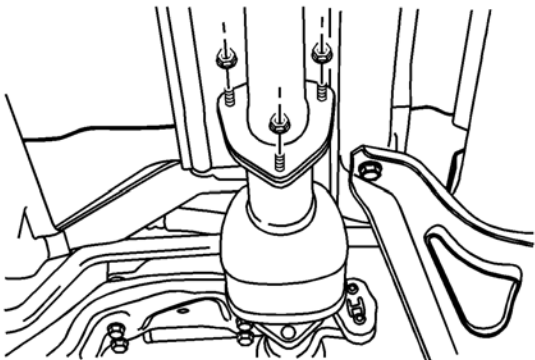


3. Install the nuts and gasket to the front muffler pipe-to-UCC.

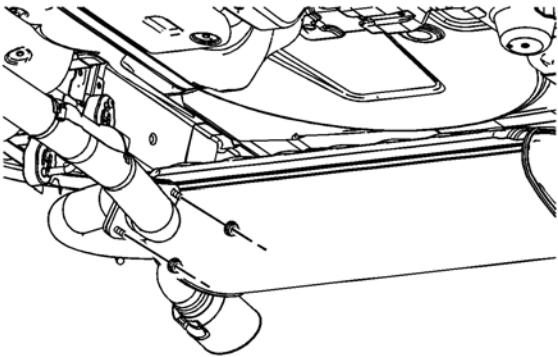
Tighten
Tighten the front muffler-to-underbody catalytic converter nuts to 30 N·m (22 lb ft).

Resonator Replacement (3.2L)

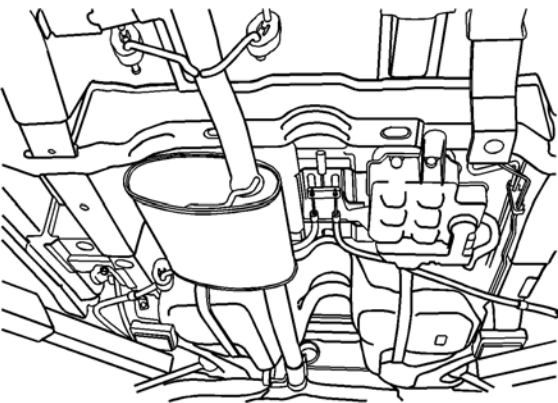
Removal Procedure



1. Remove the nuts and the gasket from the front muffler pipe-to-underbody catalytic converter (UCC).

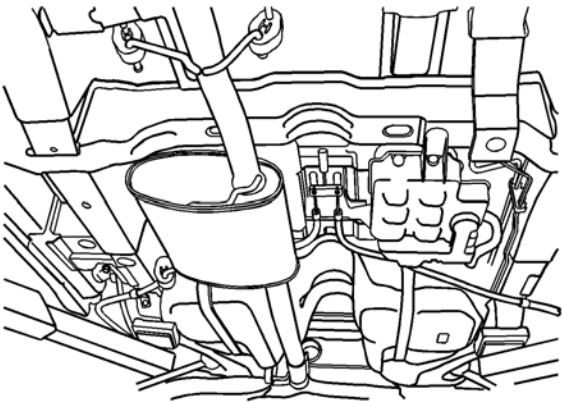


2. Remove the nuts and the gaskets from the rear muffler pipe flange.



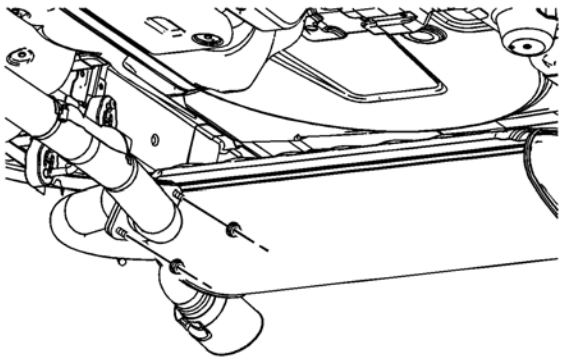
3. Disconnect the front muffler from the rubber hangers.
4. Remove the front muffler.
5. Check the UCC and the front muffler for holes, damage, open seams or other deterioration which could permit exhaust fumes to seep into the passenger compartment or the trunk.

Installation Procedure



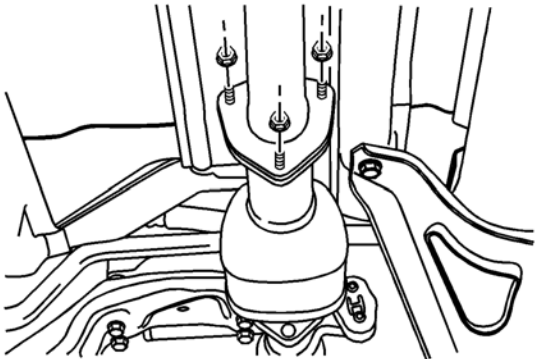
1. Secure the front muffler to the rubber hangers.

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



2. Install the nuts and the gaskets to the rear muffler pipe flange.

Tighten
Tighten the front muffler-to-rear muffler nuts to 40 N·m (30 lb ft).

