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31 - Collision Information

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Warning

SAFETY NOTICE

CAUTION: All service and rebuilding instructions contained herein are applicable to, and for the convenience of, the automotive trade only. All test and repair procedures on components or assemblies in non-automotive applications should be repaired in accordance with instructions supplied by the manufacturer of the total product.

Proper service and repair is important to the safe, reliable operation of all motor vehicles. The service produces recommended and described in this publication were developed for professional service personnel, and are effective methods for performing vehicle repair. Following these procedures will help ensure efficient economical vehicle performance and service reliability. Some service procedures require the use of special tools designed for specific procedures. These special tools should be used as recommended throughout this publication.

Special attention should be exercised when working with spring-or tension-loaded fasteners and devices such as E-Clips, Circlips, Snap rings, etc., since careless removal may cause personal injury. Always wear safety goggles when working on vehicles or vehicle components.

It is important to note that this publication contains various Cautions and Warnings. These should be read carefully in order to minimize risk of personal injury or the possibility that improper service methods may damage the vehicle or render it unsafe. It is important to note that these Cautions and Warnings cover only the situations and procedures Chrysler Group LLC has encountered and recommended. Chrysler Group LLC cannot possibly know, evaluate, and advise the service trade of all conceivable ways in which service may be performed, or of the possible hazards of each. Consequently, Chrysler Group LLC has not undertaken any such broad service review. Accordingly, anyone uses a service procedure or tool that is not recommended in this publication must be certain that neither personal safety, nor vehicle safety, will be jeopardized by the service methods they select.

USE OF HEAT DURING REPAIR

WARNING: Chrysler Group LLC engineering's position on the use of heat during collision repair is as follows:

- Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the “cold straightening” method. No heat may be used during the straightening process.
- During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.

This “no heat” recommendation is due to the extensive use of high strength and advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

Standard Procedure

SERVICE AFTER A SUPPLEMENTAL RESTRAINT SYSTEM DEPLOYMENT

Any vehicle which is to be returned to use following a Supplemental Restraint System (SRS) component deployment must have the deployed restraints replaced. In addition, the following guidelines **MUST** be observed.

- **Following ANY major vehicle impact damage in the vicinity of an impact sensor or the ORC** - It is critical that the mounting surfaces and mounting brackets for the Occupant Restraint Controller (ORC), front impact sensors and side impact sensors located within the proximity of the impact damage be closely inspected and restored to their original conditions. Because the ORC and each impact sensor are used by the SRS to monitor or confirm the direction and severity of a vehicle impact, improper orientation or insecure fastening of these components may cause airbags not to deploy when required, or to deploy when not required.
- **Following ANY airbag deployment event** - The Lower Anchors and Tethers for CHildren (LATCH) provisions, the upper tether anchors and all interior trim panels must also be inspected.
- **If the driver airbag is deployed** - If the Driver AirBag (DAB) has been deployed, the DAB, the clockspring and stalk unit, the steering column assembly including the intermediate shaft and coupler, both front seat belt anchor buckle tensioners, both front seat belt retractor and tensioner assemblies, any front seat belt buckle in use and all rear seat belt retractors and buckles in use must be replaced. The front impact sensors and the steering wheel must also be inspected.
- **If the knee airbag is deployed** - If the Knee AirBag (KAB) (also known as the Inflatable Knee Blocker/IKB) has been deployed, the KAB and the instrument panel steering column opening cover must also be replaced. The instrument panel must also be inspected.
- **If the passenger airbag is deployed** - If the Passenger AirBag (PAB) has been deployed, the PAB, the PAB wire harness or connector, and the instrument panel must be replaced.
- **If a seat airbag is deployed** - If a Seat AirBag (SAB) (also known as a pelvic and thoracic airbag) has been deployed, the SAB, the seat back frame, the seat back foam, the seat back trim cover and the side impact sensor on the same side of the vehicle as the deployed airbag must be replaced. Both front seat belt anchor buckle tensioners, both front seat belt retractor and tensioner assemblies, any front seat belt buckle in use and all rear seat belt retractors and buckles in use must be replaced.
- **If a seat belt tensioner is deployed** - The seat belt retractor and anchor buckle tensioners are deployed in conjunction with the front airbags. All seat belt tensioners must be replaced if any airbag in the vehicle except the Knee AirBag (KAB) has been deployed.
- **If a side curtain airbag is deployed** - If a side curtain airbag (also known as a Side AirBag Inflatable Curtain/SABIC) has been deployed, the SABIC, the trim on the upper A and B-pillars (without a rear seat option) or on the upper A and B-pillars and also on the C-pillars (with a rear seat option) as well as the side impact sensor on the same side of the vehicle as the deployed airbag must be replaced. The headliner, both front seat belt anchor buckle tensioners, both front seat belt retractor and tensioner assemblies, any front seat belt buckle in use and all rear seat belt retractors and buckles in use must be replaced. The deploy brackets on the B-pillar and on the C-pillar (with a rear seat option) for the same side of the vehicle as the deployed airbag must be replaced following a side curtain airbag deployment.

The components identified with the deployed SRS components in the preceding list are not intended for reuse and will be damaged or weakened as a result of an airbag deployment, which may or may not be obvious during a visual inspection. All other vehicle components should be closely inspected following any SRS component deployment, but are to be replaced only as required by the extent of the visible damage incurred.

SQUIB CIRCUIT DAMAGE

In addition to the preceding guidelines, be aware that the heat created by the initiator during an airbag or tensioner deployment will cause collateral damage to the connected wiring (squib circuits) and connector insulators. There are two methods by which an airbag or seat belt tensioner may be connected to the vehicle electrical system. The first method involves a short pigtail harness and connector insulator that are integral to the airbag or tensioner unit and are replaced as a unit with the service replacement airbag or seat belt tensioner. This connection method typically requires no additional wiring repair following a deployment.

However, the second connection method involves a wire harness takeout and connector insulator that are connected directly to the airbag or tensioner initiator or squib. These direct-connect type take outs and connector insulators **MUST** be repaired following an airbag or seat belt tensioner deployment using the approved Supplemental Restraint System Wiring Repairs procedure. ([Refer to 10 - Restraints - Standard Procedure](#)).

AIRBAG SQUIB STATUS

Multistage airbags with multiple initiators (squibs) must be checked to determine that all squibs were used during the deployment event. The Driver AirBag (DAB) and Passenger AirBag (PAB) in this vehicle are deployed by

electrical signals generated by the Occupant Restraint Controller (ORC) through the driver squib 1 and tether cutter squib or passenger squib 1, squib 2 and tether cutter circuits to the initiators in the airbag inflators and tether cutters. Typically, all initiators are used and all potentially hazardous chemicals are burned during an airbag deployment event. However, it is possible for only one initiator to be used; therefore, it is always necessary to confirm that all initiators have been used in order to avoid the improper handling or disposal of potentially live pyrotechnic or hazardous materials. The following procedure should be performed using a diagnostic scan tool to verify the status of all airbag squibs before either deployed airbag is removed from the vehicle for disposal.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

1. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, outboard of the steering column.
2. Turn the ignition switch to the On position.
3. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.

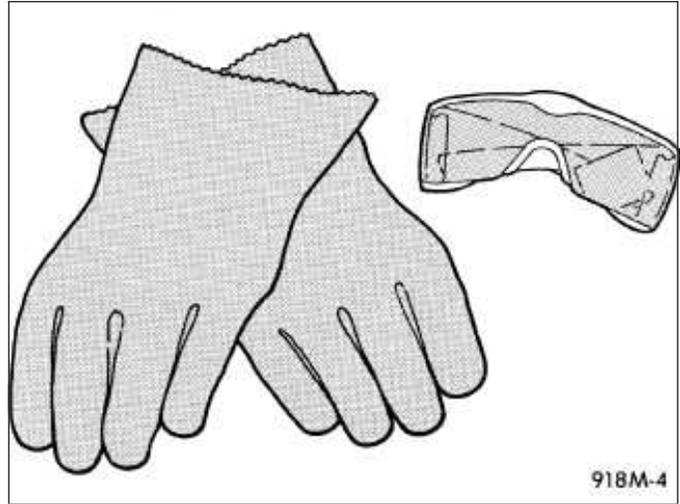
Using the active DTC information, refer to the **Airbag Squib Status** table to determine the status of both DAB squibs and both PAB squibs.

AIRBAG SQUIB STATUS		
IF THE ACTIVE DTC IS:	CONDITIONS	SQUIB STATUS
Driver or Passenger Squib 1 open	AND the stored DTC minutes for both Driver or Passenger squibs are within 15 minutes of each other	Both Squib 1 and 2 were used.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	AND the stored DTC minutes for Driver or Passenger Squib 2 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 1 by 15 minutes or more	Squib 1 was used; Squib 2 is live.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	AND the stored DTC minutes for Driver or Passenger Squib 1 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 2 by 15 minutes or more	Squib 1 is live; Squib 2 was used.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	AND Driver or Passenger Squib 2 open is NOT an active code	Squib 1 was used; Squib 2 is live.
Driver or Passenger Squib 2 open	AND Driver or Passenger Squib 1 open is NOT an active code	Squib 1 is live; Squib 2 was used.

NOTE: If none of the Driver or Passenger Squib 1 or 2 open are active codes, the status of the airbag squibs is unknown. In this case the airbag should be handled and disposed of as if the squibs were both live.

CLEANUP PROCEDURE

Following a Supplemental Restraint System (SRS) component deployment, the vehicle interior will contain a powdery residue. This residue consists primarily of harmless particulate by-products of the small pyrotechnic charge that initiates the propellant used to deploy a SRS component. However, this residue may also contain traces of sodium hydroxide powder, a chemical by-product of the propellant material that is used to generate the inert gas that inflates the airbag. Since sodium hydroxide powder can irritate the skin, eyes, nose, or throat, be certain to wear safety glasses, rubber gloves, and a long-sleeved shirt during cleanup.



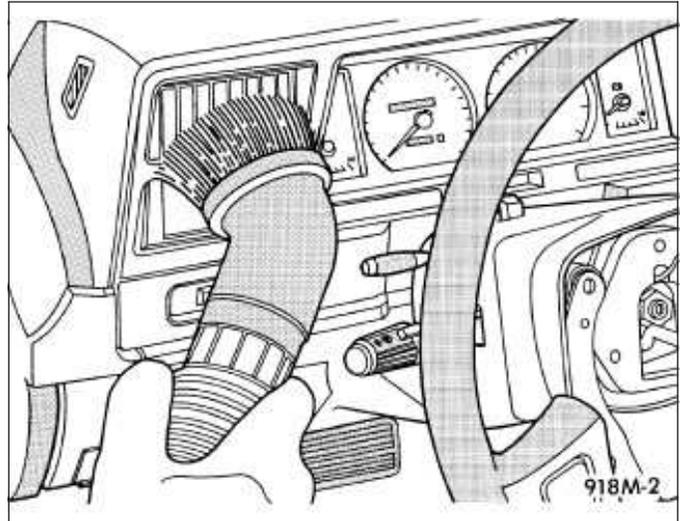
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WARNING: To avoid serious or fatal injury, if you experience skin irritation during cleanup, run cool water over the affected area. Also, if you experience irritation of the nose or throat, exit the vehicle for fresh air until the irritation ceases. If irritation continues, see a physician.

1. Begin the cleanup by using a vacuum cleaner to remove any residual powder from the vehicle interior. Clean from outside the vehicle and work your way inside, so that you avoid kneeling or sitting on a non-cleaned area.
2. Be certain to vacuum the heater and air conditioning outlets as well. Run the heater and air conditioner blower on the lowest speed setting and vacuum any powder expelled from the outlets.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

3. Next, remove the deployed SRS components from the vehicle. Refer to the appropriate service removal procedures.
4. You may need to vacuum the interior of the vehicle a second time to recover all of the powder.



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BASE COAT/CLEARCOAT FINISH

The original equipment paint finish is a multi step process that involves cleaning, applying electro de-position (E-coat), anti-chip primer, basecoat, and clearcoat steps.

CAUTION: Do not use abrasive chemicals, abrasive compounds or harsh alkaline based cleaning solvents on the painted surfaces of a vehicle. Failure to follow this caution can result in damage to vehicle finish.

On most vehicles a two-part paint application (basecoat/clearcoat) is used. Color paint that is applied to primer is called basecoat. A clear coat paint is then applied to protect the basecoat from ultraviolet light and to provide a durable high-gloss finish.

FINESSE SANDING, BUFFING, AND POLISHING

CAUTION: Do not remove more than 0.5 mils of clearcoat finish when sanding, hand buffing or polishing. Basecoat paint must retain clearcoat for durability.

CAUTION: If the finish has been finesse sanded in the past, it cannot be repeated. Failure to follow this caution can result in damage to vehicle finish.

NOTE: Finesse sanding should only be performed by a trained automotive paint technician.

Minor acid etching, orange peel, or smudging in a clearcoat or single-stage finish can be reduced with light finesse sanding, hand buffing and polishing. Use a Paint Thickness Gauge #PR-ETG-2X or equivalent to determine clearcoat or single-stage paint thickness before and after the repair.

PAINT TOUCH-UP

If the painted metal surface of a vehicle becomes scratched or chipped, it should be touched-up as soon as possible to avoid corrosion.

WARNING: Use an OSHA approved respirator and safety glasses when spraying paint or solvents. Failure to follow this warning may result in possible personal injury or death.

When repairing painted metal surfaces, for best results, use MOPAR® Scratch Filler/Primer, Touch-Up Paints and Clear Top Coat.

1. Scrape any loose paint and corrosion from inside the scratch or chip.

WARNING: Avoid prolonged skin contact with petroleum or alcohol-based cleaning solvents. Failure to follow this warning can result in possible personal injury or death.

2. Clean affected area with MOPAR® Tar/Road Oil Remover or equivalent, and allow to dry.
3. Fill the inside of the scratch or chip with a coat of filler/primer. Do not overlap primer onto good surface finish. The applicator brush should be wet enough to puddle-fill the scratch or chip without running. Do not stroke brush applicator on body surface. Allow the filler/primer to dry hard.
4. Cover the filler/primer with color touch-up paint. Do not overlap touch-up color onto the original color coat around the scratch or chip. Butt the new color to the original color, if possible. Do not stroke applicator brush on body surface. Allow touch-up paint to dry hard.
5. On vehicles with clearcoat, apply clear top coat to touch-up paint with the same technique as described in step 4. Allow clear top coat to dry hard. If desired, the clearcoat can be lightly finesse sanded (1500 grit) and polished with rubbing compound.

NON-STRUCTURAL SHEET METAL REPAIR

Safety Notice

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Safety Precautions

WARNING: Always wear an approved respirator, as well as skin and eye protection per adhesive manufacturer recommendations as stated in the product Safety Data Sheets (SDS).

Adhesives:

- Safety Data Sheets (SDS) must be available and understood before adhesives are handled.
- All personnel should be instructed on the proper procedures to prevent skin contact with solvents, curing agents, and uncured base adhesives, which could cause allergic reactions or sensitization.

Types of Structural Adhesives

Overview: There are three basic chemistries used in the collision repair industry. The types of adhesives used include Acrylic, Epoxy and Urethane. To achieve optimal results, it is best to use the chemistry that bonds best to the substrate being repaired, is easiest to use and offers the most permanent, non-detectable repair at the most economical repair cost. All three chemistries have their strengths and weaknesses.

NOTE: Structural adhesives that meet Chrysler Group LLC's approved replacement materials specifications include - Fusor 112B and 3M 08116

Adhesive Types:

- **Acrylic Adhesives** - Bond all types of bare metals and are excellent for cross bonding aluminum to steel. They have good NVH (Noise Vibration Harshness) properties and some offer anti-corrosion properties, so primers on bare metals are not necessary. Most acrylics have a fast room temperature cure, and are stable with regards to temperature and moisture during cure. However, both of these can effect shelf life. Mix ratio is modestly important although the performance properties can vary with a change in mix ratio. Acrylics are the most forgiving of the three chemistries with regards to mix ratio accuracy.
- **Epoxy Adhesives** - Bond well to ridged and semi-ridged plastics and are generally easy to sand and feather edge. Some may be too ridged for flexible substrates and they often require primers on bare metal applications. Epoxies can be heat cured to increase strength and accelerate the curing process. They have a long and stable shelf life. The mix ratio can vary by $\pm 50\%$ and still cure. However, the performance properties will vary when the mix ratio is incorrect. Epoxies are more forgiving than urethanes with regards to mix ratio accuracy.
- **Urethane Adhesive** - Typically flexible and bond well to plastics. However, they usually require primers on metal surfaces to protect against corrosion. Urethanes have good seam sealing and NVH qualities and are frequently the optimal choice for seam sealers. They are sensitive to moisture during cure, packaging and storage. Single component urethanes usually have a much shorter shelf life than two component urethanes. Mix ratios are critical for urethanes. In most cases it cannot vary more than $\pm 5\%$. Therefore, hand mixing is not recommended. Urethanes are the most unforgiving of the three chemistries with regards to mix ratio accuracy.

Non-Structural Sheet Metal Repair Table

JOINT AND REPAIR TYPES	REFERENCE
Backer Panel Joint	Backer Panel Joint
Door Skin	Door Skin Replacement
Lower Body Side Panel	Lower Body Side Panel
Upper Body Side Panel	Upper Body Side Panel
Metal Fatigue/Stress Cracks	Metal Fatigue Stress Crack

Backer Panel Joint

Overview: Backer panel procedures may be used to achieve a smooth joint between panel sections. The backer panel works well in areas where there is not enough room to smooth or feather in an overlap joint. The backer panel joint is a common repair for rocker panels, quarter panels and body side apertures.

NOTE: OEM panel replacement such as a quarter panel, side aperture and rocker panel will always require the weld bonding procedure at the pinch weld flange area(s).

Preparation:

NOTE: Be certain vehicle is evenly supported at normal suspension points.

1. Restore structural dimensions as well as all related mating flanges.

NOTE: It will be difficult to abrade the underside mating surface of the original panel, however this is an important step and should be done effectively.

2. Create a 50mm. (2in.) backer panel out of an unused portion of original or new sheetmetal panel, whichever contains the appropriate shape. Be certain it has a precise fit to the back of the panels it will join.
3. All paint, primer, adhesive and any other corrosion protective coatings must be removed from the mating surfaces as well as the backer panels themselves, prior to application of adhesive. Grind a 25mm. (1in.) contact area on all panels where backer panel bonding will take place. The metal should be completely bare and shiny in appearance, if the metal appears pewter in color all of the galvanized coating has not been removed.
4. Pre-fit the backer panel to the panel(s) being joined, to ensure proper fit. If screws will be used to hold the panels in place during curing, dry fit them now to be certain of proper fit later. There should be a 0.8 - 1.6mm. (1/32 - 1/16in.) gap between the two outer panels, no gap on backer panels.
5. Without a mixing tip attached, purge a small amount of structural adhesive from the cartridge. This will ensure an even flow of both components.
6. Attach a mixing tip and dispense a mixing tube's length of adhesive from the cartridge.

Application:

NOTE: Refer to the structural adhesives manufacturer for information on work, handling and curing times.

7. Apply a 10 - 13mm. (3/8 - 1/2in.) bead of structural adhesive to the bare metal mating surfaces of the backer panels. Evenly apply the adhesive over the complete bonding surface. Apply a 10 - 13mm. (3/8 - 1/2 in.) bead of structural adhesive to bare metal mating surfaces. Use a body filler applicator to level the adhesive, making sure to cover all bare metal to protect against corrosion.
8. Position the new backer panel(s), making sure not to separate after contact. Lifting will create air bubbles and weaken the bond. **Adjustments must be made by sliding, not lifting the panel(s).**
9. Clamp tightly and evenly. Adhesive has glass beads that will prevent complete squeeze out. Install screws to the "hard to clamp areas".
10. Remove excess adhesive from all joints prior to adhesive cure.
11. Allow adhesive to cure, per manufacturer recommendations. When fully cured, expect the adhesive to be a little tacky, as this is a normal characteristic of the adhesive.
12. Remove clamps and screws.
13. Repeat procedure for installation of new panel.
14. Remove any remaining adhesive with a grinder or abrasive disc. All adhesive must be removed from the cosmetic repair area to ensure proper adhesion of further repair and refinish materials.
15. Bevel the center of the screw holes and apply fiber-reinforced waterproof body filler to the screw holes and section seam. When cured, sand and apply conventional body filler and block sand as necessary. Prime and

paint per paint manufacturer recommendations.

- Apply inner panel corrosion inhibiting materials (Mopar Cavity Wax part #6804292970 or equivalent).

Door Skin Replacement

Overview: Depending on the type of door to be repaired, a full skin or a belt cut will be required. Belt cut replacement is necessary when a door with a full skin, around the window opening, has an angle that makes it to difficult to get tools into to do a quality hem flange installation. A butt-joint is used at this seam.

Preparation:

- Belt cut skins will require determining and cutting of the sectioning locations on the original panel and on the replacement panel.
- Remove the door skin by grinding the outer edge (C) until the seam is perforated.
- Cut around weld nuggets and spot welds with a spot weld cutting bit or similar weld removal tool.
- If panel is attached with adhesive you may use heat, from a **non-flame** heat source, up to 204°C. (400F°). This will aid in loosening the bond.
- With an air chisel and a flat bladed bit, remove outer skin and any remaining hem flange.
- Grind any remaining weld nuggets flush with door frame, and remove all adhesive, paint, E-coating and corrosion protective coatings from the area where the **structural adhesive** will be applied, and where the 'butt-joint' is to take place. The metal should be completely bare and shiny in appearance, if the metal appears pewter in color all of the galvanized coating has not been removed.
- Straighten door flange and any remaining damage on door shell using the hammer and dolly method.
- The area of the new door skin that will make contact with the door shell will need to be scuffed with a course abrasive pad or ground with a 50 grit grinding disc. This will vary upon adhesive manufacturers, be certain to check adhesive manufacturer recommendations.
- Dry fit the new panel. Determine where to place clamps to hold the panel in place, as necessary.

CAUTION: Be certain the fit is good from the skin to door and door to door opening. Cured adhesive is extremely strong and will not allow for "adjustments".

- Without a mixing tip attached, purge a small amount of structural adhesive from the cartridge. This will ensure an even flow of both components.
- Attach a mixing tip and dispense a mixing tube's length of adhesive from the cartridge.

NOTE: Refer to the structural adhesives manufacturer for information on work, handling and curing times.

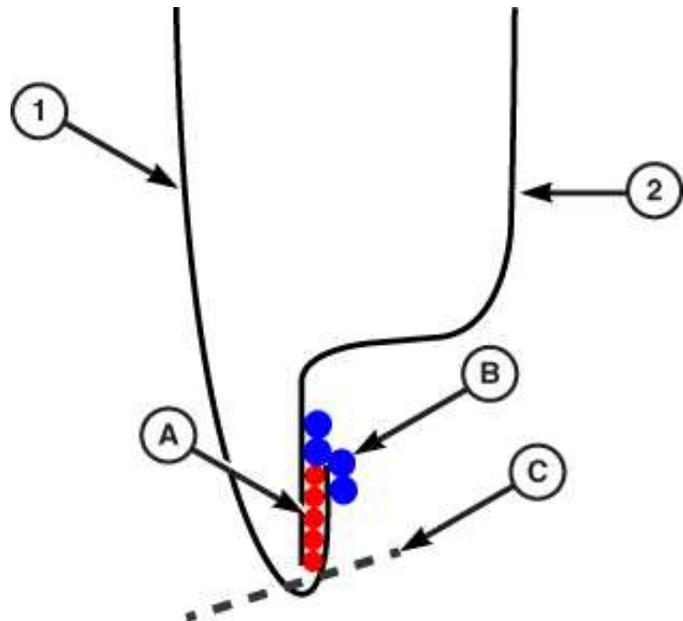
Installation:

NOTE: Do not apply adhesive within 25mm. (1in.) of the belt cut location.

- Apply a 10 - 13mm. (3/8 - 1/2 in.) bead of structural adhesive to bare metal mating surfaces. Use a body filler applicator to level the adhesive, making sure to cover all bare metal to protect against corrosion.

NOTE: When applying adhesives be certain any and all drain holes remain open and clear of obstructions.

- Apply a second bead of adhesive to ensure proper bead thickness.
- Position the new panel. If repositioning is necessary slide the panel, do not lift or separate panels.



Door Skin

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NOTE: Drain holes must remain clear of obstructions from adhesives and sealers.

- 1 - DOOR SKIN (OUTER)
- 2 - DOOR SHELL (INNER)
- A - STRUCTURAL ADHESIVE
- B - SEAM SEALER
- C - HEM FLANGE CUT LINE (BOTTOM EDGE SHOWN, SURROUNDING EDGES TYPICAL)

Adjustments must be made by sliding, not lifting the panel(s). Apply clamps to hold panel in position, as necessary.

NOTE: There are many tools readily available to aid in the hem flange folding process.

15. Roll the hem flange over. Remove excess adhesive. This will save time, as compared to waiting until cured.
16. Re-check door gap and flushness to the vehicle opening and adjust as necessary.
17. Allow the adhesive to cure per manufacturer recommendations. When fully cured, expect the adhesive to be a little tacky, as this is a normal characteristic of the adhesive. Remove clamps, if used.
18. Remove any excess cured adhesive with a grinder or abrasive disc. All adhesive must be removed from the cosmetic repair area to ensure proper adhesion of repair and refinish materials.
19. Weld the butt-joint with GMAW (Gas Metal Arc Welding), if a belt cut was used. Clean and dress welds accordingly.
20. Apply fiber-reinforced waterproof body filler to the section seam, as necessary. When cured sand and apply conventional body filler and block sand.
21. Apply an epoxy or anti-corrosion primer. When cured, lightly scuff.
22. Seam seal the entire door. Duplicate the factory seam sealer. Apply a discrete bead around the rest of the door to seal and protect, maintaining the original appearance.
23. Prime and paint per paint manufacturers recommendations.
24. Apply inner panel corrosion inhibiting materials (Mopar Cavity Wax part #68042970AA , or equivalent).

Lower Body Side Panel

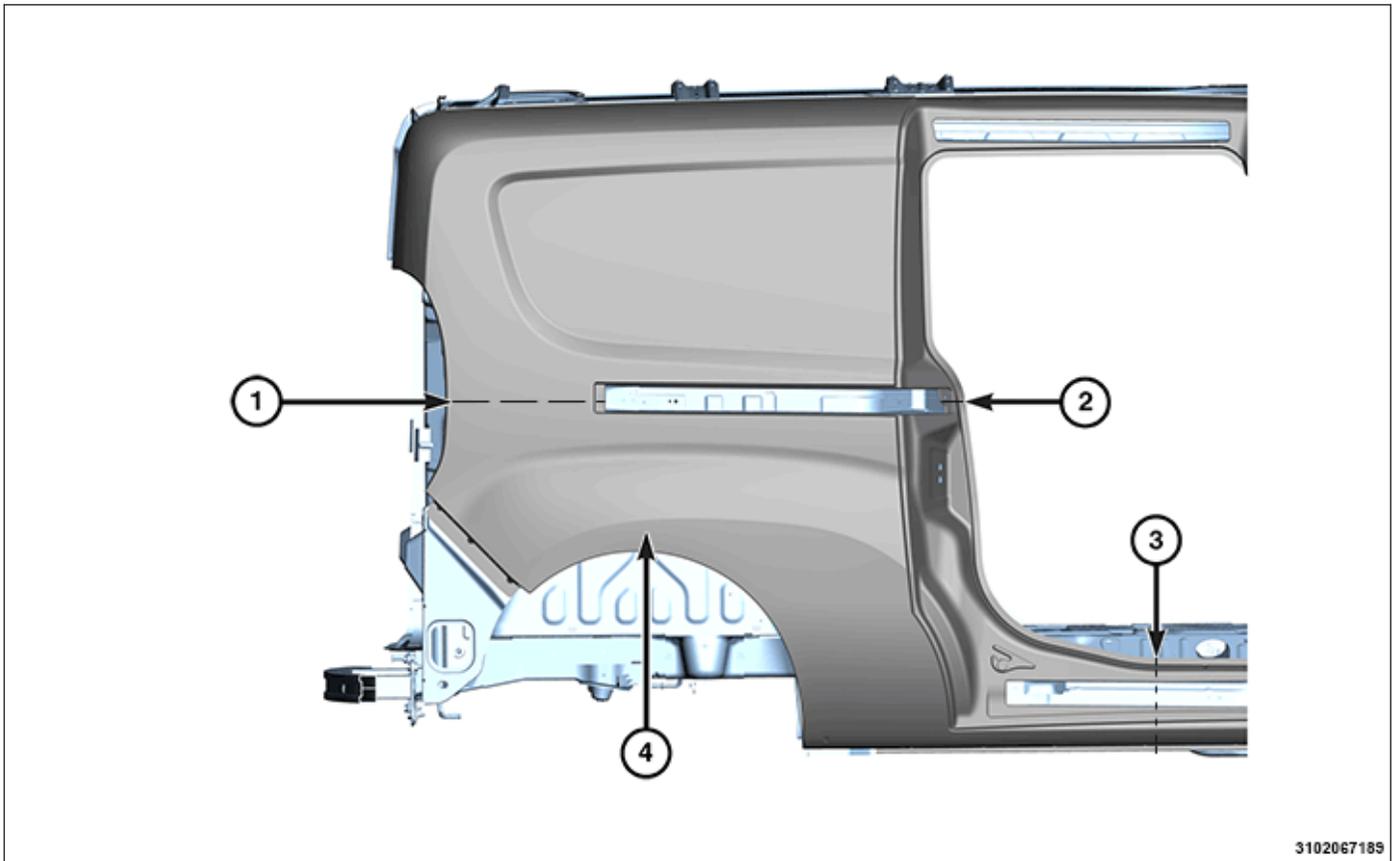
Overview: Chrysler's recommended repair procedure for body side aperture / quarter panel replacement include butt joints using backer panels with structural adhesive at the sectioning joint, or a welded backer panel with a welded butt joint using GMAW (Gas Metal Arc Welding). Resistance spot welding with structural adhesive, referred to as weld bonding, should be used at all pinch welds and may be used at the drain trough and tail panel areas as well. With the exception of the sectioning joint, the rule to follow is "Re-assemble as it was built from the OEM". For further information on Weld / Weld Bonding, (Refer to Collision Information – Standard Procedure). GMAW (plug or puddle) welds may be used in place of STRSW (Squeeze Type Resistance Spot Welding) only in areas that specifically use spot welds and in areas that access limitations will not allow STRSW. GMAW cannot be used in the weld bonding process. Never weld with GMAW within 25mm. (1in.) of any area where structural adhesive is used. The weld "heat zone" will destroy the properties of the adhesive.

For locations and warnings that may apply to body side aperture / quarter panel sectioning locations reference Sectioning Procedures, (Refer to Collision Information – Standard Procedure).

Chrysler approved replacement materials include -

- **Structural Adhesives** : Fusor 112B, 3M 08116.
- **Anti-Flutter Adhesive (flexible)** : Fusor 121 (Flexible Foam), 3M 04724 (NVH Dampening Material) and Crest (CFF Flexi-Foam).
- **Seam Sealer** : Fusor 129, 3M 08308.

CAUTION: Proper angles and depths must be maintained throughout the entire cut to prevent damage to surrounding components



NOTE: Right side shown, left side typical.

- 1 - REAR SECTIONING CUT LINE
- 2 - FRONT SECTIONING CUT LINE
- 3 - SILL SECTIONING CUT LINE
- 4 - BODY SIDE PANEL (LOWER)

Preparation:

NOTE: Be certain vehicle is evenly supported at normal suspension points.

1. Restore structural dimensions as well as all related mating flanges.
2. Once sectioning locations have been established, cut original and replacement panels at the pre-determined locations. Remove spot welds within sectioned parameter.

NOTE: Be careful not to destroy any areas that may be able to be used as backer panels.

NOTE: Where the panel is attached with adhesive, you may use heat, from a non-flame heat source, up to 204°C. (400F°). This will aid in loosening the bond.

3. Use an air chisel with a flat bladed bit to remove original panel.
4. Using a hammer and dolly, restore any and all damage to mating surfaces.
5. Create 13mm (0.5in.) backer panels to be used at the sill and rear butt joints.

NOTE: It will be difficult to abrade the underside mating surface of the original panel, where backer panel is to be used, however this is important step and should be done effectively.

6. Grind all mating surfaces with a 50 grit grinding disk. Remove all adhesive, sealers, paint, E-coating and corrosion protective coatings from the area where the structural adhesive and welds will be applied. The metal should be completely bare and shiny in appearance, if the metal appears pewter in color all of the galvanized coating has not been removed.
7. Pre- drill any GMAW plug / puddle weld holes that may be necessary, with a 8mm. (5/16in.) hole.
8. With the aid of an assistant, dry fit the panel. Apply clamps to hold panel in place, making note of locations. Install screws where accessibility prohibits the use of clamps. This will aid in proper alignment during installation.

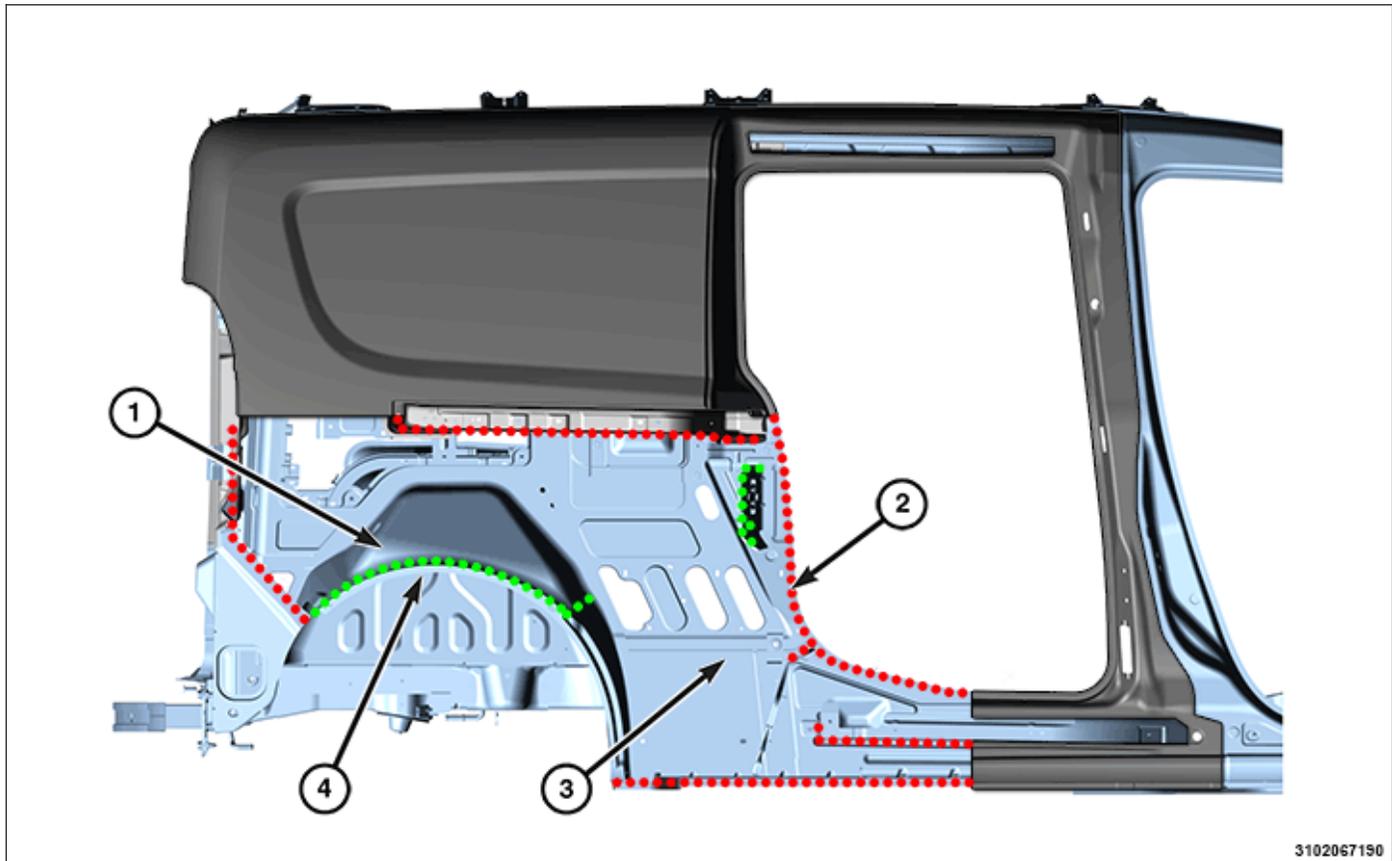
9. Without a mixing tip installed, purge a small amount of structural adhesive from the cartridge. This will ensure an even flow of both components.
10. Attach a mixing tip and dispense a mixing tube's length of adhesive from the cartridge.

NOTE: Using scrap metal and adhesive, make test coupon samples and perform peel test to ensure your STRSW equipment is ready to apply welds as required. The Weld/Weld Bonding section will provide further information on peel testing and equipment set-up, (Refer to 31 - Collision Information - Standard Procedure/Welding and Weld Bonding).

NOTE: Refer to the structural adhesives manufacturer for information on work, handling and curing times.

Installation:

11. Install backer panels, to the sectioning butt-joint locations.



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- 1 - OUTER WHEELHOUSE
- 2 - STRUCTURAL ADHESIVE
- INNER BODY SIDE
- FLEXIBLE ADHESIVE

12. Apply 10 - 13mm. (3/8 - 1/2in.) bead of structural adhesive (1) to the area where the two panels are to be bonded and weld bonded. **Do not apply to areas that will only be STRSW or GMAW welded.**
13. Apply 10 - 13mm. (3/8 - 1/2in.) bead of flexible adhesive (2) to the area where the two panels are to be bonded and weld bonded.
14. Smooth the adhesive with a body filler spreader or equivalent, to cover all bare metal surfaces. Apply a second bead of adhesive to ensure proper adhesive thickness.
15. With the aid of an assistant place the panel to the vehicle. If the panel needs to be adjusted, slide the panel.

NOTE: Adjustments must be made by sliding, not lifting the panel(s). Lifting will cause air bubbles and weaken the bond.
16. Install clamps and screws to locations determined during the dry fit process.
17. Remove all squeeze out of adhesive, prior to curing.

NOTE: Structural adhesive manufacturers will vary on time allowed for completion of STRSW in weld bond zones. Check and follow adhesive manufacturer recommendations.

18. Apply STRSW to weld bond area immediately.
19. Once fully cured, remove clamps and screws. When fully cured, expect adhesive to remain a little tacky, as this is a normal characteristic of the adhesive.
20. Complete STRSW and / or GMAW (plug / puddle) welds.
21. Finish / Dress the welds as necessary. If screws were necessary bevel the screw holes. Prepare the joint and screw holes by grinding the area with 50 grit grinding disc. Get in seams as best as possible without thinning the metal.
22. Remove any excess cured adhesive with a grinder or abrasive disc. All adhesive must be removed from the cosmetic repair area to ensure proper adhesion of repair and refinish materials.
23. Apply fiber-reinforced waterproof body filler to screw holes and joint. Complete the repair using conventional body filler, and block sanding.
24. Apply an epoxy or anti-corrosion primer. When cured, lightly scuff and then apply seam sealer as necessary.
25. Prime and paint per paint manufacturer recommendations.
26. Apply inner panel corrosion inhibiting materials (Mopar Cavity Wax part #68042970AA, or equivalent).

Upper Body Side Panel

Overview: Chrysler's recommended repair procedure for body side aperture / quarter panel replacement include butt joints using backer panels with structural adhesive at the sectioning joint, or a welded backer panel with a welded butt joint using GMAW (Gas Metal Arc Welding). Resistance spot welding with structural adhesive, referred to as weld bonding, should be used at all pinch welds and may be used at the drain trough and tail panel areas as well. With the exception of the sectioning joint, the rule to follow is "Re-assemble as it was built from the OEM". For further information on Weld / Weld Bonding, (Refer to Collision Information – Standard Procedure). GMAW (plug or puddle) welds may be used in place of STRSW (Squeeze Type Resistance Spot Welding) only in areas that specifically use spot welds and in areas that access limitations will not allow STRSW. GMAW cannot be used in the weld bonding process. Never weld with GMAW within 25mm. (1in.) of any area where structural adhesive is used. The weld "heat zone" will destroy the properties of the adhesive.

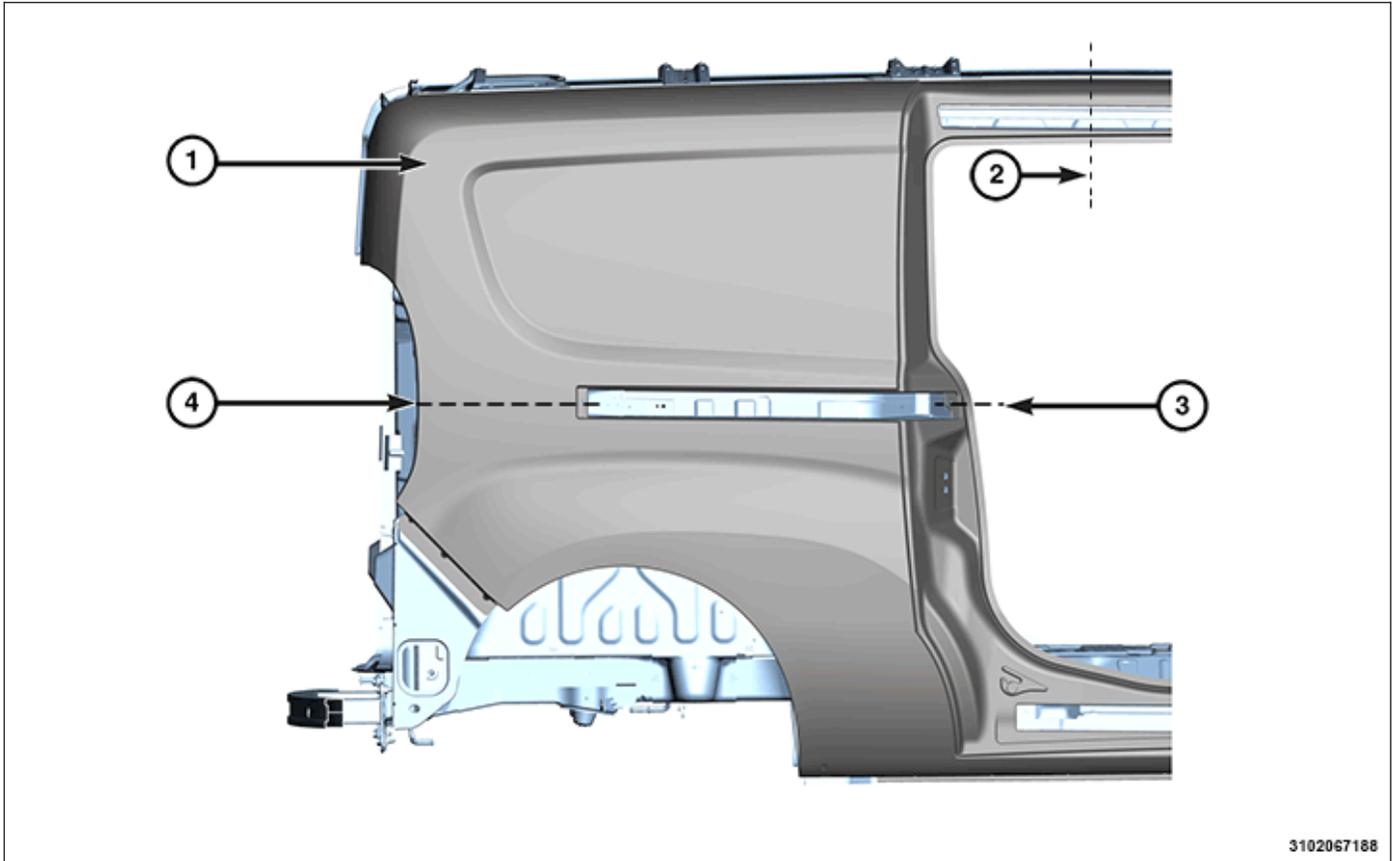
For locations and warnings that may apply to body side aperture / quarter panel sectioning locations reference Sectioning Procedures, (Refer to Collision Information – Standard Procedure).