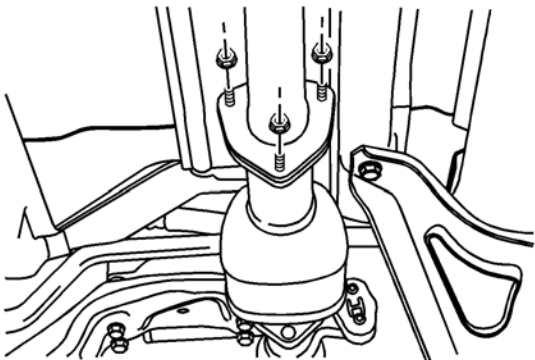


3. Install the nuts and gaskets to the front muffler pipe-to-UCC.

Tighten
Tighten the front muffler-to-underbody catalytic converter nuts to 30 N·m (22 lb ft).

Resonator Replacement (2.0L Diesel)

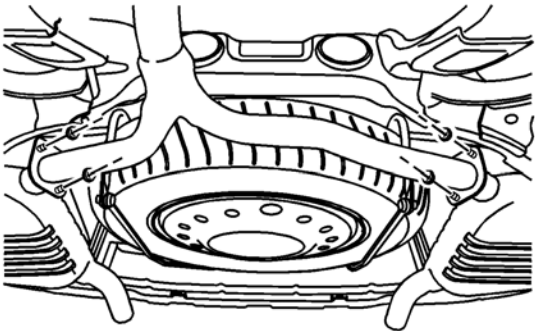
Removal Procedure



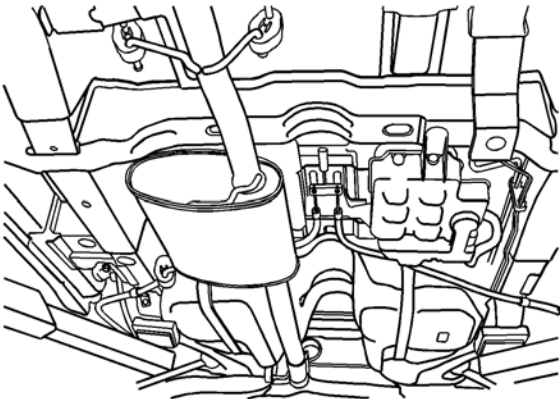
Caution: In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool.

Notice: When inspecting or replacing exhaust system components, make sure there is adequate clearance from all points on the underbody to prevent overheating of the floor pan and possible damage to the passenger compartment insulation and trim materials.

1. Remove the nuts and the gasket from the front muffler pipe-to-DPF.

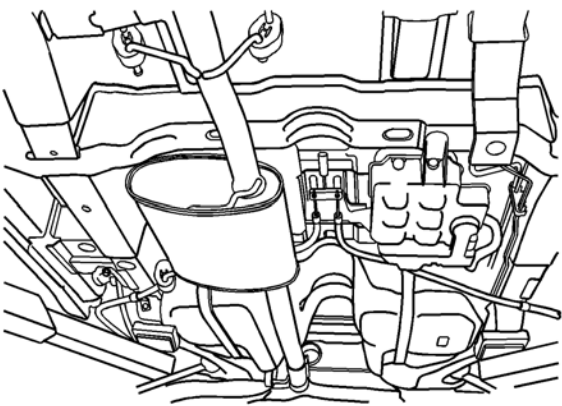


2. Remove the nuts and the gaskets from the both rear muffler pipe flange.



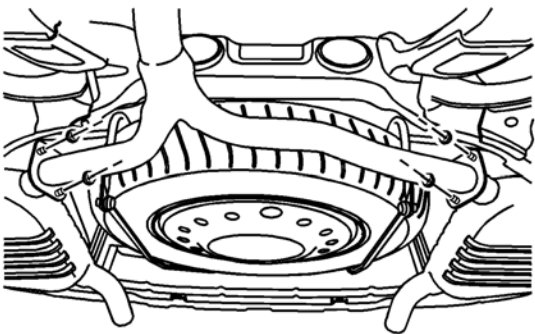
3. Remove the rubber hangers.
4. Remove the front muffler.

Installation Procedure



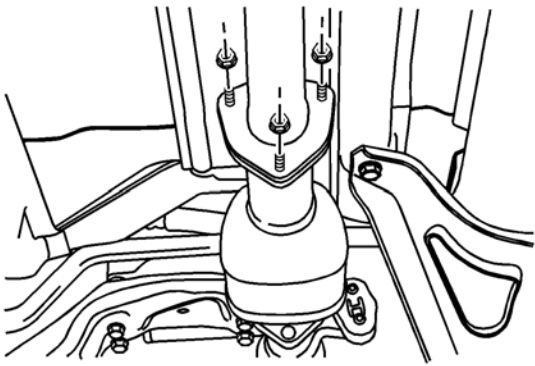
1. Secure the front muffler to the rubber hangers.

Notice: Refer to [Fastener Notice](#) in Cautions and Notices.



2. Install the nuts and the gaskets to the both rear muffler pipe flange. If damaged, replace the new gasket.

Tighten
Tighten the front muffler-to-rear muffler nuts to 40 N·m (30 lb ft).



3. Install the nuts and gasket to the front muffler pipe-to-DPF. If damaged, replace the new gasket.

Tighten
Tighten the front muffler-to-DPF nuts to 30 N·m (22 lb ft).