Chrysler approved replacement materials include -

- **Structural Adhesives** : Fusor 112B, 3M 08116.
- **Anti-Flutter Adhesive (flexible)** : Fusor 121 (Flexible Foam), 3M 04724 (NVH Dampening Material) and Crest (CFF Flexi-Foam).
- **Seam Sealer** : Fusor 129, 3M 08308.

CAUTION: Proper angles and depths must be maintained throughout the entire cut to prevent damage to

surrounding components



NOTE: Right side shown, left side typical.

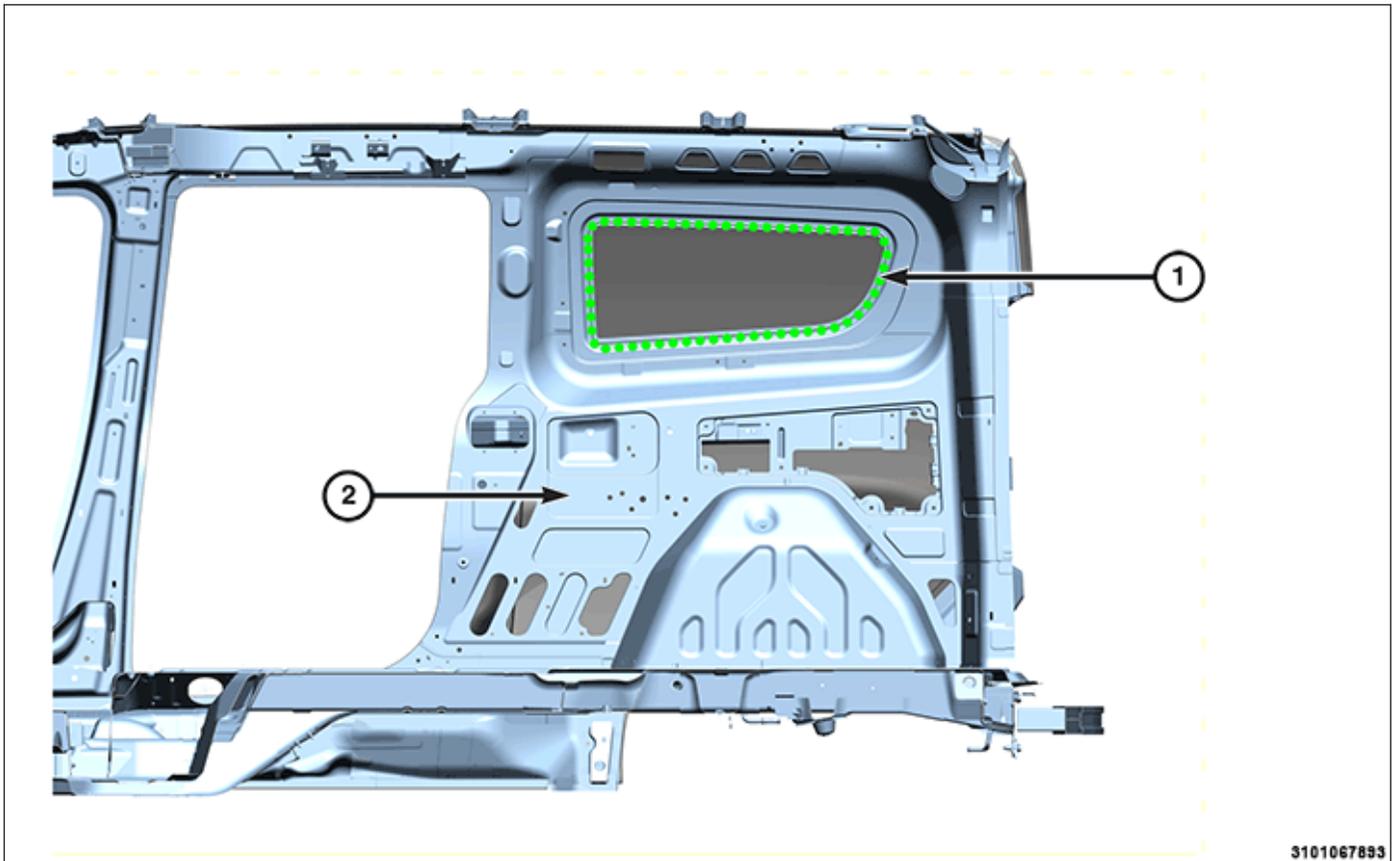
- 1 - BODY SIDE PANEL (UPPER)
- 2 - UPPER SECTIONING CUT LINE
- 3 - FRONT SECTIONING CUT LINE
- 4 - REAR SECTIONING CUT LINE

Preparation:

NOTE: Be certain vehicle is evenly supported at normal suspension points.

1. Restore structural dimensions as well as all related mating flanges.
2. Once sectioning locations have been established, cut original and replacement panels at the pre-determined locations. Remove spot welds within sectioned parameter.

NOTE: Be careful not to destroy any areas that may be able to be used as backer panels.



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1 - FLEXIBLE ADHESIVE

2 - INNER BODY SIDE

NOTE: Where the panel is attached with adhesive, you may use heat, from a non-flame heat source, up to 204°C. (400F°). This will aid in loosening the bond.

3. Use an oscillating knife or equivalent, placed between the outer body side panel and the inner body side panel (2) to cut the flexible adhesive (1).
4. Use an air chisel with a flat bladed bit to remove original panel.
5. Using a hammer and dolly, restore any and all damage to mating surfaces.
6. Create 13mm (0.5in.) backer panels to be used at the upper and rear butt joints.

NOTE: It will be difficult to abrade the underside mating surface of the original panel, where backer panel is to be used, however this is important step and should be done effectively.

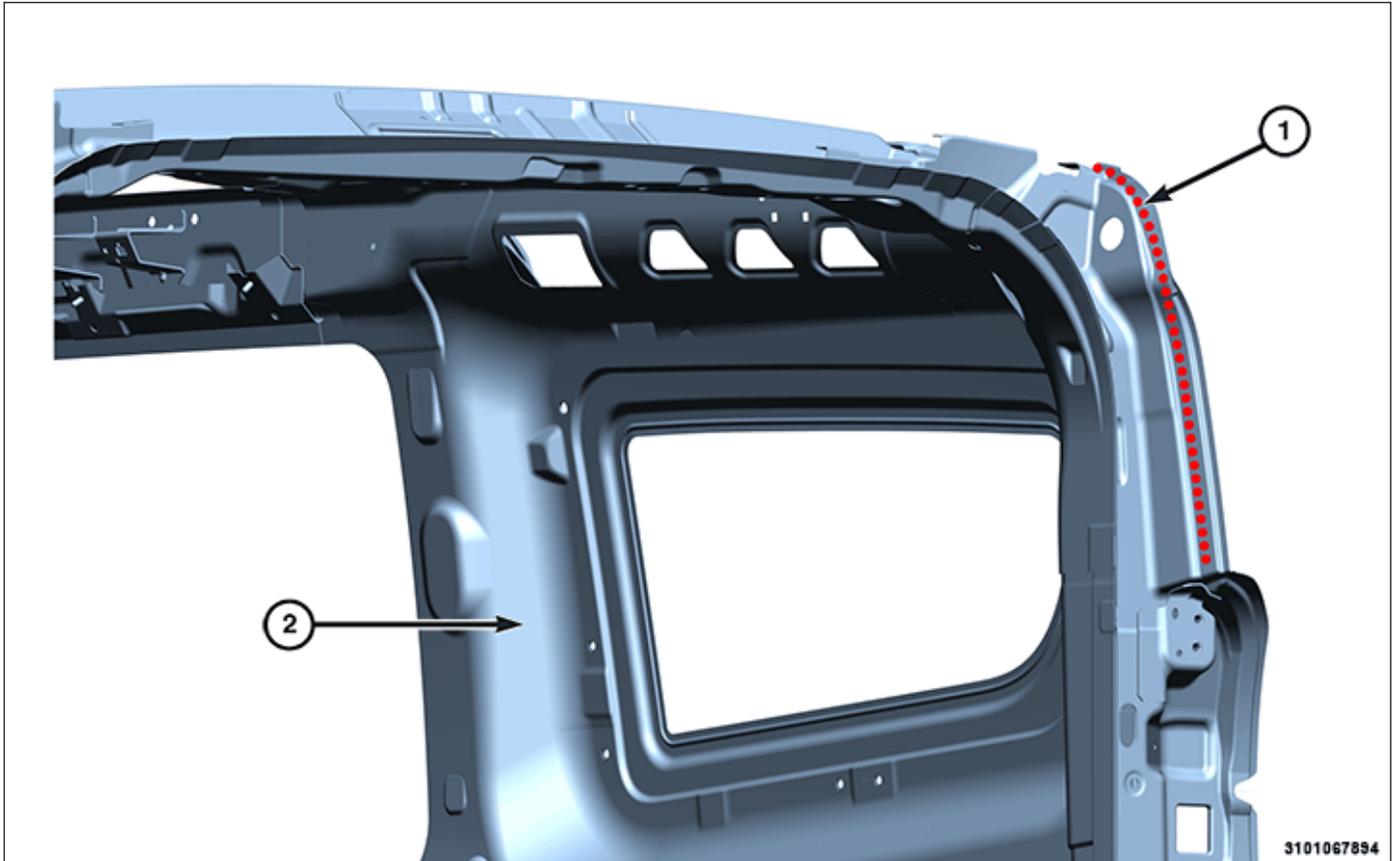
7. Grind all mating surfaces with a 50 grit grinding disk. Remove all adhesive, sealers, paint, E-coating and corrosion protective coatings from the area where the structural adhesive and welds will be applied. The metal should be completely bare and shiny in appearance, if the metal appears pewter in color all of the galvanized coating has not been removed.
8. Pre-drill any GMAW plug / puddle weld holes that may be necessary, with a 8mm. (5/16in.) hole.
9. With the aid of an assistant, dry fit the panel. Apply clamps to hold panel in place, making note of locations. Install screws where accessibility prohibits the use of clamps. This will aid in proper alignment during installation.
10. Without a mixing tip installed, purge a small amount of structural adhesive from the cartridge. This will ensure an even flow of both components.
11. Attach a mixing tip and dispense a mixing tube's length of adhesive from the cartridge.

NOTE: Using scrap metal and adhesive, make test coupon samples and perform peel test to ensure your STRSW equipment is ready to apply welds as required. The Weld/Weld Bonding section will provide further information on peel testing and equipment set-up, (Refer to 31 - Collision Information - Standard Procedure/Welding and Weld Bonding).

NOTE: Refer to the structural adhesives manufacturer for information on work, handling and curing times.

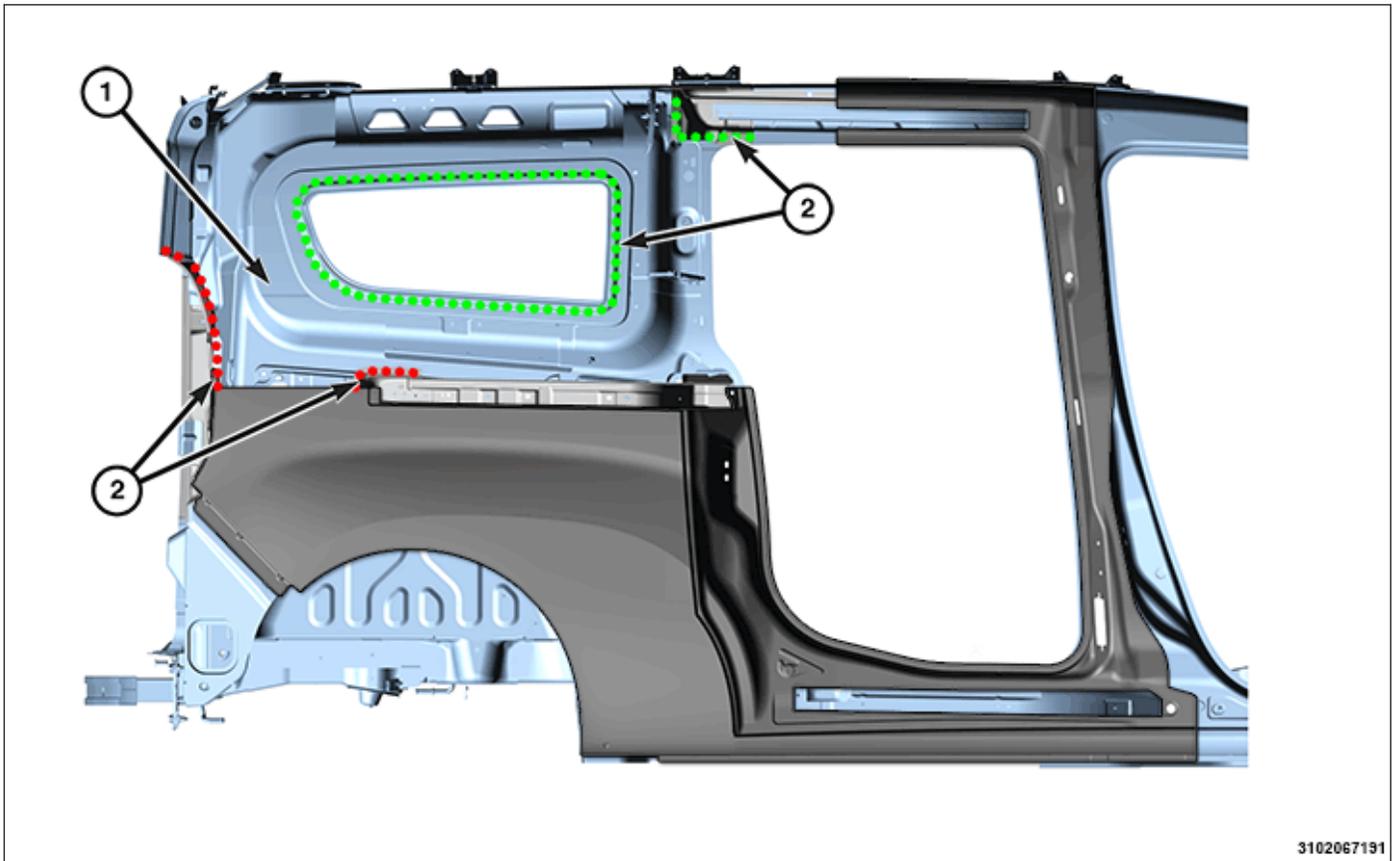
Installation:

12. Install backer panels, to the sectioning butt-joint locations.



- 1 - STRUCTURAL ADHESIVE
- 2 - INNER BODY SIDE

13. Apply 10 - 13mm. (3/8 - 1/2in.) bead of structural adhesive (1) to the upper D-pillar.



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1 - INNER BODY SIDE PANEL

2 - FLEXIBLE ADHESIVE

3 - STRUCTURAL ADHESIVE

14. Apply 10 - 13mm. (3/8 - 1/2in.) bead of structural adhesive (1) to the area where the two panels are to be bonded and weld bonded. **Do not apply to areas that will only be STRSW or GMAW welded.**
15. Apply 10 - 13mm. (3/8 - 1/2in.) bead of flexible adhesive (2) to the area where the two panels are to be bonded and weld bonded.
16. Smooth the adhesive with a body filler spreader or equivalent, to cover all bare metal surfaces. Apply a second bead of adhesive to ensure proper adhesive thickness.
17. With the aid of an assistant place the panel to the vehicle. If the panel needs to be adjusted, slide the panel.

NOTE: Adjustments must be made by sliding, not lifting the panel(s). Lifting will cause air bubbles and weaken the bond.
18. Install clamps and screws to locations determined during the dry fit process.
19. Remove all squeeze out of adhesive, prior to curing.

NOTE: Structural adhesive manufacturers will vary on time allowed for completion of STRSW in weld bond zones. Check and follow adhesive manufacturer recommendations.
20. Apply STRSW to weld bond area immediately.
21. Once fully cured, remove clamps and screws. When fully cured, expect adhesive to remain a little tacky, as this is a normal characteristic of the adhesive.
22. Complete STRSW and / or GMAW (plug / puddle) welds.
23. Finish / Dress the welds as necessary. If screws were necessary bevel the screw holes. Prepare the joint and screw holes by grinding the area with 50 grit grinding disc. Get in seams as best as possible without thinning the metal.
24. Remove any excess cured adhesive with a grinder or abrasive disc. All adhesive must be removed from the cosmetic repair area to ensure proper adhesion of repair and refinish materials.
25. Apply fiber-reinforced waterproof body filler to screw holes and joint. Complete the repair using conventional body filler, and block sanding.
26. Apply an epoxy or anti-corrosion primer. When cured, lightly scuff and then apply seam sealer as necessary.
27. Prime and paint per paint manufacturer recommendations.

28. Apply inner panel corrosion inhibiting materials (Mopar Cavity Wax part #68042970AA, or equivalent).

Metal Fatigue/Stress Crack

Overview: On rare occasions you may encounter metal fatigue, also referred to as stress cracks. This will appear as a crack starting at an edge and trailing away. Follow these steps for a proper repair:

1. Locate the trailing end of the crack and drill a 3mm. (1/8in.) hole at the very point at which it stops. This is referred to as "Stop Drilling".
2. Remove all contaminants and coatings including primer, paint and anti-corrosion, from the repair area. Surface should be clean and shiny (if pewter in color then anti-corrosion has not been removed).
3. Stitch weld the seam/crack closed using GMAW. Follow welding guidelines as found in Weld/Weld Bonding, (Refer to Collision Information - Standard Procedure).
4. Dress the welds as necessary. **Careful not to thin the base metal.**
5. Depending on the location and visibility of the repair surface refinishing will vary from body filler, finishing and painting to simply applying an epoxy or anticorrosion primer and rubberized undercoating, Mopar part #05093417AA or equivalent.
6. Apply inner panel corrosion inhibiting materials (Mopar Cavity Wax part #68042970AA , or equivalent).

WELDING AND WELD BONDING

Safety Notice

CAUTION: All Service and rebuilding instructions contained herein are applicable to, and for the convenience of, the automotive repair industry only

The service procedures recommended and described in this publication were developed for professional service personnel, and are effective methods for performing vehicle repair.

It is important to note this publication contains various **Cautions** and **Warnings**. These should be read carefully in order to minimize risk of personal injury or the possibility that improper service may damage the vehicle or render it unsafe. Chrysler Group LLC. cannot possibly know, evaluate, and advise the service trade of all conceivable ways in which service may be performed, or the possible hazards of each. Consequently, Chrysler has not undertaken any broad service review. Accordingly, anyone that uses a service procedure or tool that is not recommended in this publication must be certain that neither personal safety, nor vehicle safety will be jeopardized by the service methods they select.

Safety Precautions

WARNING:

- When Welding and/or working with Adhesives always wear safety goggles and gloves to prevent contact with chemicals and to prevent weld spatter, sparks, and sharp metal from causing bodily injury.
- Wear an approved respirator while welding and during the application of adhesives to prevent inhalation of harmful vapors.
- Always remove NVH (Noise Vibration and Harshness) foam from welding repair area, as material is flammable.

WARNING: Failure to follow these instructions may result in possible serious or fatal injury

Welding

- Comply with all federal, state and local regulations to avoid any injuries due to shock, fires, fumes, sparks and liquids.
- All flammable materials or liquid should be stored in tightly sealed and labeled containers, and used only in well ventilated areas.
- No spark producing equipment should be permitted in any area where flammable materials are being handled or stored.

Adhesives:

- Safety Data Sheets (SDS) must be available and understood before adhesives are handled.
- All personnel should be instructed on the proper procedures to prevent skin contact with solvents, curing agents, and uncured base adhesives, which could cause allergic reactions or sensitization.

Introduction

Gas Metal Arc Welding

The purpose of this document is to clearly explain the welding options available to the collision repair technician and how to determine that welding repairs are made properly. The primary types of welding covered in this section are Squeeze Type Resistant Spot Welding (STRSW), Gas Metal Arc Welding (GMAW) and Weld Bonding (a combination of STRSW and structural adhesive). Proper training and weld testing are required to ensure that a safe, high quality, vehicle repair is made.

INDEX	REFERENCE
Panel Removal	Panel Removal
Key Points of a Welding Repair	Key Points of a Welding Repair
Requirements of a Welding Repair	Requirements of a Welding Repair
Modified Lap Joint	Modified Lap Joint

INDEX	REFERENCE
Types of Welding (STRSW, GMAW and Weld Bonding)	Types of Welding
Weld Processes (STRSW, GMAW and Weld Bonding)	Weld Processes
Minimum Weld Nugget Requirement Chart	Minimum Weld Nugget Chart
Training and Qualification	Training and Qualification

Panel Removal

WARNING: Always Wear Safety Goggles, Work Gloves, Hearing Protection and a Dust Mask when removing welded panels this way. Failure to follow these instructions could result in serious or fatal injury.

When removing panels and components for replacement, care must be taken not to damage the underlying component. On welded and "Weld Bonded" panels spot welds must be removed using a spot weld cutting type tool, or equivalent. On panels that are adhesive bonded or weld bonded it is acceptable to use heat up to **204°C. (400°F.)**, from a **Non-Open Flame** heat source. This will loosen the bond, so less damage is inflicted to the mating surface. After panel is removed, any remaining weld nugget should be ground smooth. Cut-off wheels should not be used, as there is potential to remove material from the base material which would weaken the final repair. Place an air hammer with a flat bladed chisel bit (or equivalent) in between panels and remove the panel. Care should be taken as to not damage mating flanges and the surrounding components.

Key Points of a Welding Repair

- Poor fit up will adversely affect weld quality and may result in a weld failure due to excessive metal stretching around the nugget.
- Clamps should be used to bring parts together and hold them in position.
- Clamps should be insulated when using STRSW to control weld current shunting (This can be accomplished with specialized clamps or by placing a insulating material such as cardboard between the clamp jaws and the panels.)
- Number, size and location of welds should closely duplicate the original assembly. Do not place the new spot weld directly on the original spot weld location. Placement of a new weld over an original weld location may lead to metal fatigue or poor weld quality.
- Surface of the steel parts should be clean and free of scale, rust, paint, cured adhesives/sealers and any other contaminants that could adversely affect the quality of the weld joint. This includes the removal of any E-coat applied to the service part within 25mm. (1in.) of any welds.
- Proper corrosion protection must be installed when repairs are complete, (Refer to 31 - Collision Information/ Standard Procedure/Corrosion Protection).
- If the joint originally had adhesive, all E-coat must be removed where the adhesive is to be reapplied.
- "Weld-thru" primers are not recommended anywhere STRSW or GMAW are used.
- Do not remove base material from the base panel when releasing welds.

NOTE: Chrysler Group LLC recommends the same quantity of welds as the original panel, but placement of the new weld should NOT be put directly on the original spot weld location. Placement of a new weld over an original weld location may lead to metal fatigue or poor weld quality.

Requirements of a Welding Repair

The number one requirement of any welding repair is to restore the vehicle to its OEM condition. Materials and technologies should duplicate original OEM conditions as much as possible. To meet this requirement, the technician must ensure the following:

- Panel layering (shingling) is the same as original
- Part fit up is correct
- Equivalent sealers and/or adhesives are utilized
- Welds are replaced in the same size, quantity and location
- "Weld-thru" primers are NOT recommended
- Structural adhesives and sealers must be replaced where they were located

A significant amount of structural adhesive is used at the OEM to improve joint strength. It may be difficult to determine if the material between the panels is an adhesive or a sealer, and for this reason, the following guideline should be used: **If in doubt, use a two-component, corrosion inhibiting, structural adhesive.** GMAW welding

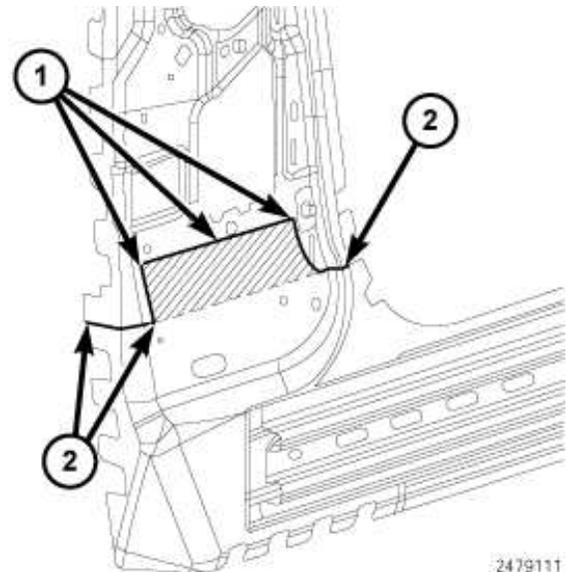
is not recommended within 25mm. (1in.) of the adhesive as it creates heat that will destroy the adhesive. STRSW on the other hand, can weld through the adhesive and will not destroy its properties.

NOTE: Structural adhesives that meet Chrysler materials recommendations for adhesive strength and corrosion protection qualities include Lord Fusor #112B and 3M #08816

Modified Lap Joint

NOTE: Parts shown for example purposes only. Emphasis is on joint design and proper plug weld placement

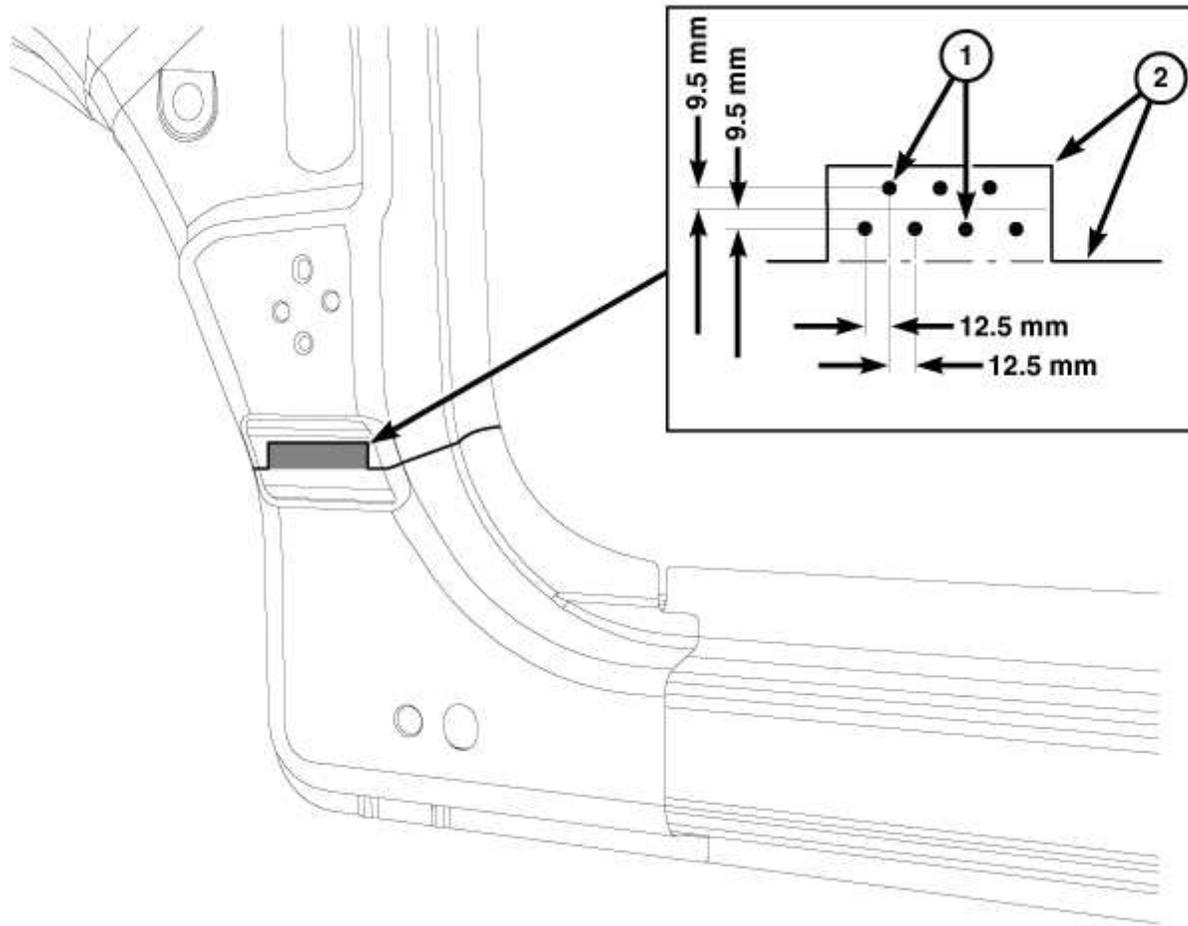
The repair joint is a combination lap-joint (1) and butt-joints (2) – the panels are lapped in the flat areas and butted in contoured locations and at weld flanges. The graphic better illustrates this process.



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Modified Lap Joint

- 1 - LAP-JOINT WELDS
- 2 - BUTT-JOINT WELDS



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Plug Weld Layout

- 1 - MIG PLUG WELDS
- 2 - MIG SEAM WELD

The MIG plug welds, or "puddle welds" should be made after drilling 8 mm (5/16 in) holes and should be staggered 12.5 mm (0.5 in) apart following the centerline of the lap and should be alternating above and below the centerline 9.5 mm (3/8 in.).

In the lap-jointed area, staggered MIG plug welds (1) are used to augment the joint and **all edges** of the lapped panel seam (2) should be **completely** welded.

Types of Welding

STRSW (Squeeze Type Resistant Spot Welding)

- STRSW relies on the resistance of the material being welded to create heat as a current is passed through. The materials being welded are squeezed together, and as current passes through, resistance causes heat buildup. The force of the tips and the heat from the current allow the materials to fuse together. The current is removed and the force from the welding tips is held during a cool down cycle. When the cool down cycle is complete, the pressure is released and the next weld is positioned.
- Learning how to create weld coupons, refer to [Test Weld Coupon](#) and then performing a destructive test using these coupons, is the key to successfully using STRSW. Chrysler Group LLC requires a physical test using test coupons and the methods outlined in this document to test welds prior to making repairs.
- Tip condition is very important for producing proper welds. Inspect tips often and either dress or change per equipment manufacturer recommendations.
- High-quality welding equipment must be used or welds may be inadequate. Also, the equipment must be able to produce repeatable welds from the beginning of the repair to the end.

GMAW (Gas Metal Arc Welding or "MIG")

- GMAW is an arc welding process where the electrode wire is fed through a weld gun and is surrounded by a shielding gas. The term MIG comes from early uses on aluminum where argon was used as shielding gas and

the process was referred to as Metal Inert Gas welding. The GMAW process is currently the most common in the uni-body repair environment.

Weld Bonding

- A method of joining metals using STRSW in conjunction/combination with a structural adhesive.
- Weld bonding provides the customer with a superior repair as compared to the traditional plug/puddle welding process using GMAW. Structural adhesive should not be used in a joint that did not originally contain it.
- The repair joint or seam should duplicate the OE build as closely as possible, unless otherwise stated in the collision information.

NOTE: Chrysler Group LLC. DOES NOT approve or endorse the use of structural adhesives alone in the replacement of body panels.

Weld Processes

Squeeze Type Resistance Spot Welding (STRSW)

Applications

- With advancements in equipment technologies, STRSW is not restricted to light gauge sheet metal any longer. Heavier gauges of high strength and coated steel, currently used in vehicle structures, can now be welded in the field, providing destructive testing is performed on each combination. This is to ensure quality welds are being maintained.

Equipment Requirements

- Equipment must produce two sided welds
- Equipment must have been tested to SAE J2667 with satisfactory results obtained
- Equipment must have the capability to create welds that comply with the Minimum Weld Nugget Requirement Chart
- Technician must have the appropriate sheet metal measuring equipment to ensure their welds meet the minimum weld nugget size for the actual panels being welded

Gas Metal Arc Welding (GMAW or "MIG")

Applications

- Sheet metal repairs where STRSW is not available or practical, and truck frame repairs.
- The most common usage of GMAW on uncoated or galvanized coated steel will utilize a 75% Argon - 25% CO₂ shielding gas mix, and AWS specification ER70S6 wire. When welding galvanized material, Flux Core Arc Welding (FCAW) using AWS specification E71T-GS wire should be used to avoid weld porosity from the zinc in the galvanizing.

Weld Process

COMPONENT PARTS	TRUCK FRAME		BODYSHELL EXTERIOR & UNDERBODY PANELS			
	Zinc and Zinc Iron Alloy coated sheet steels					
WELDING PROCESS	GAS METAL ARC (Note: 1)	FLUX CORED ARC	GAS METAL ARC (Note: 1)	MIG BRAZE (Note: 2)	GAS METAL ARC (Note: 1)	FLUX CORED ARC
Material Type	High Strength and Structural Quality Steels which includes HSLA, Martensitic, and Dual Phase materials					
Material Thickness Range	2 mm - 4 mm		0.6 mm - 1.02 mm		>1.02 mm - 3.0 mm	
ELECTRODE TYPE (AWS SPEC. A5.18)	AWS CLASS. ER70S-6	AWS CLASS. E71T-11 (Note 3)	AWS CLASS. ER70S-6	AWS CLASS. ERCuSi - A Silicon Bronze	AWS CLASS. ER70S-6	AWS CLASS. E71T-11 (Note 3)
ELECTRODE SIZE	0.035	0.045	0.023 - 0.025	0.035	0.035	0.045
ELECTRODE MAKER	Lincoln®	Lincoln® NR-211-MP	Lincoln®		Lincoln®	Lincoln® NR-211-MP

COMPONENT PARTS	TRUCK FRAME		BODYSHELL EXTERIOR & UNDERBODY PANELS			
	WIRE FEED SPEED (in/min)	245-250 Vertical Down 70-90 Flat & Horizontal	110 Vertical Down 70-90 Flat & Horizontal	95-115 All Welds	150-155 Flat & Horizontal	245-250 Vertical Down 70-90 Flat & Horizontal
TRAVEL SPEED (in/min)			10			
VOLTAGE	19-20	15-18	16-19	18-19	19-20	15-18
POLARITY	DCEP	DCEN	DCEP	DCEP	DCEP	DCEN
GAS FLOW (cfh)	25-35	N/A	25-35	25-35	25-35	N/A
ELECTRICAL STICKOUT (in)	1/2 - 5/8	3/8 - 1/2	1/2 - 5/8	5/8 - 3/4	1/2- 5/8	3/8 - 1/2
GAS TYPE	75% Ar 25% CO2	N/A	75% Ar 25% CO2	100% Ar	75% Ar 25% CO2	N/A
TYPE OF ARC TRANSFER	Short Circuit		Short Circuit	Pulse	Short Circuit	

These Procedure Specifications are appropriate as of this publication. Procedures may be superseded with new spec's at a later date.

Always process to the thinner material thickness (TMT)

All persons performing welding must be qualified to weld in all positions.

NOTE:

1. Must remove Zinc Coating on both sides of metal at the weld zone.
2. MIG Braze welding process requires use of Pulse Arc® or STT® welding machine.

Equipment Requirements

- The preferred GMAW welder will be a 220V. unit with minimum output capacity of 150 amps (250 amps suggested to avoid equipment limitations).

Limitations

- Welds must be "dressed", or ground down before applying topcoats.
- GMAW cannot weld through paints, sealers, or adhesives. Additionally, the zinc used in coated steels can lead to reduced weld strength due to porosity. This porosity problem on materials with heavy coatings can be dealt with by using FCAW.
- Due to the heat affected zone, structural adhesives cannot be applied within 25mm. (1in.) of GMAW welds.

Testing

- Weld coupons identical to the repair situation need to be created to help set up the welding equipment and weld process. These coupons then should be destructively tested to ensure proper quality welds are being made

Post Weld Procedures

- When welding has been completed, welds in cosmetic locations must be dressed.
- Welds will need to be smoothed down to the height of the surrounding panel without any thinning of the sheet metal. This can be accomplished using one of many sanding or grinding products available in the aftermarket.
- Slag must always be removed prior to refinishing to restore corrosion protection and appearance.
- Corrosion inhibiting materials must be applied to seal the weld zone from future corrosion.

Minimum Weld Nugget Requirement Chart

*Governing Metal Thickness (GMT)	**Minimum Weld Nugget Diameter
0.64mm. - 0.79mm.	3.5mm.
0.8mm. - 0.99mm.	4.0mm.
1.0mm. - 1.29mm.	4.5mm.

*Governing Metal Thickness (GMT)	**Minimum Weld Nugget Diameter
1.3mm. - 1.59mm.	5.0mm.
1.6mm. - 1.89mm.	5.5mm.
1.9mm. - 2.29mm.	6.0mm.
2.3mm. - 2.69mm.	6.5mm.
2.7mm. - 3.04mm.	7.0mm.

*Governing Metal Thickness (GMT) = The minimum weld nugget for two thickness welds shall be based on the thinner of the two sheets being welded. The minimum weld nugget diameter for three thickness welds shall be based on the middle gauge of the three panels being welded (not necessarily the middle panel).

**Minimum nugget diameter should be measured with a venire caliper. If the weld is not round, measure the major and minor diameter and average.

Equipment Limitations

- Each brand/model is limited to material capacity that can be welded
- The facility power supply can also impact equipment performance

Access Limitations

- Due to the existing structure of the vehicle being repaired, each weld must be evaluated for feasibility. Due to power limitations of the equipment, tongs that are long and deep enough for certain welds may not be available, and the weld will need to be made by another method.

CAUTION: All NVH foam must be removed from the repair area of the vehicle, as material is flammable.

Preparation

- Prior to making repairs with STRSW, weld coupons must be created for testing. The test joint must be an exact duplicate of the original joint, including layering and adhesive application. The testing is required to ensure the repair restores the vehicle to its originally produced condition using the minimum weld nugget requirement chart.
- To correctly identify the material being welded or tested, the technician must possess an accurate material thickness gauge
- No "improvements" to the vehicle design are allowed as this could have a negative impact on the vehicle as a whole. The repair should mirror what was used on the vehicle at the assembly plant.
- Note, the weld is affected by more than just the thickness or number of panels being welded, but also material coatings. Zinc based anti-corrosion coatings (i.e., galvannealing, galvanizing), sealers, adhesives, and E-coat will affect welder performance. Any sandwich type coatings will increase weld time (and current in some types of STRSW welders) required to accomplish an acceptable weld nugget.
- When preparing an E-coated panel for STRSW the E-coat must be removed from both of the mating flanges within 25mm. (1in.) of any flange. Corrosion protection is required anytime you remove E-coat. A scuffing disc should be used to remove the E-coat without damaging other sheet metal coatings
- If the panel originally had structural adhesives it should be reapplied prior to welding. The adhesive should have a corrosion inhibitor and cover all bare metal.
- Prior to creating weld coupons and the final body repairs, all coatings and dirt/road debris must be removed.

Testing

- Weld coupons identical to the repair situation need to be made prior to performing any repair. These coupons must be tested (peel test) to determine if the weld nugget meets the minimum size outlined above in the Minimum Weld Nugget Requirement Chart. Keep in mind that different material coatings, coating thickness, material thickness, and joint configurations have a direct impact on nugget size.

Weld Bonding

NOTE: Structural adhesive manufacturers will vary on time allowed for completion of STRSW in weld bond zones. Check and follow adhesive manufacturer recommendations.

Application

- Weld bonding is the STRSW welding process utilizing structural adhesive between the panels that are resistance welded together. The adhesive creates a very stiff structure, while the welding eliminates concerns of the adhesives' peel strength.
- Additionally, the adhesive acts as a sealer and provides a high level of corrosion protection.

Sealers and Adhesives

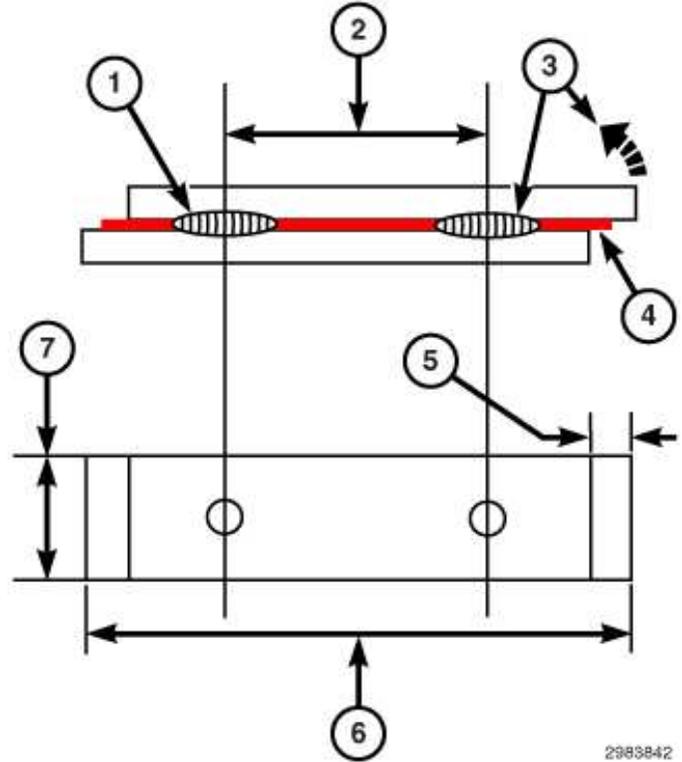
- Sealers are materials placed on top of a seam to control water and air intrusion.
- Adhesives, providing structural improvements, are found between panels welded together. Adhesives also

provide the qualities of sealers when applied correctly.