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Engine Protection Shield Nut	10 N·m	89 lb in
Engine Shield Bolts	2 N·m	18 lb in
Fender Liner Screws	4 N·m	35 lb in
Front Suspension Crossmember Support Bracket to Body Bolts	10 N·m	89 lb in
Front Suspension Crossmember to Body Bolts	155 N·m	114 lb ft
Front Suspension Crossmember to Transmission Front Mount Bolts	50 N·m	37 lb ft
Front Suspension Crossmember to Transmission Rear Mount Bolt	110 N·m	81 lb ft
Mud Guard Bolts	110 N·m	81 lb ft
Outer Tie Rod to Knuckle Nut	170 N·m	125 lb ft
Power Steering Gear to Front Suspension Crossmember Bolts	50 N·m	37 lb ft
Rear Support to Body Bolts	110 N·m	81 lb ft
Stabilizer Link Nuts	65 N·m	48 lb ft
Stabilizer Shaft Clamp to Front Suspension Crossmember Bolts	50 N·m	37 lb ft
Transmission Front Mount to Transmission Bolt	50 N·m	37 lb ft
Wheel Nuts	125 N·m	92 lb ft



Paint and Coatings



- Clearcoat Repair without Repainting
- Environmental Fallout (Acid Rain)
- Paint Gauges
- Clearcoat Thickness
- Rail Dust Damage Repair
- Clearcoat Repair Specifications
- Basecoat / Clearcoat Paint systems
- Anti-Corrosion Treatment and Repair
- Paint Identification



Clearcoat Repair without Repainting

Service Precautions

- Avoid washing vehicles in direct sunlight.
- Avoid using strong soaps or chemical detergents.
- Use brushless type automatic car wash equipment.
- Avoid using products containing acids, unless specified in order to correct a condition such as rail dust.
- Do not use brushes or brooms in order to remove snow or ice from vehicles in storage or on lots.
- Cleaning agents and water should be dried promptly and not allowed to dry on the surface.
Drying with a soft chamois is recommended.
- Standing rinse water should be dried promptly and not allowed to dry on the surface.
Drying with a soft chamois is recommended.
- Do not polish vehicles unless a surface condition exists that can only be corrected by polishing. Refer to [Clearcoat Repair Specifications - 3M Products](#) .
- If a surface condition does exist, the repair approach should be one of less is best, the very least it takes to correct the condition.
- Avoid removing too much clear coat whenever possible, use paint gauges before, during and after polishing. Refer to [Paint Gages](#) .
- Use only the products recommended in this procedure (or their equivalent). Refer to [Clearcoat Repair Specifications - 3M Products](#) .
- Ensure that any power polishing equipment does not exceed the requirements in the polish manufacturers recommendations. The final process step typically uses an orbital type polisher with speeds of 1,500-2,000 RPM. Refer to [Clearcoat Repair Specifications - 3M Products](#) .
- Do not use wax or silicone type products in order to hide swirl marks, this damage will reappear later and cause customer dissatisfaction.
- Specific conditions on the paint (environmental damage, rail dust, etc.) may be corrected by:
 - Refer to [Environmental Fallout \(Acid Rain\)](#) .
 - Refer to [Rail Dust Damage Repair](#) .

Repair Procedure

Notice: Removing more than 0.5 mils of the clearcoat can result in early paint failure. The clearcoat contains ultraviolet screeners. Do not finesse sand more than what is required to remove the defect.

1. Thoroughly wash the repair area with Liquid Wash and Wax GM P/N 1052870 or the equivalent.
2. Readings of the paint film build should be taken prior to the operation. Refer to [Paint Gages](#) .
3. Apply a small amount of the appropriate material to repair area and smear evenly with the pad. Refer to [Clearcoat Repair Specifications - 3M Products](#) .
4. With the polisher running at approximately 1,500-2,000 RPM, polish the repair area. Keep the pad flat against the panel while applying heavier pressure for 4-6 seconds. Then, polish with lighter pressure for 6-8 seconds. Feature lines and panel edges should be hand-rubbed in order to avoid burn-through.
5. Inspect the repair area frequently. Add more of the appropriate material as needed.
6. Always blend or feather the outer edges of the repaired area.
7. After buffing, inspect the repaired area.
8. If swirls are still visible, repeat the buffing procedure.
9. Clean the repaired area using a clean soft, non-scratching cloth with a 50/50 mixture of Isopropyl Alcohol and water.
10. If sanding is required, refer to [Clearcoat Repair Specifications - 3M Products](#) .

Environmental Fallout (Acid Rain)

Since the severity of the condition varies from area to area, proper diagnosis of the damage extent is critical to the success of repairs. Perform diagnosis under high intensity fluorescent lighting, on horizontal surfaces, hood, roof panel, rear compartment lid after the surfaces have been properly cleaned. There are 3 basic types of acid rain damage:

Surface Level Contamination: May be repaired by simply washing the vehicle, cleaning the surface with a silicone, wax and grease remover, neutralizing acidic residue and finesse polishing. Refer to Surface Level Contamination Repair.

Clearcoat Etching: Slight etching still noticeable after the above washing and finesse polishing procedure. Refer to Slight Clearcoat Damage - Wet Sanding, Finesse Polishing.

Basecoat Etching: Severe etching beyond the clearcoat into the basecoat.