- The Chrysler Group LLC. recommendation is to replace any suspected adhesive with a two-component, corrosion inhibiting structural adhesive when any repairs are made, providing the STRSW process is applicable.

Test Weld Coupon

NOTE: Periodically check the electrodes tips to determine whether the faces have been contaminated, damaged or increased in size. If any of these conditions have occurred, replace or re-face the electrode tips per equipment manufacturer recommendations.

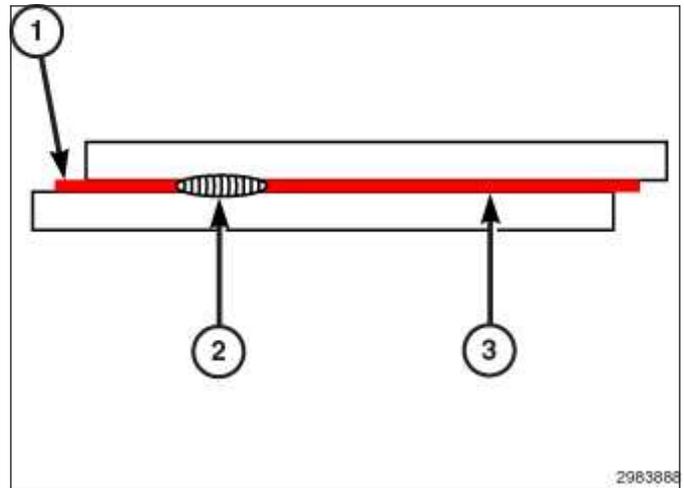


Weld Coupon

- 1 - FIRST WELD TOWARD END OF COUPON, AT LEAST 12.5mm. (0.5in.) FROM ANY EDGE
- 2 - DISTANCE MUST EQUAL THE SPACING FROM THE REPAIR WELD TO THE CLOSEST EXISTING WELD ON THE VEHICLE
- 3 - TEST THE SECOND WELD BY PEELING APART IN DIRECTION SHOWN (USING PLIERS OR EQUIVALENT)
- 4 - STRUCTURAL ADHESIVE
- 5 - APPROXIMATELY 13mm. (0.5in.)
- 6 - APPROXIMATELY 100mm. (4in.)
- 7 - APPROXIMATELY 25mm. (1in.)

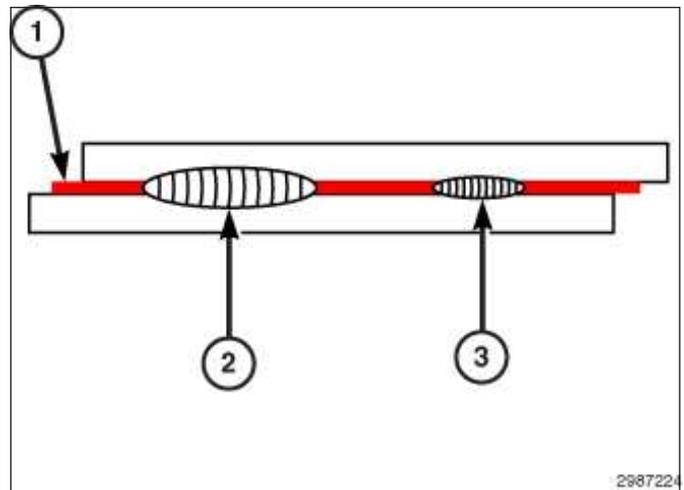
Weld Examples

Current Level Low for Both Welds



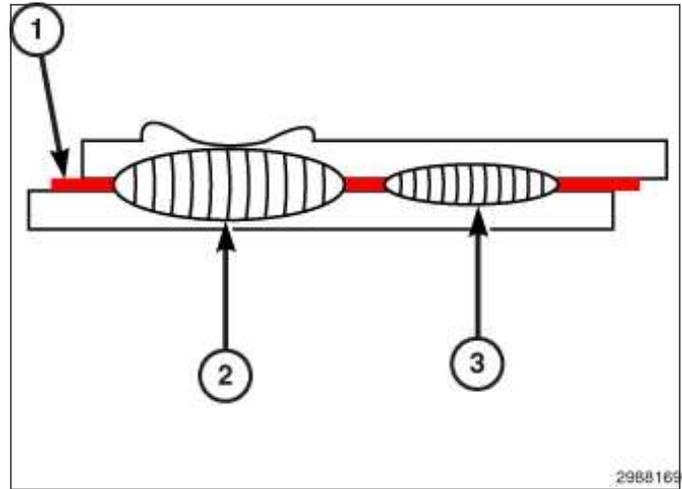
- 1 - STRUCTURAL ADHESIVE
- 2 - WELD TOO SMALL
- 3 - WELD NON-EXISTENT

Current Level Medium for Both Welds



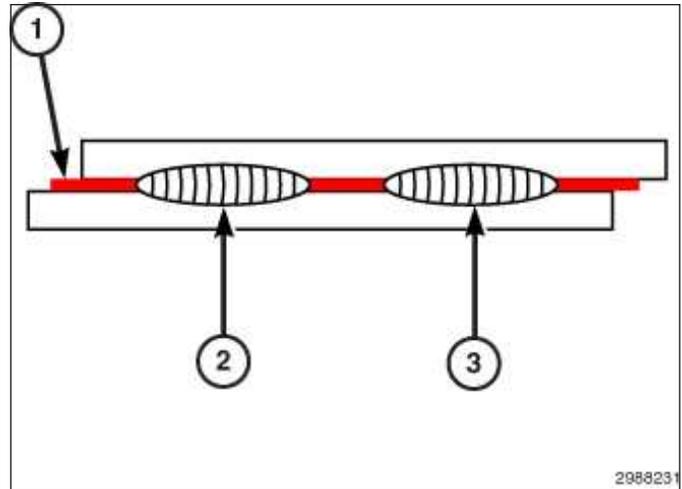
- 1 - STRUCTURAL ADHESIVE
- 2 - WELD CORRECT SIZE
- 3 - WELD TOO SMALL

Current Level High for Both Welds



- 1 - STRUCTURAL ADHESIVE
- 2 - WELD HAS HEAVY EXPULSION OF METAL AND SURFACE MARKINGS
- 3 - WELD CORRECT SIZE

Current Level Adjusted to Provide Acceptable Welds



- 1 - STRUCTURAL ADHESIVE
- 2 - WELD CORRECT SIZE
- 3 - WELD CORRECT SIZE

1. Select the proper spot welding "arm" which provides the best access to the areas of the vehicles where the spot welds are to be made.
2. Obtain metal of the same thickness and coating (i.e., bare, galvanized, or galvanized) to be welded. This metal will be used for spot welder set up. Damaged sheet metal taken from the vehicle being repaired may be used if it is from the area from which the work is to take place. The sheet metal must be flat, free of cracks, wrinkles and scored metal.
3. Using the procedure outlined in [Test Weld Coupon](#), prepare the test coupons.
4. Clean and prepare both mating coupons. If using adhesives, verify the recommendations of the adhesive manufacturer. All contaminants such as rust scale, dirt, paint, and existing sealers and adhesives must be removed. Remove any E-coat within 25mm. (1in.) of where the welds are to be placed.
5. If the panel joint originally contained structural adhesive, it should be applied to the coupon at this time.
6. Install the equipment manufacturers recommended electrode tips.
7. Adjust the welding electrode tip force, and clamp time per manufacturer recommendations.

NOTE: Galvanized and galvanized coated steel will require more force

8. As shown in [Test Weld Coupon](#), place first weld at a position at least 12.5mm. (0.5 in.) away from end weld coupons. Then make the second weld. The weld spacing should be the same distance as the original welds or the closest existing weld, whichever is the least on the vehicle being repaired.
9. Destructively test the **second** weld to determine the size of the resistance spot weld produced (see examples

in [Test Weld Coupon](#). If the weld is insufficient, adjust the welder per the welder manufacturer recommendations and repeat steps 7,8 and 9 until the proper weld size is achieved.

NOTE: If the first weld becomes too "hot" before the second weld reaches the correct size, reduce the current settings for the first weld and continue increasing the current setting for the second weld until the proper size for the second has been reached.

Final Weld Preparation

CAUTION: NVH foam should be removed from the weld area, as material may be flammable.

1. Visually verify that mating flanges are free of scale, rust, dirt, paint and cured adhesives/sealers, as well as wrinkles. If cracked, wrinkled or scored metal exists the condition needs to be corrected at this time.
2. E-coat within 25mm. (1in.) needs to be removed for STRSW. If Weld Bonding, E-coat should be ground off completely along seam.

NOTE: Corrosion resistance coating (i.e., galvaneal, galvanized) should not be removed during cleanup of components.

3. If adhesive is to be used, apply it at this time. Clamp the component to the vehicle.

NOTE: Insulated clamps should be used, as not to shunt the weld current.

4. Visually verify that the welds to be made **will not** be placed directly over an existing weld.
5. After verifying that the welder control settings are the same required to produce the second weld on the test coupons, make the welds on the vehicle.

NOTE: Structural adhesive manufacturers will vary on time allowed for completion of STRSW in weld bond zones. Check and follow adhesive manufacturer recommendations.

6. If adhesive was used, clean up any excessive squeezeout prior to adhesive curing.

Training and Qualification

Training

As with any equipment, proper training is required, and in the case of welding equipment this is no exception. The goal of automobile facilities and technicians is to restore the vehicle to its OEM condition.

Training must be considered a two-fold process:

- The technician must be well versed in how the equipment operates, how adjustments are made and what effects those adjustments have on the weld. The technician must also clearly understand the maintenance of the equipment and the impact of poor maintenance on welds and equipment longevity.
- The second and most important, aspect of the training, is weld quality confirmation. Destructive testing of weld coupons must be performed to ensure the minimum weld size is created. Physical appearance of the weld is not enough to determine the quality of the weld. Additionally, poor welds may also reduce the durability, or quality, of the repaired vehicle in time.

It is required that technicians have received training regardless of the welding equipment or method they utilize. Both training in the specific field of welding, and the particular equipment, are necessary to ensure safe, durable, quality welds are obtained.

Qualification

To demonstrate welding skill, it is highly important that technicians obtain certification from an organization such as the American Welding Society (AWS) or a certificate from the Inter-Industry Conference on Auto Collision Repair (ICAR).

SECTIONING LOCATIONS AND PROCEDURES

WARNING: Chrysler engineering’s position on the use of heat during collision repair is as follows:

- Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the “cold straightening” method. No heat may be used during the straightening process.
- During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.

This “no heat” recommendation is due to the extensive use of advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

CAUTION:

- All restraint systems should be disabled before beginning repairs.
- Electronic modules located within 305 mm (12 in.) of any welding should be isolated.
- Protect vehicle from weld spatter damage.
- Vehicle service manual should be referenced for guidelines and warnings.

Service assemblies for body components may be disassembled if utilization of the subcomponents is more appropriate to the repair or to reduce vehicle disruption. The structural and non-structural metal on the Ram Pro Master City (VM) may be sectioned in several areas providing the prescribed methods below are adhered to.

The joint should whenever possible be performed in as “flat” an area as possible to simplify the repair. While the joint may include “holes” and formations, it is suggested they be avoided but where this is not possible, the technician must ensure that the additional material thickness does not impede installation of fasteners, etc. that the hole exists for.

All dimensions are to be restored to factory specifications prior to full or partial component replacement.

CAUTION: NVH foam should be removed from the weld area, as material may be flammable.

CAUTION: Do not apply any corrosion protection or NVH foam prior to completion of welding, as materials are flammable.

The described sectioning locations only explain joint location and type. All other welds along the sectioned portion of the component must be replaced. Squeeze Type Resistance Spot Welding (STRSW) is the method to be used. If accessibility prevents application of spot welds MIG plug welds are to be used. Welding of structural panels through 3 or more tiers of panel stack ups will require 9.5 mm plug welds. Exterior panels should be installed using 8 mm. plug welds. For further information, (Refer to Collision Information - Specifications).

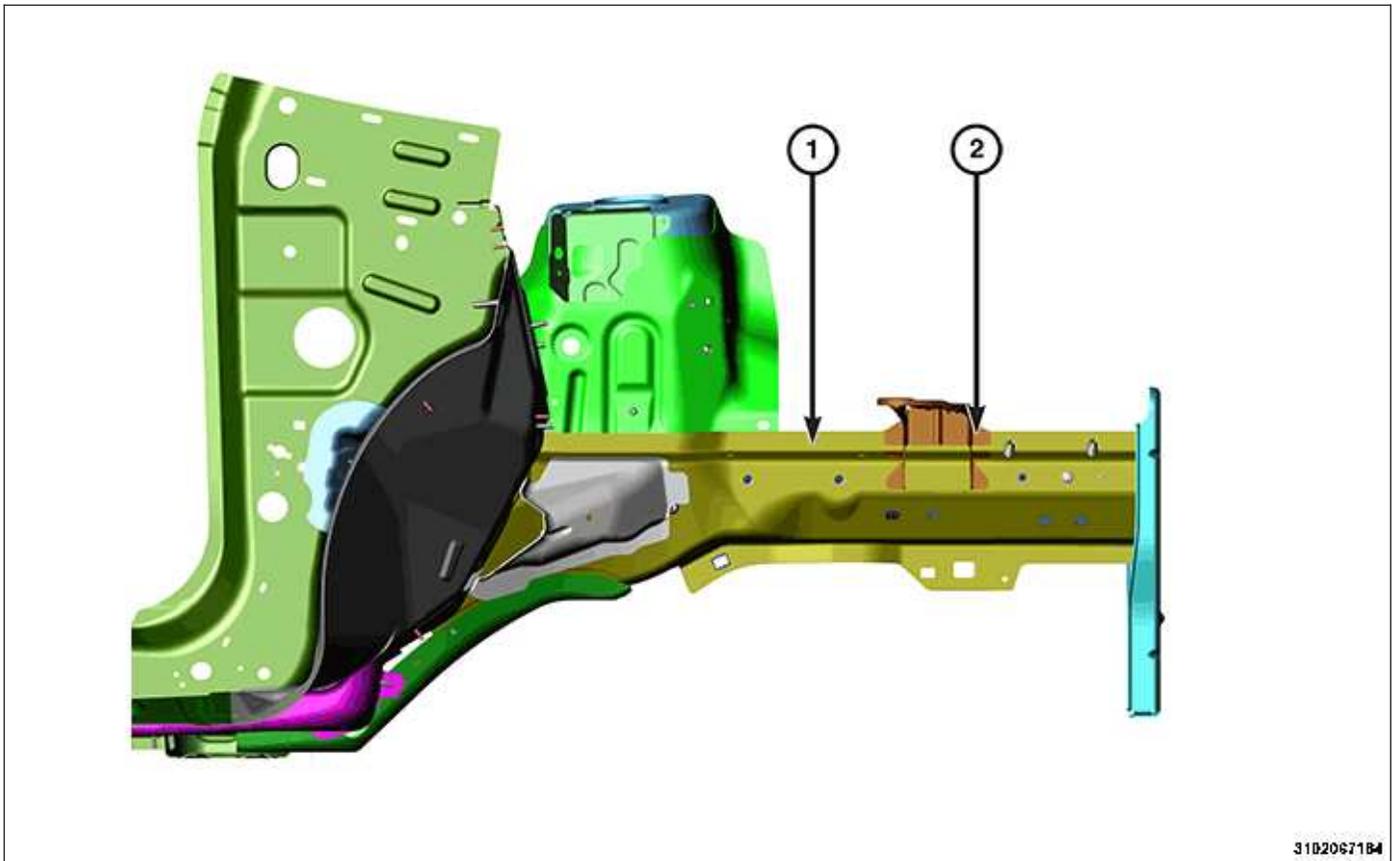
When welding is completed apply inner panel rust proofing, such as Mopar Cavity Wax Kit (part #68042969AA), Mopar Wax Refill (part #68042970AA), or equivalent. Apply to the inner cavity areas in two applications with a 30-minute flash period between the applications. Pay particular attention to areas which have been welded. Corrosion protection should always be restored to manufacturer specifications. For further information on Corrosion Protection, (Refer to Collision Information - Standard Procedure).

Finish, sealers, adhesives and silencers should be reapplied or replaced to OEM locations and specifications, (Refer to Collision Information - Locations).

DESCRIPTION	FIGURE
Left Front Frame Rail	Left Front Frame Rail
Right Front Frame Rail	Right Front Frame Rail

DESCRIPTION	FIGURE
Inner Body Side Components DO NOT SECTION	Inner Body Side Components Do Not Section
Sill/Rocker Panel	Sill/Rocker Panel
Body Side Panel	Body Side Panel
Rear Floor Panel	Rear Floor Panel

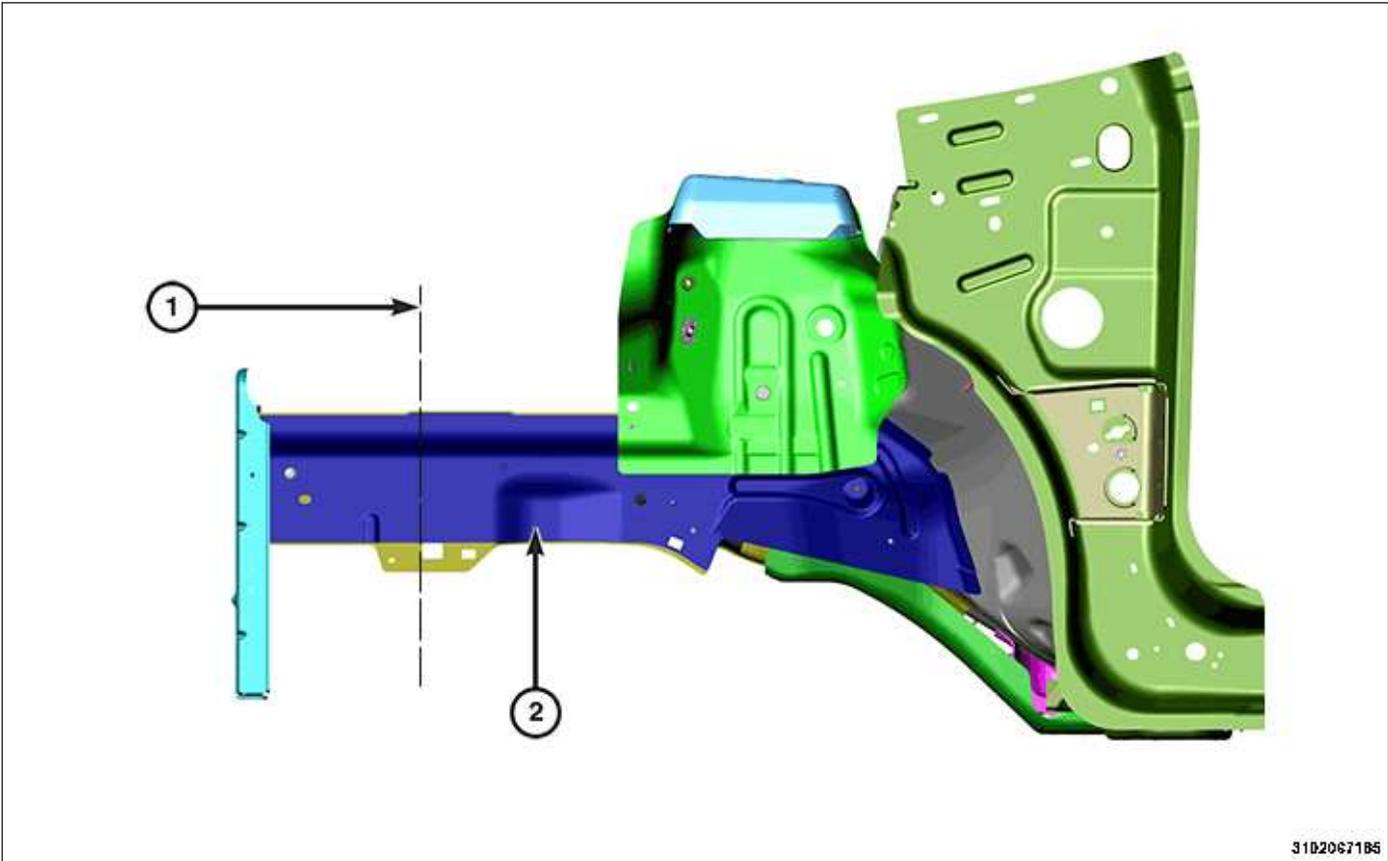
Left Front Frame Rail



1 - LEFT FRONT FRAME RAIL INNER

2 - BATTERY MOUNTING BRACKET

Remove the spot welds that join the battery mounting bracket (2) to the left front frame rail inner (1). Remove the battery mounting bracket (2).