Slight Clearcoat Damage - Wet Sanding, Finesse Polishing

Notice: Removing more than 0.5 mils of the clearcoat can result in early paint failure. The clearcoat contains ultraviolet screeners. Do not finesse sand more than what is required to remove the defect.

Important: Always refer to manufacture's packaged instructions for the detailed procedures of materials used for compounding or polishing.

1. Select a small test area on the damaged panel.
2. Readings of the paint film build should be taken prior to the operation. Refer to [Paint Gages](#) .
3. Wet sand the damaged area using an ultra-fine sandpaper and rubber sponge sanding block. Refer to the manufacturer's instructions for detailed procedures for the materials used in the repairs. During the wet sand process:
 - Use ample amounts of water.
 - Work slowly in order to prevent removing too much clearcoat.
4. Remove the excess water with a rubber squeegee and inspect the area. If wet sanding has repaired the damage, continue the sanding procedure on the entire panel.
5. Apply a finesse-type polish with a foam pad. Remove any swirl marks with a dual action orbital polisher and foam pad. Refer to [Clearcoat Repair Specifications - 3M Products](#) . If, during the repair, you suspect or observe that etching has penetrated into the basecoat, too much clearcoat has been removed during sanding or base color is transferred to pad during polishing, the affected areas may require clearcoat/basecoat application or refinishing.
6. Polish the entire vehicle after all damage has been repaired.

Surface Level Contamination Repair

Notice: Removing more than 0.5 mils of the clearcoat can result in early paint failure. The clearcoat contains ultraviolet screeners. Do not finesse sand more than what is required to remove the defect.

Important: Always refer to manufacture's packaged instructions for the detailed procedures of materials used for compounding or polishing.

1. Thoroughly wash the repaired area with Liquid Wash and Wax GM P/N 1052870.
2. Dry the area thoroughly.
3. Clean the affected area with silicone, wax and grease remover.
4. Neutralize left over acidic residue by cleaning damaged areas with mixture of baking soda and water, 1 tablespoon of baking soda per 1 liter or 1 quart of water. Rinse thoroughly and dry the panel completely.
5. Apply finesse-type polish with a foam panel. If damage has been repaired, remove any swirl marks with dual action orbital polisher and foam pad. Refer to [Clearcoat Repair Specifications - 3M Products](#) .
6. If some damage remains, refer to Slight Clearcoat Damage--Wet Sanding, Finesse Polishing.



Paint Gauges

Paint thickness gauges measure the total thickness of the vehicle finish. It is important to accurately measure the thickness of the finish on each vehicle as the thickness of the finish will vary on each vehicle. Use a paint gauge before the sanding process in order to accurately measure how much finish there is to remove before, during, and after the sanding process. Paint gauges range from magnetic pull type to sophisticated electronic types, and are available from a variety of sources. The older magnetic type gauges, at best have a 5 percent accuracy range and are not sensitive enough to detect removal of 0.02 mm 0.5 mil (0.0005 in) clearcoat. The newer type magnetic gauges have improved accuracy ranges. Most gauges are confined to checking either ferrous metal, steel, non-ferrous metal, or aluminum panel. At this time, there are no viable gauges for reading film thickness on composite (SCM doors, RIM fenders) panels. The more sophisticated (ETG) electronic paint thickness gauges digital type gauges are able to read film thickness on both ferrous and non-ferrous metal panel. Digital ETG gauges may have an accuracy range of 1 percent and include thickness standards for recalibration. The following paint thickness gauges are available. Call 1-800-GM-TOOLS for information:

Paint Thickness Gages

- 147-5437-ETG Standard model
- 147-5437-ETG-P Standard model with print option
- 147-5437-N-ETG-N Non-ferrous model for aluminum panels
- 147-5437-NP-ETG-NP Non-ferrous model with print option
- 147-54437-SD-ETG Steel and aluminum gauge





Clearcoat Thickness

The clearcoat on the vehicle is typically 0.059-0.078 mm (1.5-2 mils [0.0015-0.0020 in]) thick. The clearcoat contains ultraviolet screeners. Removing more than 0.5 mils (0.019 in) of the clearcoat may result in early paint failure.



Rail Dust Damage Repair

Caution: Approved safety glasses and gloves should be worn when performing this procedure to reduce the chance of personal injury.

Important: If rail dust has penetrated into the basecoat, the panel requires refinishing. Ensure all the rail dust has been removed prior to refinishing or the rust spots will return.

Rail dust damage comes from the tiny iron particles produced from the friction between the train wheels and the track. It can also be deposited on vehicles if stored near any operation producing iron dust, i.e., steel ore yards. This dust can either lay on top of, or embed into the paint surface. It is usually diagnosed as bumps in the paint surface or rust colored spots in the paint.

1. Move the vehicle to a cool shaded area and ensure the vehicle surfaces are cool during the removal process.
2. Thoroughly wash the repair area with Liquid Wash and Wax GM P/N 1052870 or the equivalent.
3. Wipe the area dry.
4. Clean the affected area with silicone, wax and grease remover.
5. Perform the removal process according to the manufacturer's directions of the type of repair material used, Gel Type Oxalic Acid or Clay Type Non-Acid Based. If, upon inspection, some particles are still present, the process may be repeated. If the damage has been repaired, complete the repair to the entire panel.
6. Polish the entire panel after the removal process. Refer to [Clearcoat Repair Specifications - 3M Products](#) . If small pits remain in the clearcoat after all of the damage has been repaired, refer to [Clearcoat Repair without Repainting](#) .