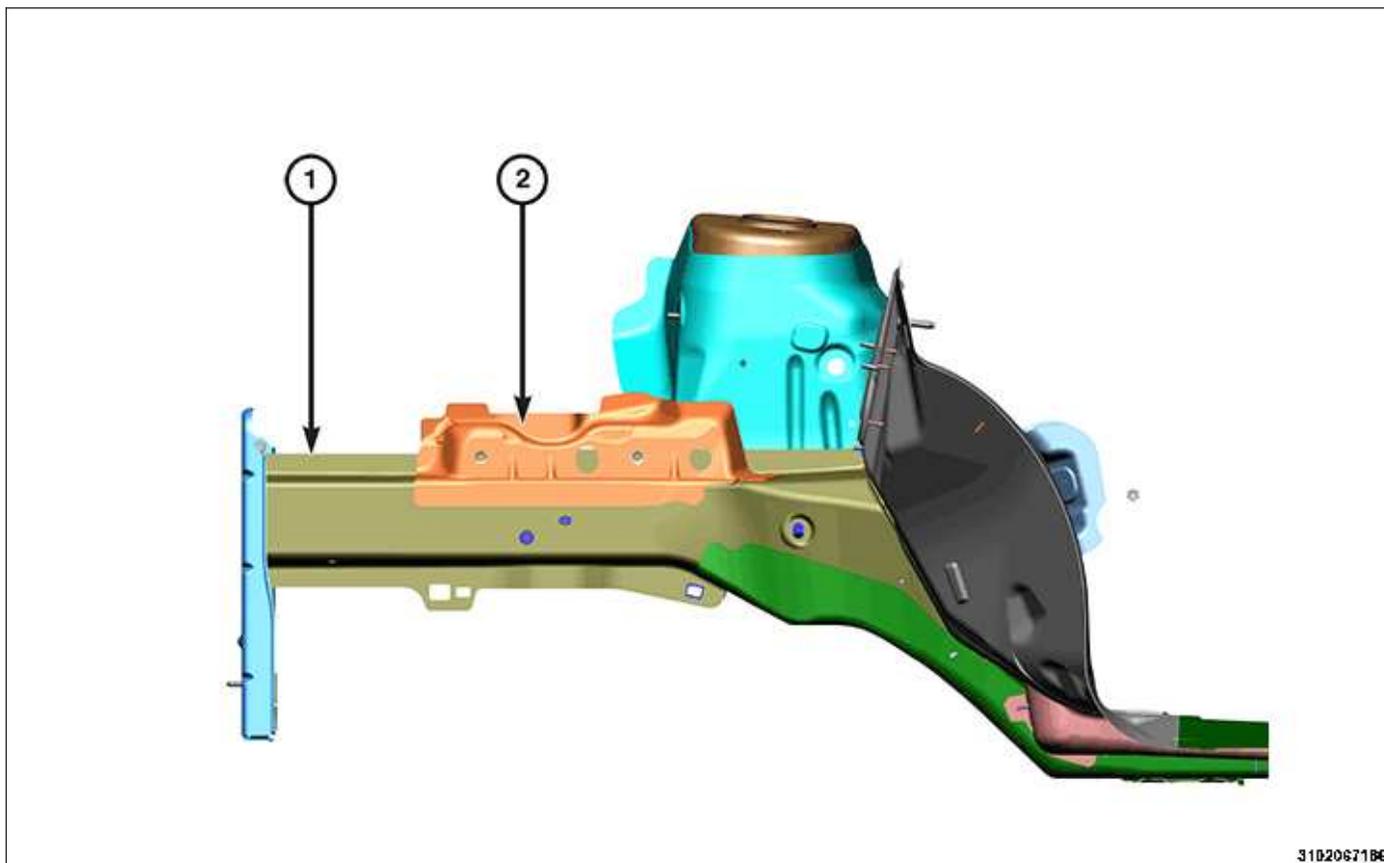
- 1 - SECTIONING CUT LINE
- 2 - LEFT FRONT RAIL OUTER

Cut the left front lower rail (2) along the cut line (1). Measure and cut the service part to the same locations.

The left front lower rail inner and outer portions are to be sectioned using a butt-joints with a 13 mm (0.5 in.) weld backers.

Install the battery mount bracket with the use of plug welds.

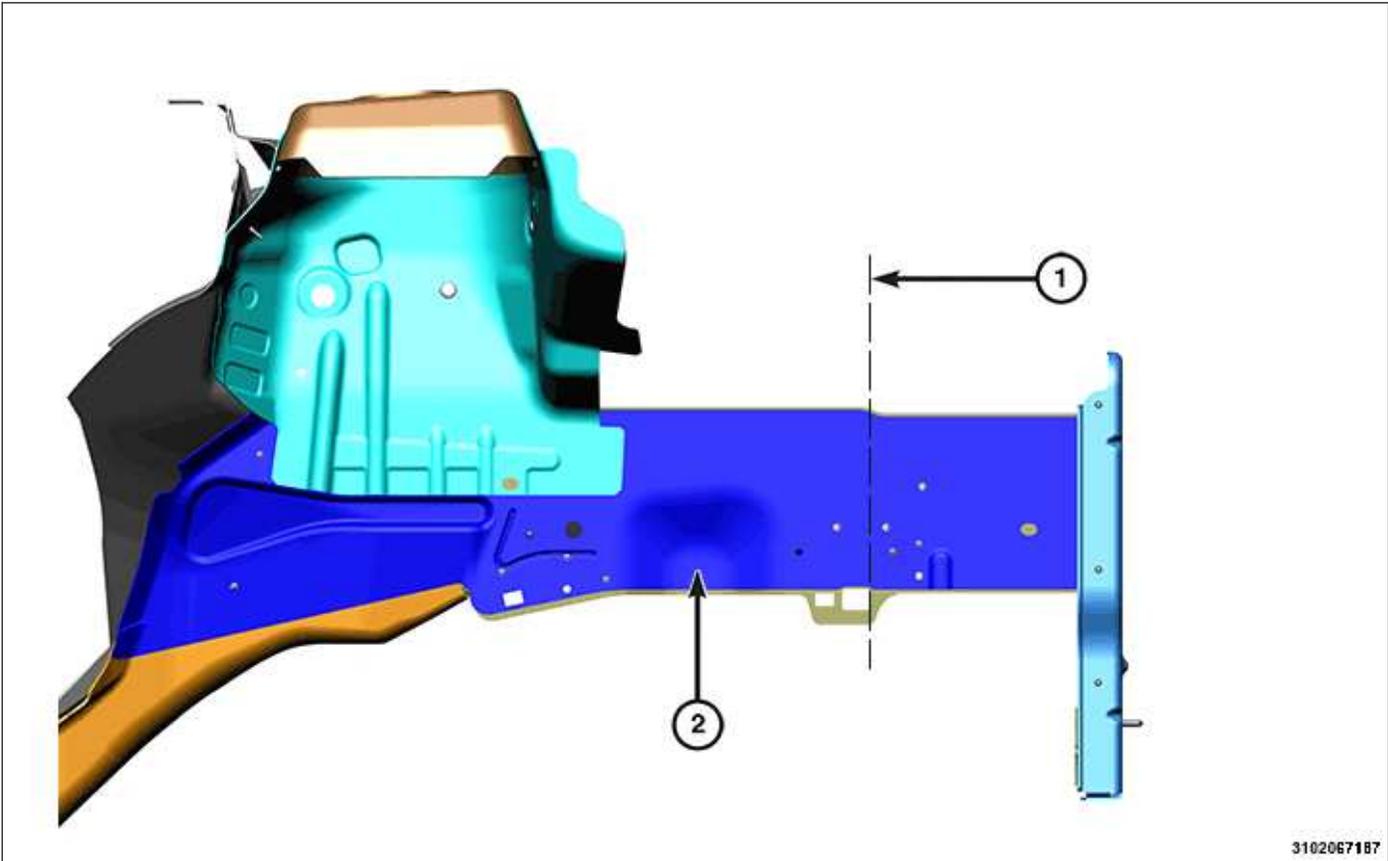
Right Front Frame Rail



1 - RIGHT LOWER RAIL INNER

2 - ENGINE MOUNT BRACKET

Remove the spot welds that join the engine mount bracket (2) to the right lower rail inner (1) and outer. Remove the engine mount bracket.



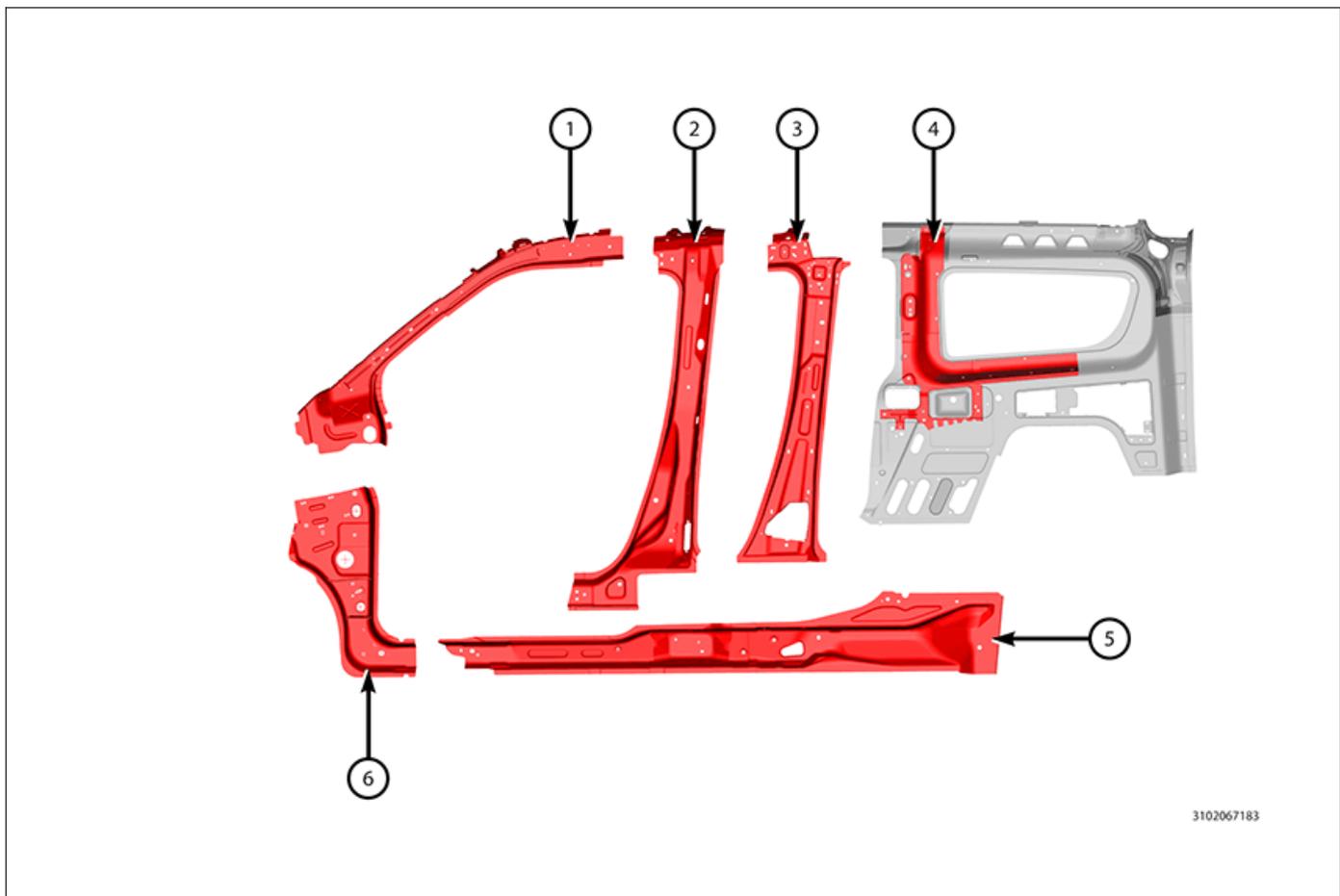
- 1 - SECTIONING CUT LINE (FRONT RIGHT RAIL INNER)
- 2 - RIGHT FRONT RAIL OUTER

Cut the outer right rail (2) along the cut line (1). Measure and cut the service part to the same locations.

The front right rail inner and outer portions are to be sectioned using a butt-joints with a 13 mm (0.5 in.) weld backers.

Install the engine mount bracket with the use of plug welds.

Inner Body Side Components Do Not Section

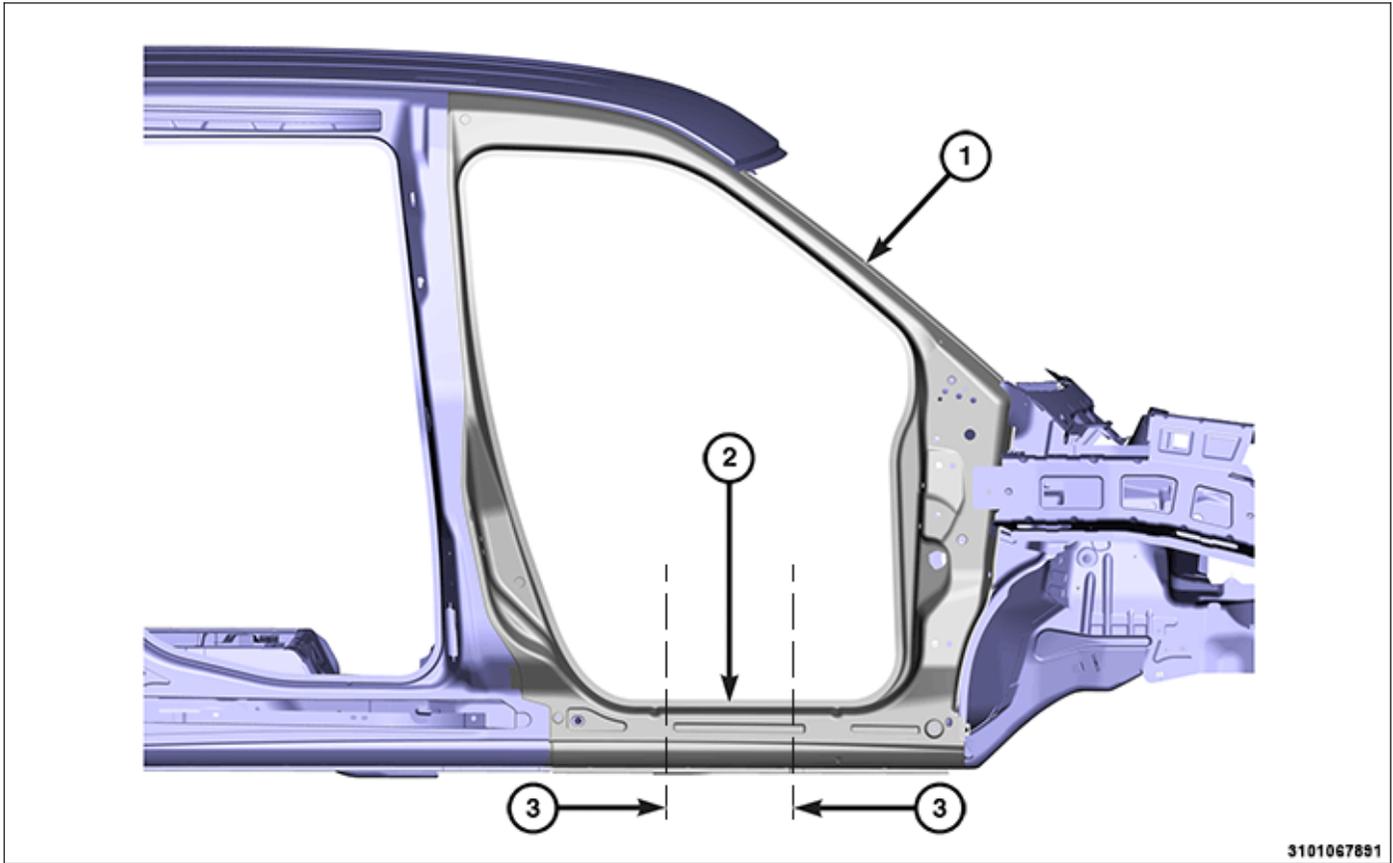


VERY HIGH STRENGTH (VHS) REINFORCEMENTS AND PANELS — DO NOT SECTION

- 1 - A-PILLAR REINFORCEMENT
- 2 - OUTER B-PILLAR REINFORCEMENT
- 3 - INNER B-PILLAR REINFORCEMENT
- 4 - INNER BODY SIDE REINFORCEMENT
- 5 - SILL REINFORCEMENT
- 6 - COWL REINFORCEMENT

Due to the usage of VHS on the inner components and reinforcements sectioning of these parts are not allowed, complete replacement of the component or reinforcement is the only acceptable repair. It will be necessary to use a **Tungsten Carbide Drill Bit** to release the spot welds along the areas where these parts join other components.

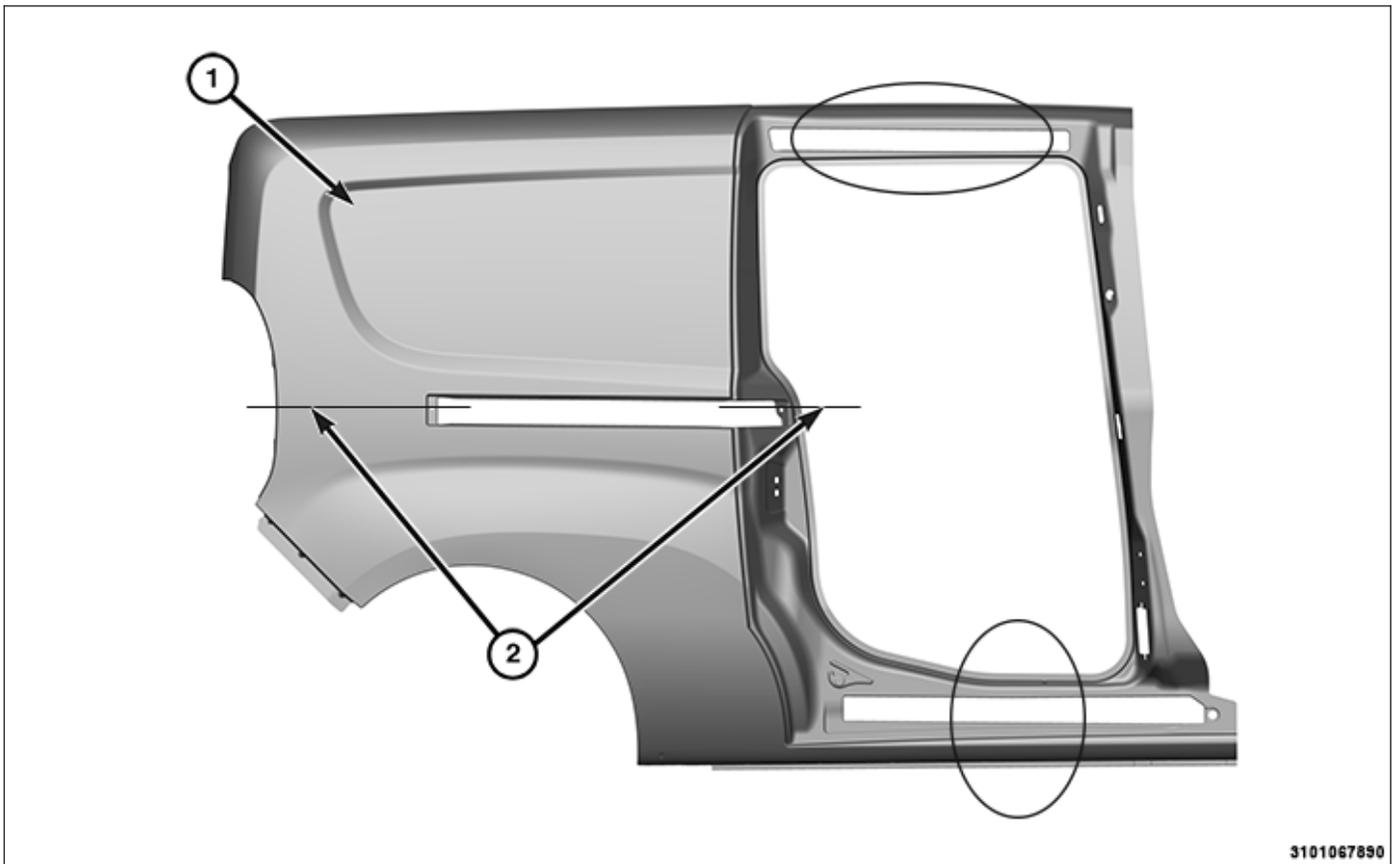
Sill/Rocker Panel



- 1 - DOOR SURROUND PANEL
- 2 - SILL/ROCKER PANEL
- 3 - SILL SECTIONING CUT LINES

When cutting through the door surround for sill/rocker panel sectioning use care to **ONLY** cut through the door surround. Do not cut into the sill reinforcement located beneath.

A butt-joint with a 13mm (0.5in.) weld backer panel is to be used for sectioning the sill/rocker area.

Body Side Panel

NOTE: Solid lines represent dedicated sectioning areas. Ovals areas represent general sectioning areas within.