Clearcoat Repair Specifications - 3M Products

Paint Condition	Wet Sanding	Scratch Refinement	Compounding	Rotary Polisher	Dual Action Orbital Polisher	Hand Glazing/ Polishing
New vehicle prep or fine wheel marks	--	--	--	--	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit DA 6-inch Backup Pad P/N 05776	- Perfect-It Wax P/N 39026/39526 - Detail Cloth P/N 06016
Swirl marks, water spotting, or light oxidation	--	--	--	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit SBS/Perfect-it Backup Pad P/N 05717/18	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit DA 6-inch Backup Pad P/N 05776	- Perfect-It 3000 Swirl Mark Remover P/N 06066 - Perfect-It III Foam DA Pad P/N 05729 - Detail Cloth P/N 06016 - Perfect-It Wax P/N 39026/39526
Overspray or medium oxidation	--	--	- Perfect-It III Cleaning Clay P/N 38070 - Perfect-It 3000 Rubbing Compound P/N 06060/62 - Superbuff III Buff Pad P/N 05703/04	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit SBS/Perfect-it Backup Pad P/N 05717/18	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit DA 6-inch Backup Pad P/N 05776	- Perfect-It 3000 Swirl Mark Remover P/N 06066 - Perfect-It III Foam DA Pad P/N 05729 - Detail Cloth P/N 06016 - Perfect-It Wax P/N 39026/39526
Heavy oxidation or minor acid rain pitting	Micro Fine 2000	--	- Perfect-It 3000 Rubbing Compound P/N 06060/62 - Superbuff III Buff Pad P/N 05703/04	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit DA 6 in Backup Pad P/N 05776	- Perfect-It 3000 Swirl Mark Remover P/N 06066 - Perfect-It III Foam DA Pad P/N 05729 - Detail Cloth P/N 06016 - Perfect-It Wax P/N 39026/39526
Dust nibs, minor scratches, or major acid rain pitting	Micro Fine 1500 or 2000	- Trizact Hookit II Foam Disc 6 in 3000 P/N 02075 - Hookit II Soft Interface Pad 6 in P/N 05274 - Hookit II Painters Disc Pad 6 in P/N 05251	- Perfect-It 3000 Rubbing Compound P/N 06060/62 - Superbuff III Buff Pad P/N 05703/04	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit DA 6 in Backup Pad P/N 05776	- Perfect-It 3000 Swirl Mark Remover P/N 06066 - Perfect-It III Foam DA Pad P/N 05729 - Detail Cloth P/N 06016 - Perfect-It Wax P/N 39026/39526
Orange peel, paint runs or sags	- Hookit II Film Disc 6 in P1200 P/N 00868 - Hookit II Film Disc 6 in P1500 P/N 000850 - Hookit II Painters Disc Pad P/N 05251	- Trizact Hookit II Foam Disc 6 in 3000 P/N 02075 - Hookit II Soft Interface Pad 6 in P/N 05274 - Hookit II Painters Disc Pad 6 in P/N 05251	- Perfect-It 3000 Rubbing Compound P/N 06060/62 - Superbuff III Buff Pad P/N 05703/04	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It 3000 Swirl Mark Remover P/N 06064 - Perfect-It Foam Polishing Pad P/N 05725/38 - Hookit DA 6 in Backup Pad P/N 05776	- Perfect-It 3000 Swirl Mark Remover P/N 06066 - Perfect-It III Foam DA Pad P/N 05729 - Detail Cloth P/N 06016 - Perfect-It Wax P/N 39026/39526



Basecoat/Clearcoat Paint Systems

Caution: Exposure to isocyanates during paint preparation and application processes can cause severe breathing problems. Read and follow all of the instructions from the manufacturers of painting materials, equipment, and protective gear.

All paint finish repairs of rigid exterior surfaces must meet GM standards. Refer to the latest revision of the GM Approved Refinish Materials book GM P/N GM4901M-D to identify the paint systems you may use that have been engineered to meet GM standards. The GM Approved Refinish Materials book supplies all approved products, including volatile organic compound (VOC) compliant regulations recommended by the individual manufacturer, and detailed procedures for materials used in their paint system.

The booklet is now located on the Goodwrench website www.gmgoodwrench.com.



Anti-Corrosion Treatment and Repair

Caution: When applying sound deadeners, or anti-corrosion materials due care and preventative measures must be exercised to prevent any material from being sprayed into door and quarter panel mechanisms such as door locks, window run channels, window regulators and seat belt retractors, as well as any moving or rotating mechanical or suspension parts on the underbody, particularly the parking brake cable. After material application, be sure that all body drain holes are open. Improper application may increase chance of corrosion damage or limit the operation of moving parts, resulting in personal injury.

Any procedure that disturbs these special treatments, such as panel replacement or collision damage repair operations, may leave the metal unprotected and result in corrosion. Proper recoating of these surfaces with service-type anti-corrosion material is essential.

After repair and/or replacement parts are installed, all accessible bare metal surfaces must be treated with metal conditioner and reprimed. Refer to the GM Approved Refinish Materials book GM P/N GM4901M-D which identifies the paint systems you may use.