NOTE:

1 - BODY SIDE PANEL

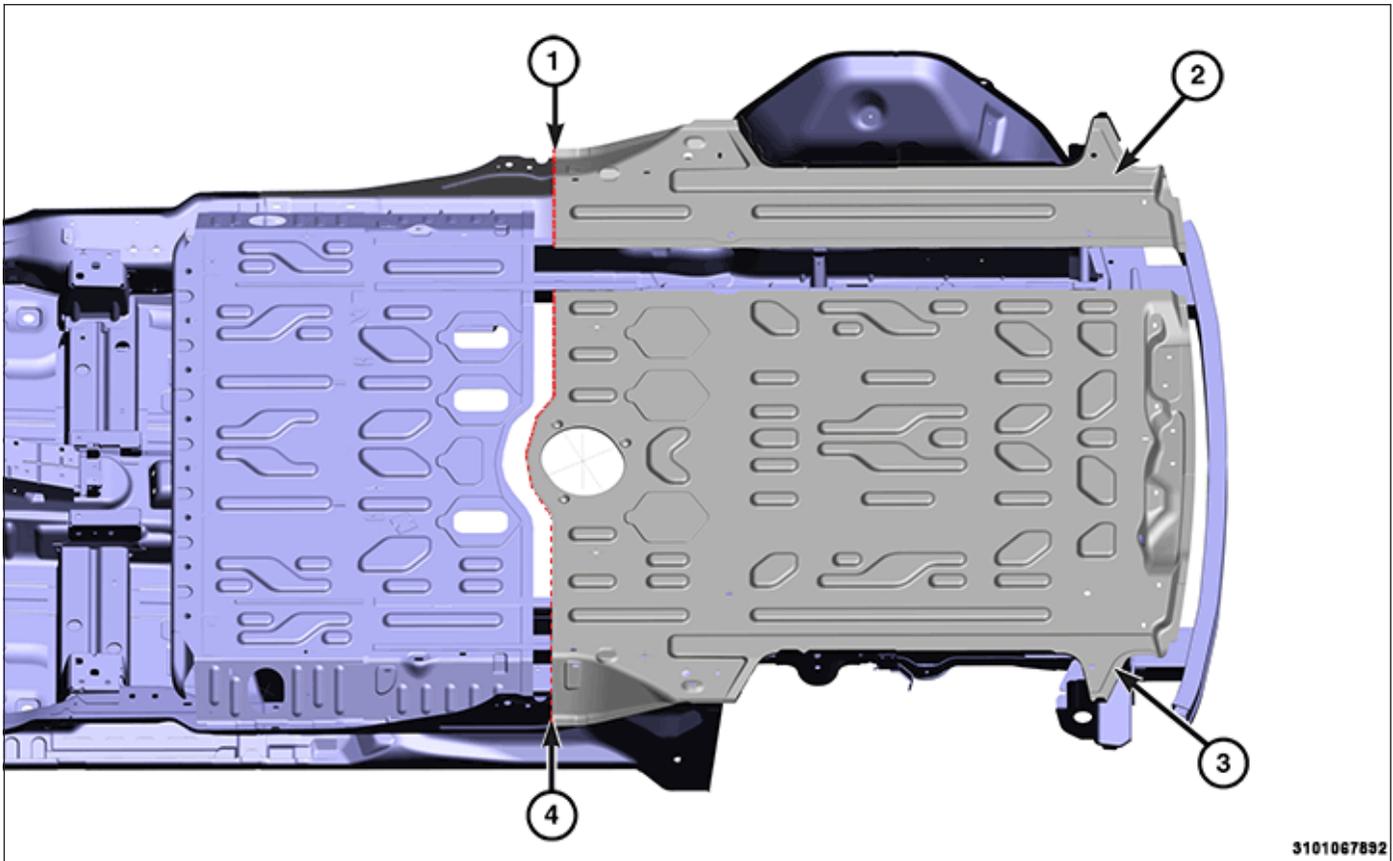
2 - CENTER SECTIONING LOCATIONS

The body side panel (1) can be sectioned to utilize the upper or lower portion.

Butt-joint with a 13mm (0.5in.) weld backer panel is to be used when sectioning the body side panel.

For more information on sectioning the body side panel (Refer to 31-Collision Information/Standard Procedure/Non-Structural Sheet Metal Repair/Body Side Panel).

Rear Floor Panels



- 1 - RIGHT REAR FLOOR TRIM AREA
- 2 - RIGHT REAR FLOOR
- 3 - LEFT REAR FLOOR
- 4 - LEFT REAR FLOOR TRIM AREA

The right and left rear floors can be partially replaced at the forward seam.

Trial fit the rear floor panel and trim the front edge back as required

CORROSION PROTECTION

Corrosion Protection Restoration

"Corrosion protection" encompasses all the materials and coatings which protect a vehicle from corrosion and include:

- Coated steels
- E-coat primer on the complete body
- Body sealing to eliminate water and air intrusion where panels join
- Structural adhesives in some joints
- Chip resistant primer applications on the entire body
- Paint application
- Underbody corrosion protection
- Inner panel corrosion protection added to repair areas

Corrosion protection must be restored during a repair anytime it may have been compromised. All areas that have been subjected to structural pulls, clamping, straightening, welding, or any other any other operation that may have imparted damage to the corrosion protection system will need to be addressed.

In the repair process corrosion protection is addressed in three phases: pre-refinish, refinish and post-refinish.

Pre-refinish

In the pre-finish phase, structural adhesives, seam sealers and other applied coatings are installed. Sheet metal seams are sealed to prevent water intrusion into the "dry" areas of the vehicle, such as passenger compartment, and also to prevent intrusions of contaminants, such as water and road salt, into seams causing corrosion. Lap joints, hem flanges, and any panel mating locations need to be addressed during the repair and treated to duplicate the original vehicle build.

All bare metal should be etch primed prior to applying seam sealer, following the refinish material provider's instructions for doing so, unless the manufacture of the sealer specifically states otherwise.

When working around pinch weld flanges, seam sealer should be installed to duplicate the original appearance and function. If it is unclear whether the original sealing material **between** the flanges is strictly a sealer or structural adhesive, always default to a structural adhesive such as Fusor 112B, or 3M 08116. For additional information related to weld-bonding and welding around adhesives and sealers, (Refer to 31 - Collision Information - Standard Procedure).

Roof and closure panels will require the use of Anti-Flutter foam. Where inner panel supports meet external panels, the proper replacement materials in these areas are Mopar part #04864015AB, or equivalent, or Fusor 121, or 3M 04274 (NVH dampening material).

All hem flanges on closure panels should be sealed whether sealer is apparent or not. This includes those disturbed during the repair, and those on new replacement panels. Either duplicate the existing bead in shape or size, or where one is not obvious, seal the hem flange in a discrete fashion. Hem flanges should be sealed using Mopar part #04318026, Fusor 129, or 3M 08308.

Lap joints, such as in floor pans, should be sealed to duplicate the sealer visible, but also addressed on any exterior surface by sealing the lap whether visible or not.

NOTE: Chrysler does not recommend the use of any type of "weld-thru" primer during repairs. Weld-bonding with corrosion protecting adhesives or sealers, along with final application of inner panel corrosion protection is the proper method.

Refinish

All painted surfaces should be coated using a Chrysler group LLC approved refinish material. The refinish process includes application of undercoats, primers (filler & sealer), basecoats and clearcoat. These approved materials have been tested to the same material standards as the production materials.

Post-refinish

All new panels, and repair areas, must have inner panel corrosion protection applied after the painting operation is complete, but before all the trim is reinstalled. Mopar Cavity Wax No. 68042970AA, or 3M Rustfighter #08891 should be applied to all interior cavities, weld flanges, hem flanges as well as any are affected by the repair

especially where any type of welding was performed. Inner panel corrosion protection should be applied using "pressure pot" equipment with wands which provide 360-degree material coverage for closed cavities, and directional spray wands for visible coverage (Mopar kit #04271235). Additionally, the corrosion protecting material must be applied in two coats with a minimum 30-minute flash time between applications.

Wheel wells and underbody panels which have been involved in the repair process should also have a final undercoating applied. Use Mopar No. 05093417AA, or equivalent, and apply with "pressure pot" style application equipment.

Any disturbed or removed NVH foam needs to be replaced. Use Mopar part No. 05142864AA, Fusor 130, or 3M 8463.

Following this arrangement, choice of materials, and proper application, the repaired vehicle should be as well protected against corrosion as it was prior to the repair.

Specifications

VEHICLE IDENTIFICATION NUMBER

The Vehicle Identification Number (VIN) can be viewed through the windshield at the upper left corner (1) of the instrument panel, near the left windshield pillar. The VIN consists of 17 characters in a combination of letters and numbers that provide specific information about the vehicle. Refer to the vehicle identification number decoding charts below, for decoding information.

To protect the consumer from theft and possible fraud the manufacturer is required to include a Check Digit at the ninth position of the vehicle identification number. The check digit is used by the manufacturer and government agencies to verify the authenticity of the vehicle and official documentation. The formula to use the check digit is not released to the general public.



POSITIONS 1 - 3: WORLD MANUFACTURER IDENTIFIER

1	2	3	Manufacturer	Vehicle Type
Z	F	B	Fiat Group Automobiles S.p.A.	MPV
Z	A	C	Fiat Group Automobiles S.p.A.	MPV

POSITION 4: BRAKE SYSTEM & GVWR

Brake System	GVWR Range		Active Belts, Air Bags	Active Belts, Air Bags, Side Bags-Front Row	Active Belts, Air Bags, Side Bags-All Rows	Active Belts, No Air Bags	Active Belts, GVWR > 10,000 lbs.
	Pounds	Kilograms					
Hydraulic	5001-6000	(2268 - 2721 kg)		E			

W = Incomplete Vehicle with Hydraulic Brakes

7 = Bus with Hydraulic Brakes

Positions 5 - 7:

Define the following: brand, marketing name, drive wheels, cab/body type, drive position, and price series.

RAM PROMASTER CITY (636) MPV

FWD			BODY TYPE	DRIVE POSITION	SERIES
R	F	A	WAGON	Left Hand Drive	ST
R	F	B	WAGON		SLT
R	F	C	VAN		ST
R	F	D	VAN		SLT

POSITION 8: ENGINE

Code	Displacement	Cylinders	Fuel	Turbo	Sales Codes
T	2.4 Liter	4	Gasoline	No	ED6

POSITION 9: CHECK DIGIT

0 through 9 or X

POSITION 10: MODEL YEAR

F = 2015

POSITION 11: ASSEMBLY PLANT

CODE	PLANT
6	BURSA (TURKEY)

POSITION 12 - 17: PLANT SEQUENCE NUMBER

A six digit number assigned by assembly plant.

STANDARDIZED STEEL IDENTIFICATION

In an effort to reduce confusion over the large number of steel grades in use, and the repairability and weldability concerns involved with each, Chrysler Group LLC has instituted new nomenclature which is applicable to material call-outs and BIW exploded views released for use in the repair industry.

All materials listed in the key may not be used on a given model, nor may every panel be identified in the blow-up (ex: some groups do not show fascias).

WARNING: Chrysler Group LLC engineering's position on the use of heat during collision repair is as follows:

- Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the "cold straightening" method. No heat may be used during the straightening process.
- During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.

This "no heat" recommendation is due to the extensive use of high strength and advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

NOTE: Corrosion protection must be restored after repair.

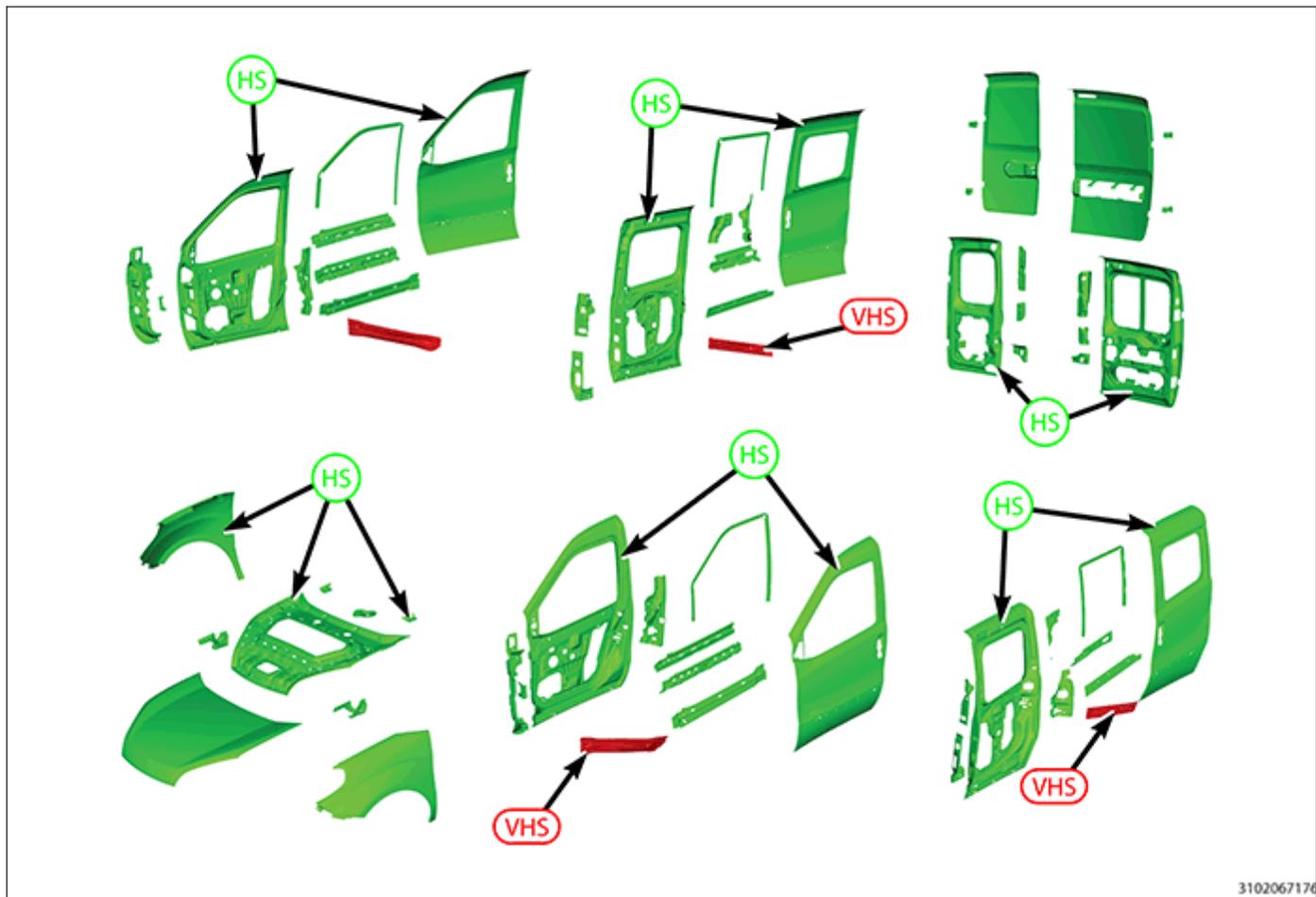
- **LS** - Good repairability and weldability (least sensitive to heat). May be attached using the preferred Squeeze Type Resistance Spot Welding (STRSW) process, weld bonding where appropriate, or MIG welding. Materials have a tensile strength of less than 270 MPa.
- **HS** - Some repairability and good weldability (the higher the strength of the steel, the greater the sensitivity to heat). May be attached using STRSW, weld bonding, and MIG welding. Material tensile strength range between 270 MPa and 600 MPa and includes DP590.
- **VHS** - Very limited repairability and weldability (very sensitive to heat). Attach only at OE defined locations using OE defined procedures. Material tensile strengths are greater than 600 MPa. This category includes hot-stamped boron materials which are also termed "press hardened". Specialized cutters are required with many materials in this group.
- **LM** - Good repairability and weldability. May be attached using STRSW, weld bonding, and Flux Core Arc Welding (FCAW).
- **AL** - Stamped aluminum sheet metal panels may be repairable with specialized tools and techniques.
- **MG** - Magnesium - no repairability, replacement components only.
- **PL and PL-R** - Some repairability depending upon the type of plastic involved, the degree of damage, and the component function. Cosmetic components such as fascias (PL) have a higher degree of repair allowed than those components which can carry components and loads. Where PL-R components are bonded to steel structure, Chrysler Group LLC will identify the proper adhesive to attach the replacement panel. Repair materials for PL are commonly available in the collision repair market.
- **CO** - Composite materials may be fiber reinforced (ex: Kevlar) panels or co-molded assemblies of steel and plastic. Any of these require specialized repair materials and processes.

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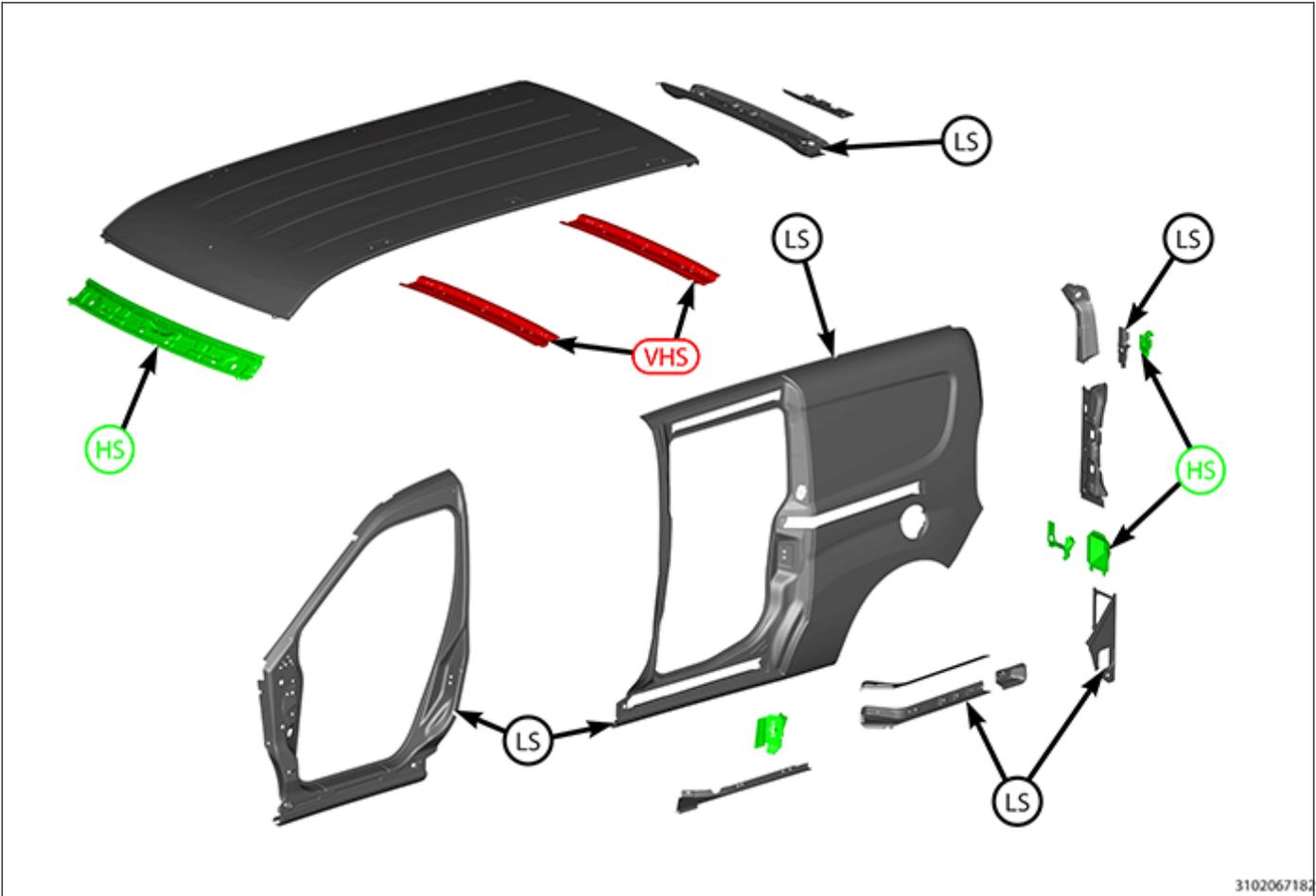
Additional information on sectioning of components will also be identified in **Non-Structural Sheet Metal Repair and Sectioning Procedures**, (Refer to Collision Information - Standard Procedure).