Anti-corrosion compounds are light-bodied materials designed to penetrate between metal-to-metal surfaces, such as pinch-weld joints, hem flanges, and integral panel attaching points where metal surfaces are difficult to coat with conventional undercoating materials, and are inaccessible for painting. The materials that are suitable for interior and exterior are listed in the chart below. Conventional undercoating is recommended in order to coat large areas, such as replacement door and quarter outer panels, floor pan sections, lids, hoods, fenders, etc. During undercoating operations, care should be taken to prevent the material from being sprayed into door and quarter panel hardware mechanisms, such as door locks, window run channels, window regulators, and seat belt retractors. On the underbody, the material should not be applied to any moving or rotating part, energy absorbing bumper components, or shock absorbers. After undercoating, ensure that all body drain holes are open.

Interior Protectant

The following products are available from GM Dealer Equipment. For technical information, call 187-Permatex (1-877-376-2839):

Permatex Part Number	Description
310-JDI-UCA1	Permatex Canister and Wand Assembly
310-81881	Permatex Amber Rust Proofing (24 oz) (Qty of 12)
310-81882	Permatex Amber Rust Proofing (1 gal)

Exterior Protectants

The following product is available from *ECP, Inc. Contact them at 1-800-323-3521 or www.ecpinc.net.

Part Number	Description
178660	Nox Rust X-121B (12 cans per case)

The following products are available from your local *3M® distributor, or call 1-800-521-8180, ext. 779-5165.

3M® Part Number	Description
08804	Water-Based Undercoat
08801	No Clean-Up Applicator Gun
05917	Weld-Thru Coating
08891	Rust Fighter-I

The following product is available from *Transtar Autobody Technologies. Contact the company at 1-800-824-2843 or www.tat-co.com

Part Number	Description
4353	Weld-Through Primer

*We believe these sources and their products to be reliable. There may be additional manufacturers of such material. General Motors does not endorse, indicate any preference for, or assume any responsibility for the products from these firms, or for any such items which may be available from other sources.

These sealers are intended to prevent water and dust from entering the vehicle and also are anti-corrosion barriers. Sealers are applied to such areas as rear compartment lid hem flanges, wheelhouse, quarter outer, floor, cowl, roof, and various other panel to panel attaching points. The originally sealed joints are obvious and any damage to these sealed locations should be corrected by resealing. Attaching points of new replacement panels should be resealed. Replacement lids and doors will also require sealing in the hem flange areas.

Flanged joints, overlap joints, and seams should be sealed using a quality sealer of medium-bodied consistency. The sealer used must retain its flexible characteristics after curing and be paintable.

Open joints which require bridging of the sealer in order to close a gap should be sealed using a heavy-bodied caulking material. Follow the label directions for the material selected.

Color application may be required in order to restore repaired areas such as hood, fenders, doors, quarters, lid, roof, engine compartment, underbody, and inner panels to original appearance. When this is necessary, conventional refinishing preparation, undercoat buildup, and color application techniques should be followed.

Deadener materials, spray-on type, are used on various metal panels in order to provide corrosion resistance and joint sealing. They control the general noise level inside the passenger area of the vehicle. When deadeners are disturbed because of damage, are removed during repair operations, or a new replacement panel is installed, the deadener material must be replaced by a service equivalent material. The application pattern and location of deadener materials can be determined by observing the original production installation.

Cleaning of the interior and underbody panel surfaces is necessary when original galvanized or other anti-corrosion materials have been burned off during welding or heating operations. Removal of the residue from burning will require additional care in such areas as interior surfaces of box-type construction and when configurations of the metal panels limit access to interior surfaces.



Paint Identification

Caution: Exposure to isocyanates during paint preparation and application processes can cause severe breathing problems. Read and follow all of the instructions from the manufacturers of painting materials, equipment, and protective gear.

Important

Always refer to the GM Approved Refinish Materials book GM P/N 4901M-D. This book identifies the paint systems you may use.

The basecoat/clearcoat paint is factory applied in the following 4 layers in order to give the finish a high gloss look:

- A cathodic immersion primer
- A primer/surfacer
- A basecoat
- A clear top coat (clearcoat)



Plastic Panel Information and Repair

- Flexible Plastic Part Repair Materials
- Rigid Plastic Part Repair Materials
- General Plastic Repair
- How to Identify Plastic Parts
- Plastic Identification and Refinishing Systems

Flexible Plastic Part Repair Materials

Product - 88861039, *88861040, High Strength Plastic Repair 50 ml

Components - 12 cartridges with 2 mixers each

Structural and Cosmetic

Recommended Repair Material

Product	Components	Recommended Repair Material	Work Time 70°F	Handling Strength at 70°F
88861039 *88861040 High Strength Plastic Repair 50 ml	12 cartridges with 2 mixers each	Structural and cosmetic bonding and repairing of all flexible plastics. Requires GM P/N 12378462 on TPO plastics. Will also bond e-coated/primed metals.	90 seconds	10 minutes
* TPO, TEO, (Polyolefin Plastics) require the application of polyolefin adhesive primer before the GM P/N 88861039 repair compound is applied.				

Working Time

Product	Adhesive Sandability at 70°F	Part Paintability at 70°F	Adhesive Full Cure at 70°F	Program
88861039 *88861040 High Strength Plastic Repair 50 ml	20 minutes	30 minutes	24 hours	Bumper covers, emblems, door trims, exterior and interior repairs*
* TPO, TEO, (Polyolefin Plastics) require the application of polyolefin adhesive primer before the GM P/N 88861039 repair compound is applied.				

Rigid Plastic Part Repair Materials

Thermoset Plastic Type	Type of Repair	Recommended Repair Material	Availability
Sheet metal compound (SMC), RIM rigid plastic parts	Cosmetic filling	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer/Retailer
		Sikkens Polystop LP™ or equivalent polyester repair putty	Refer to a local paint supplier
Most rigid plastic parts	Cosmetic repair, adhesive bonding	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer/Retailer
		Lord Fusor® SMC Body Panel Repair Adhesive or equivalent	Refer to local paint supplier
Most rigid plastic parts	Adhesive bonding	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer/Retailer
		Dynatron Dyna-Weld Plio Grip® or equivalent (OE structural adhesive)	Refer to local paint supplier
Most rigid plastic parts	Adhesive structural* bonding	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer/Retailer
Most rigid plastic parts	Adhesive bonding Structural bonding	Ashland Pliogrip® 7773B-3-minute	Supplied by Crest Industries
		Ashland Pliogrip® 7779B-10-minute	1-800-822-4100
		Ashland Pliogrip® 7770B-35-minute	fax 1-800-344-4461
SRIM most rigid plastic parts	Cosmetic repair, adhesive bonding	GM Goodwrench® SRIM™ repair kit (GM P/N 12378523) or SIA™ Adhesives, INC. SRIM™ repair kit P/N 30208030001 adhesive 200ML TUBES P/N 30208020001 50ML TUBES P/N 30208010001	SIA Adhesives, INC. customer service 1-330-374-2468
* Structural adhesive bonding may require the use of a pneumatic applicator, A8-37479-1A, or equivalent, to speed the application of the GM P/N 12345726 epoxy.			Kent-Moore 1-800-GM-TOOLS

General Plastic Repair

Caution: In order to reduce the risk of personal injury when exposed to toxic fumes while grinding, cutting, or applying repair material on any type of sheet molded compound or RIM rigid plastic, observe the following guidelines:

- Work in a properly ventilated area
- Apply protective cream to any exposed skin
- Remove any mixture that comes into contact with skin
- Wash skin with cold water to remove glass and resin dust
- Use a sander with a vacuum attachment
- Follow the repair material manufacturer's instructions

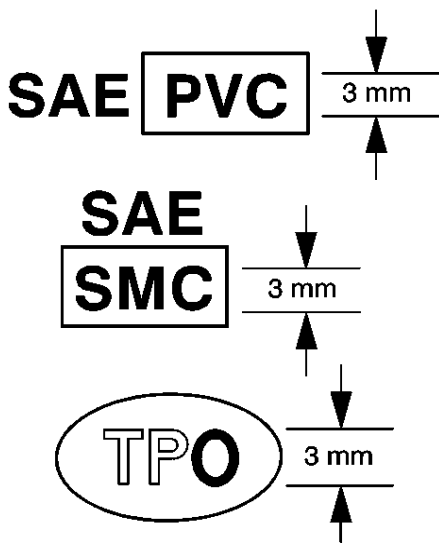
Also, always wear the following:

- An approved respirator, or air supplied respirator
- Eye protection
- Rubber gloves
- Earplugs
- Protective clothing

The following procedures should be followed when repairing all types of thermoset plastic:

- Follow the manufacturer's application and curing recommendations.
- Do not intermix systems. Use the supplies and the repair materials from the same manufacturer.
- Clean the inner and outer surfaces of the repair area with a soap impregnated scouring pad in order to remove any dirt or mold release agent.
- Clean the area with a wax and grease remover, using only enough of the remover to dampen a cloth. Allow the panel to dry thoroughly.
- Remove the surface finish from the area to be repaired. Adhesives are designed to adhere to the plastic substrate, not the finish.
- Prime a metal surface before applying the repair material.
- Inspect the rear side of the work area before making repairs in order to avoid possible damage to wires, motors, etc.

How to Identify Plastic Parts



Plastic parts can be identified by the SAE code, which is usually found on the rear of the part, and/or by the characteristics of the plastic. Knowing the type of plastic aids in selecting the proper repair materials and in selecting the proper repair procedure.

Look for the SAE code stamped into the part.

Code Found

Match the code to those in the plastic identification chart to determine whether the plastic is thermoplastic or thermoset plastic, and whether the plastic is rigid or flexible. Refer to [Plastic Identification and Refinishing Systems](#) .

No Code Found

Caution: Do NOT use a plastic burn test to distinguish the type of plastic. The burn test produces vapors which are harmful.

Perform one or both of the following tests to determine if the part is thermoplastic polyolefin or thermoset non-polyolefin.

Float Test

1. Cut a shaving of plastic from the back of the part. The shaving should be free of mold release agents and paint.
2. Place the shaving in a container of water.
 - Thermoplastic polyolefin floats.
 - Thermoset non-polyolefin sinks.

Abrasion Test

- Sand a spot near the damaged area with Grade 36 Roloc Disc.
- Thermoplastic polyolefin material melts or frays when sanded.
- Thermoset non-polyolefin material sands cleanly.

Thermoplastic and thermoset plastics can be either rigid or flexible. Thermoplastic plastic parts are best repaired with a hot iron plastic material-feed welder, but are usually replaced. Thermoset plastic can be repaired with epoxy or other more rigid 2 package repair material.

- For rigid thermoset repair materials, refer to [Repair Materials - Rigid Plastic Part](#) .
- For flexible thermoset repair materials, refer to [Repair Materials - Flexible Plastic Part](#) .
- For general repair instructions, refer to [General Plastic Repair Instructions](#) .

Plastic Identification and Refinishing Systems

Identifying Symbol - Old Symbol in ()s	Chemical Composition or Plastic Family Name	Typical Area(s) Where Part is Used	Examples of Common/Trade Names	Type of Plastic
ABS	Acrylonitrile/ Butadiene-Styrene	Armrest Support, Console, IPC, Steering Column Bracket/Jacket, Trim Molding	ABS, Absafil, Magnum, Cycolac, Dyel, Kralastic, Lustran	Thermoplastic
ABS + PC	Acrylonitrile/ Butadiene-Styrene + Polycarbonate	Instrument Panel, IPC	Bayblend, Cycology, KHA, Pulse	Rigid
ABS/PVC	ABS/Vinyl (Soft)	Head Rest Cover, Instrument Panel Pad, Trim Molding/Panel	ABS Vinyl	Flexible, Vinyl
EPDM	Ethylene Propylene Diene Monomer	Body Panel, Bumper Impact Strip	EPDM, Nordel	Rigid
EVA (EVAC)	Ethylene/Vinyl Acetate	Head Rest Cover, Misc Soft Trim	Elvax, Microthane	Flexible
PA	Polyamide	Headlamp Bezels, Quarter Panel Extensions, Exterior Finish Trim Panels	Nylon, Capron, Zytel, Rilsan, Minion, Vydyne, Welland	Rigid
PA, PAG, PAGG	Polyamide	Exterior Finish Trim Panel, Headlamp Bezel, Quarter Panel Extension	Capron, Minlon, Nylon, Rilsan, Vydyne, Wellamid, Zytel	Rigid, Thermoset
PA + PPE	Polymide + Polyphenylene Ether	Exterior Trim, Fender	GTX	Rigid, Thermoset
PBT + TEEE (PBTP + EEBC)	Polybutylene, Terephthalate + Ether, Ester Block Compound	Fascia, Rocker Panel Molding	Bexloy M	Rigid
PC	Polycarbonate	Interior Rigid/Hard Trim Panel, Valance Panel	Calibre, Lexan, Merlon, Makrolon	Rigid, Thermoset
PC + PETP	Polycarbonate + Polybutylene, Terephthalate	Bumper Fascia	Macroblend, Valox, Xenoy	Flexible, Thermoset
PE	Polyethylene	Fuel Tank Shield, Inner Fender Panel, Interior Trim Panel, Seat Belt Cover, Spoiler, Valance	Alathon, Dylan, Foriflex, Hi- fax, Hosalen, Marlex, Paxon	Rigid, Thermoplastic
PF	Phenol Formaldehyde	Ashtray	Amberol, Bakelite, Durez, Genal, Phenolic, Plyophen, Resinox	Rigid, Thermoset
PP	Polypropylene	Bumper Fascia, Cowl Panel, Deflector Panel, Door Panel, Inner Fender, Interior Molding, Kick Panel, Load Floor, Radiator Shroud, Wheel Cover	Azdel, Daplen, Escorene, Marlex, Novolen, Oleflo, Profax, Tenite	Flexible, Thermoplastic
PPE (PPO)	Polyphenylene Ether	Bezels, Chromed Plastic, Headlamp Door, Ornaments	Noryl, Oleflo, Prevex	Rigid, Thermoset
PS	Polystyrene	Dash Panel, Door Panel	Durathon, Dylan, Lustrex, Polystyrol, Styron	Flexible, Soft
PUR	Polyurethane, Thermoset (Unsaturated)	Bumper Fascia, Filler Panel, Front/Rear Body Panel, Pickup Box	Bayflex, Castethane, RIM, RRIM, SRIM	Thermoset
PVC	Polyvinyl Chloride (Vinyl)	Interior Soft Trim, I/P Skins, Roof Cover	Geon, Pliovic, Unichem, Vinoflex, Vinyl, Vinylite	Flexible, Vinyl
SAN (SA)	Styrene Acrylonitrile	Center Console, Glove Box Door, Interior Trim Panel	Foracryl, Lustran, Tyril	Rigid
TEO (EP, EPM, TPO)	Ethylene/Propylene (Rubber)	Air Dam, Bumper Fascia, Valance Panel	EPI, EPII, TPO, TPR (Thermoplastic Rubber)	Flexible, Thermoplastic
TPO	Thermal Plastic Oletin	Bumper Covers	TPO	Flexible Thermoplastic
TPU (TPUR)	Polyurethane, Polyolefin	Bumper Fascia, Gravel Deflector, Soft Filler Panel, Window Molding	Estane, Pellethane, Roylar, Toxin	Flexible, Thermoplastic
UP	Polyester/Thermoset	Air Scoop, Air Spoiler, Fascia Extension, Hood, Instrument Housing, Rear Compartment Lid, Roof, Ventilation Grid	Fiberglass, Premi-glass, Selectron, SMC, Vibrinmat	Rigid, Thermoset
For symbols not listed in this table, contact the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.				