CALLOUT KEY	DESCRIPTION	COLOR
LS	Low-Strength Steel	Black
HS	High-Strength Steel	Green
VHS	Very High-Strength Steel	Red
LM	Laminated Steel	Grey
AL	Sheet Aluminium	Purple
MG	Magnesium	Brown
PL	Plastic	Blue
PL-R	Fiber Reinforced Plastic	Purple
CO	Composite Material	Blue

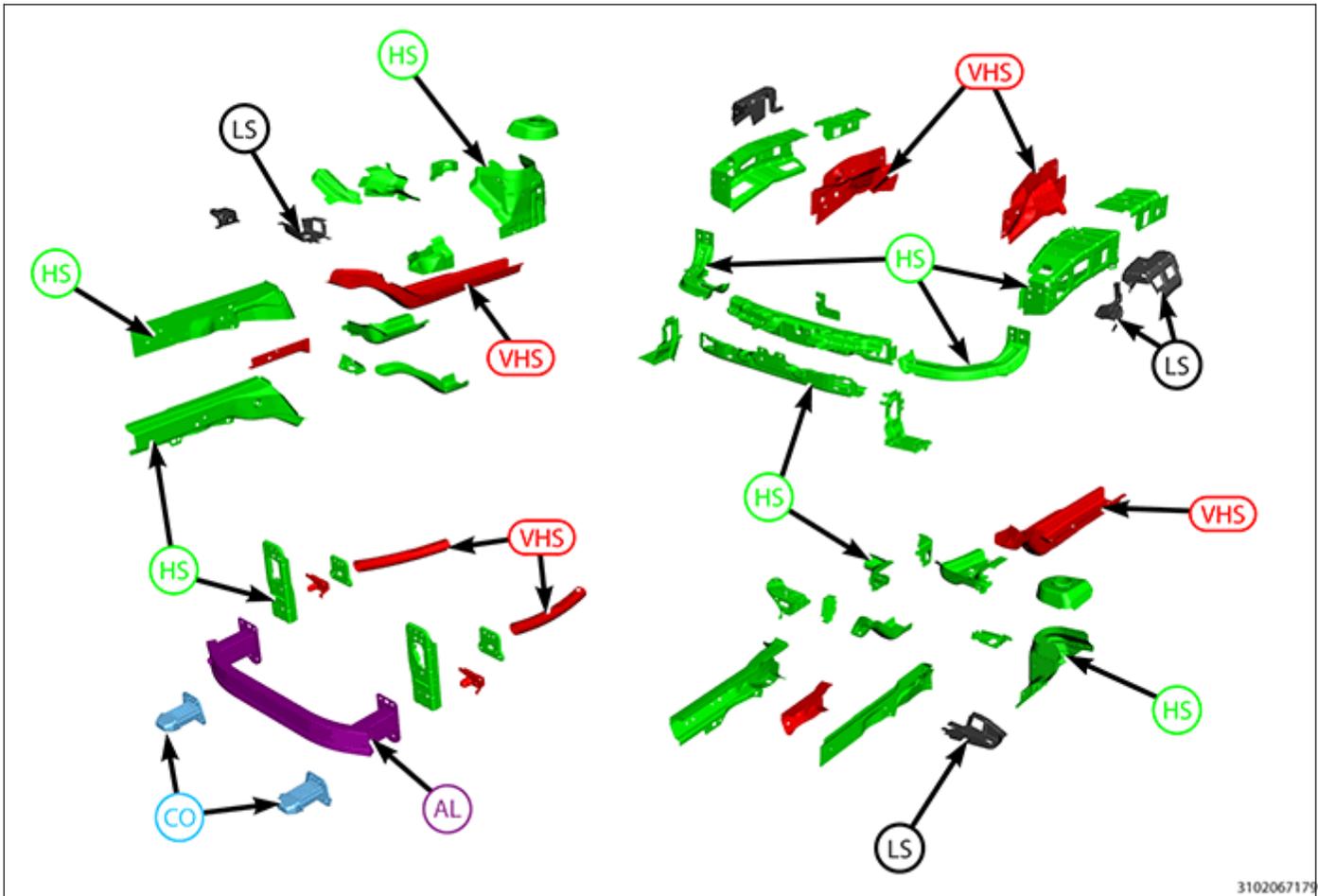


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BODY IN WHITE COMPONENT IDENTIFICATION - CLOSURE PANELS

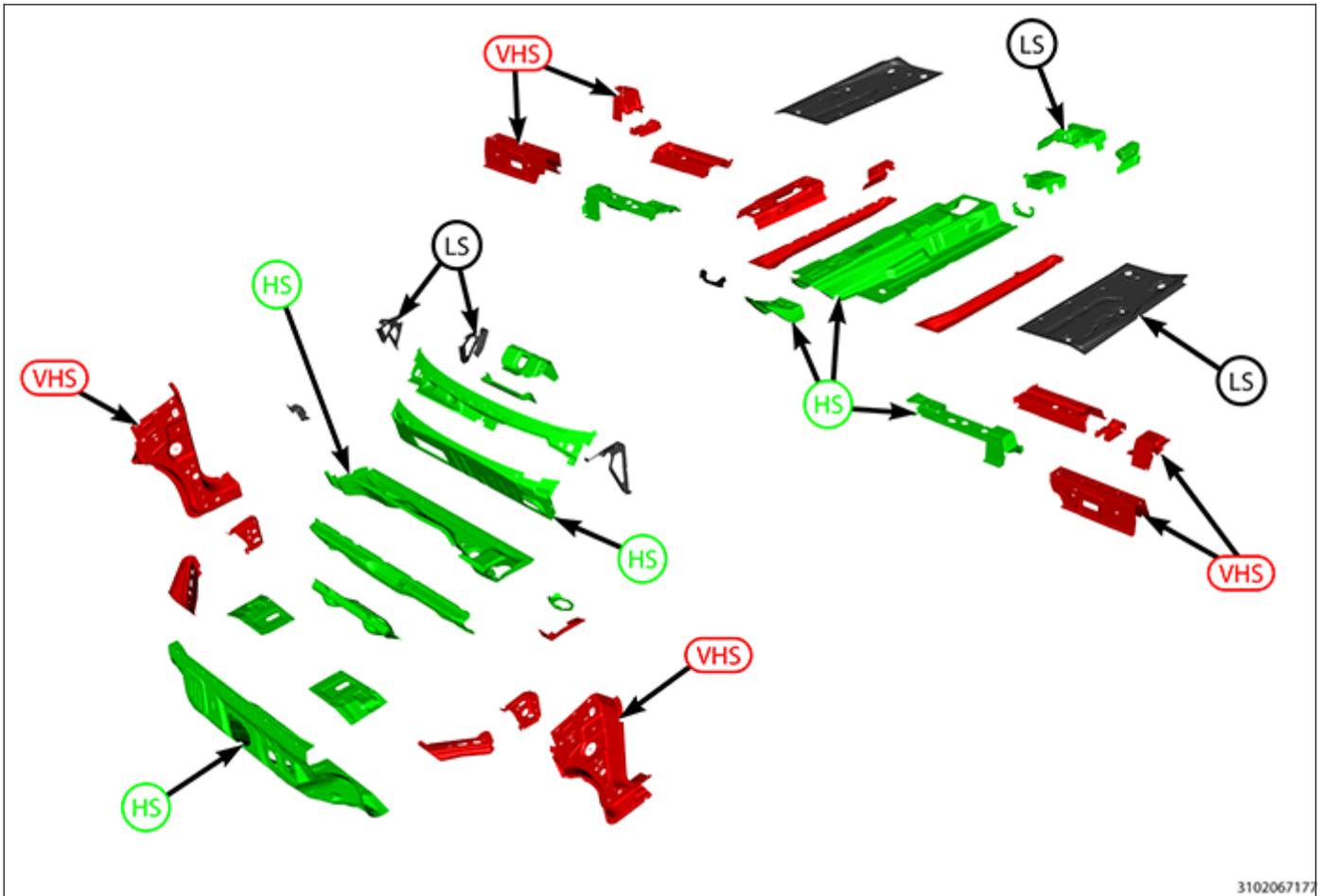


BODY IN WHITE COMPONENT IDENTIFICATION - ROOF AND SIDE PANELS

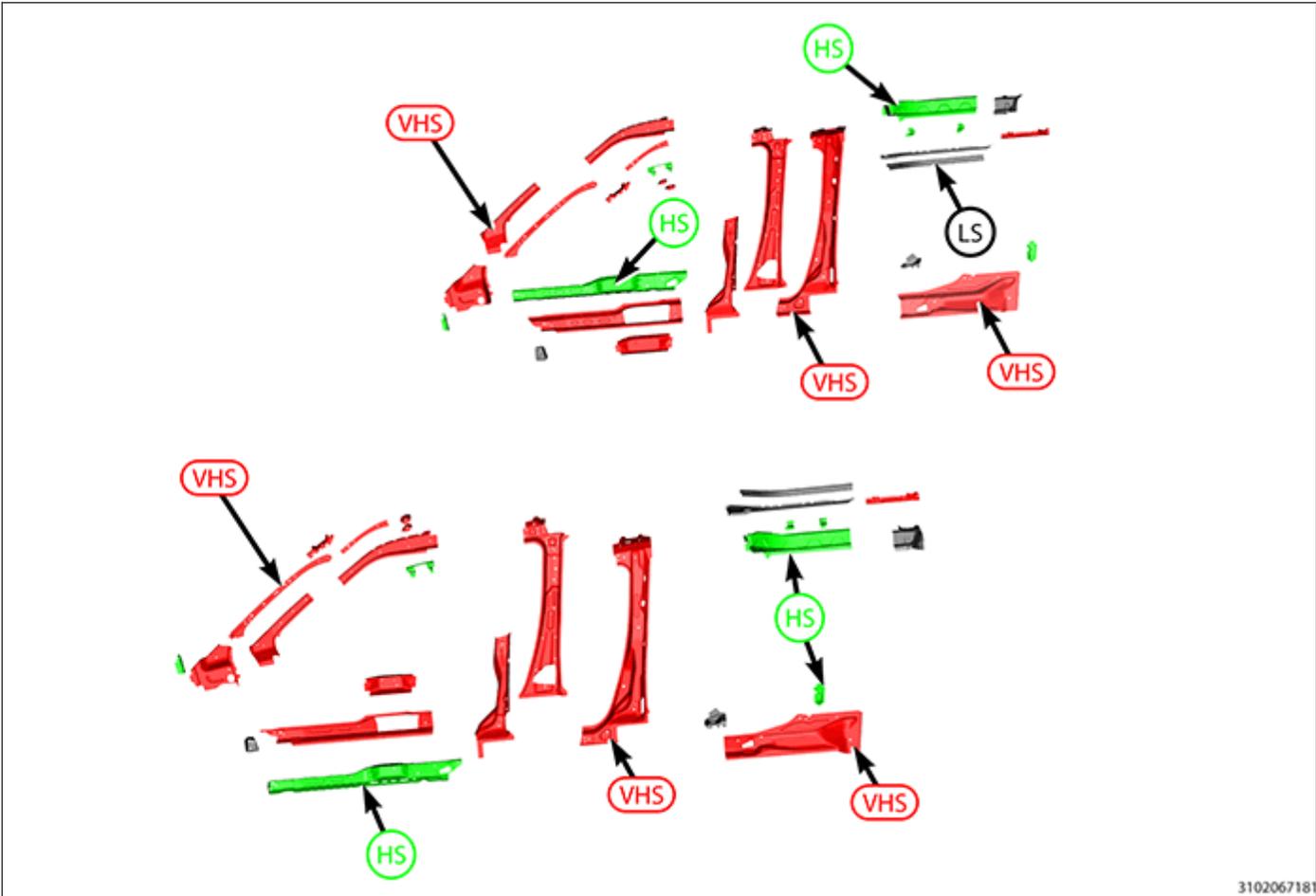


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BODY IN WHITE COMPONENT IDENTIFICATION - FRONT STRUCTURE

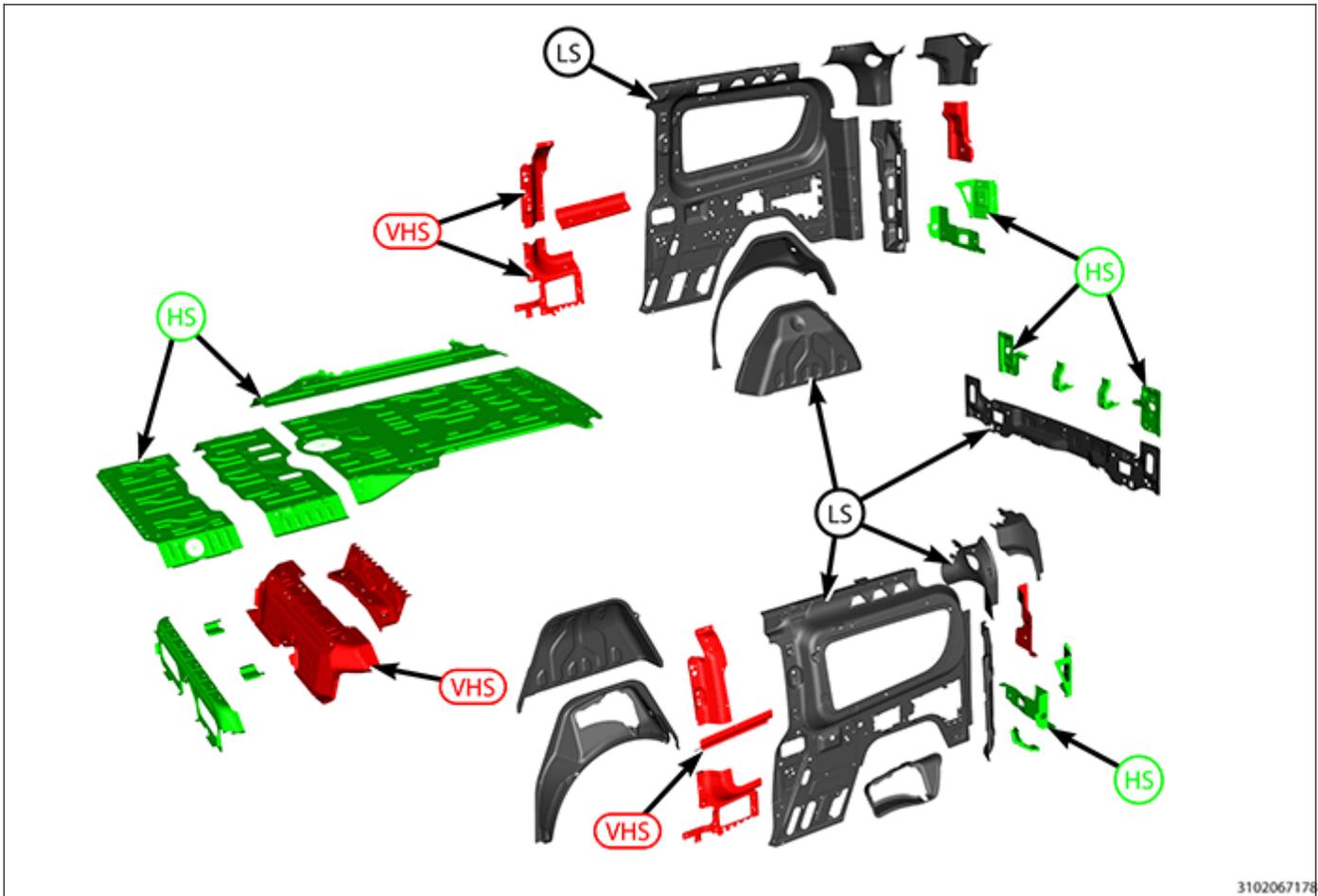


BODY IN WHITE COMPONENT IDENTIFICATION - DASH, COWL AND FRONT FLOOR



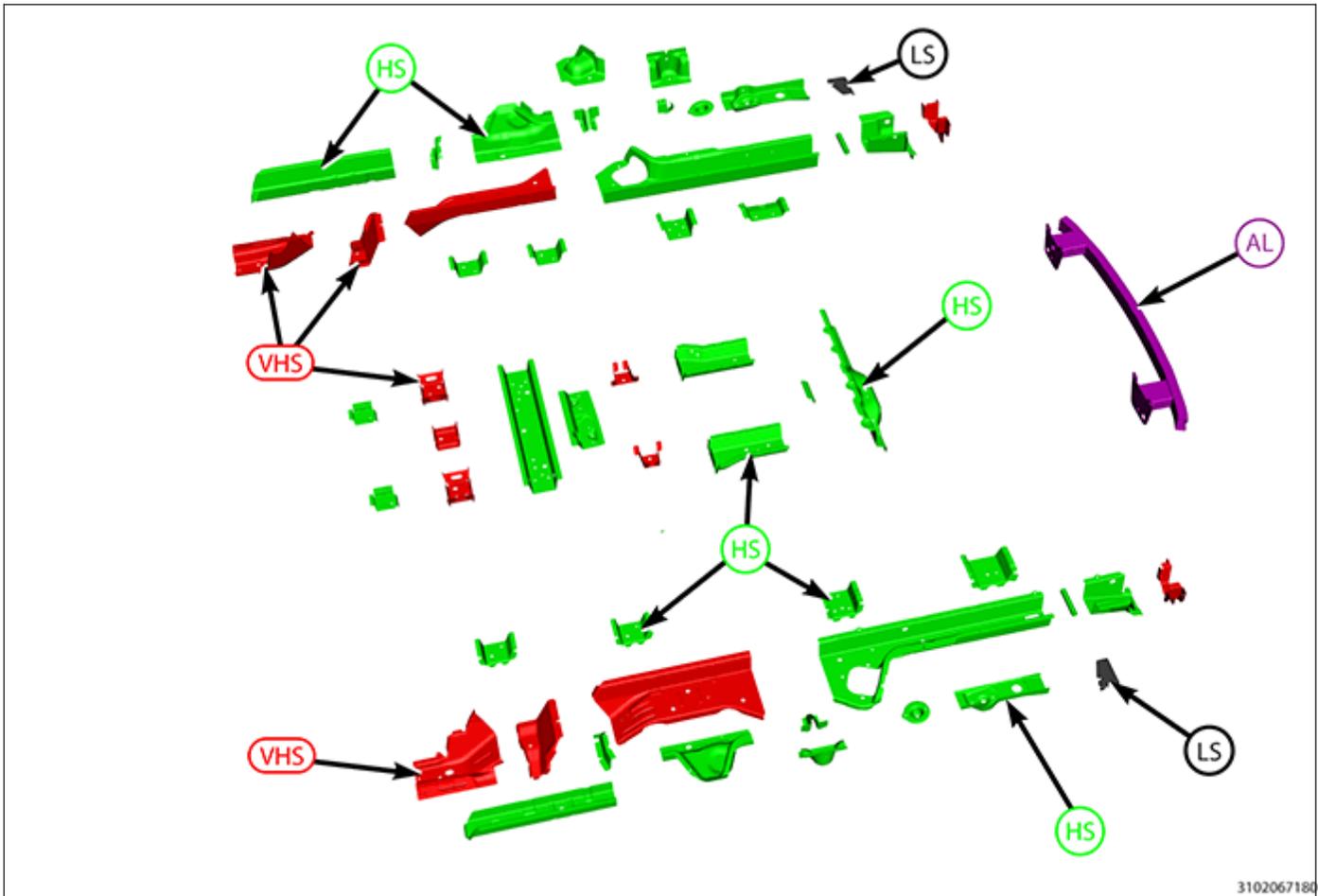
3102067181

BODY IN WHITE COMPONENT IDENTIFICATION - INNER PILLARS, SILL AND SLIDING DOOR HEADER



3102067178

BODY IN WHITE COMPONENT IDENTIFICATION - INNER BODY SIDE, CENTER AND REAR FLOORS



3102067180

BODY IN WHITE COMPONENT IDENTIFICATION - REAR STRUCTURE

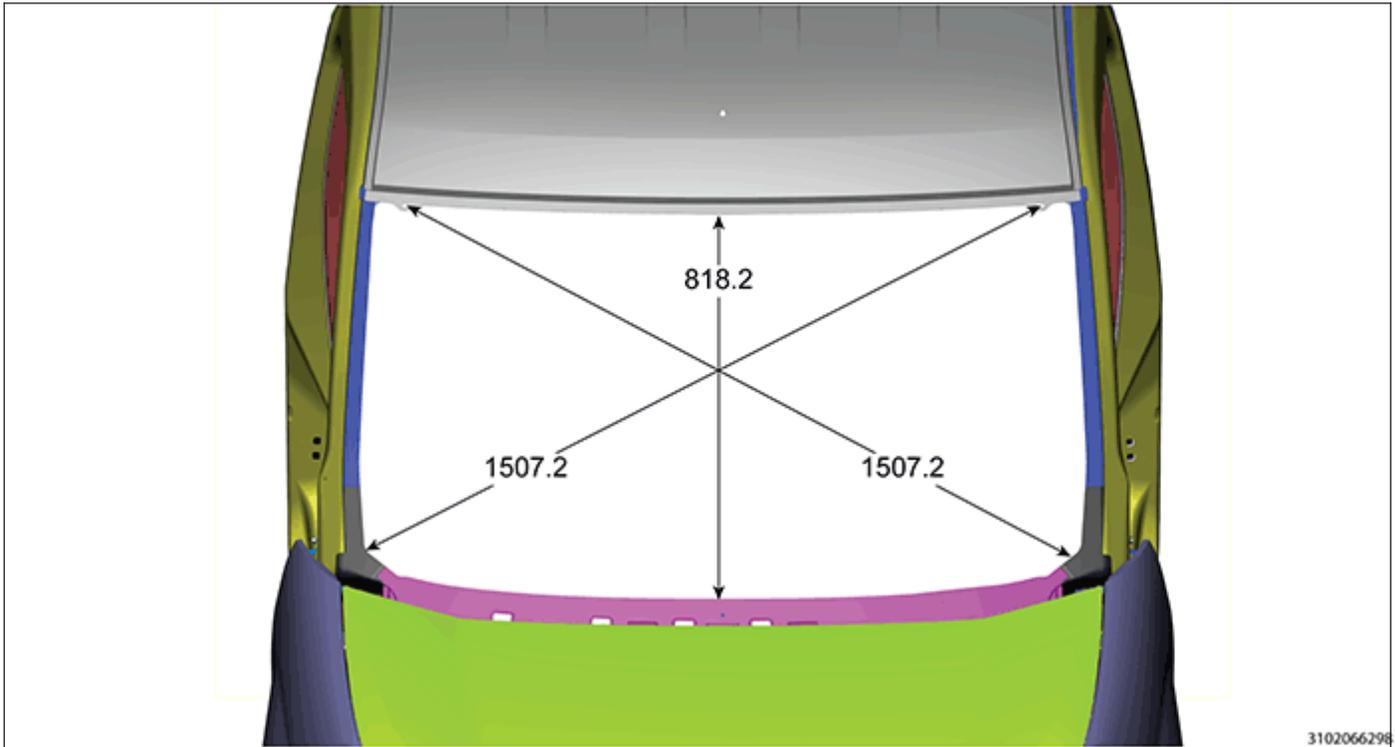
BODY OPENING DIMENSIONS

NOTE: Body opening dimensions are listed in metric scale millimeter (mm). Principal Locating Points (PLP), fastener locations, and holes are measured to center, unless noted otherwise.

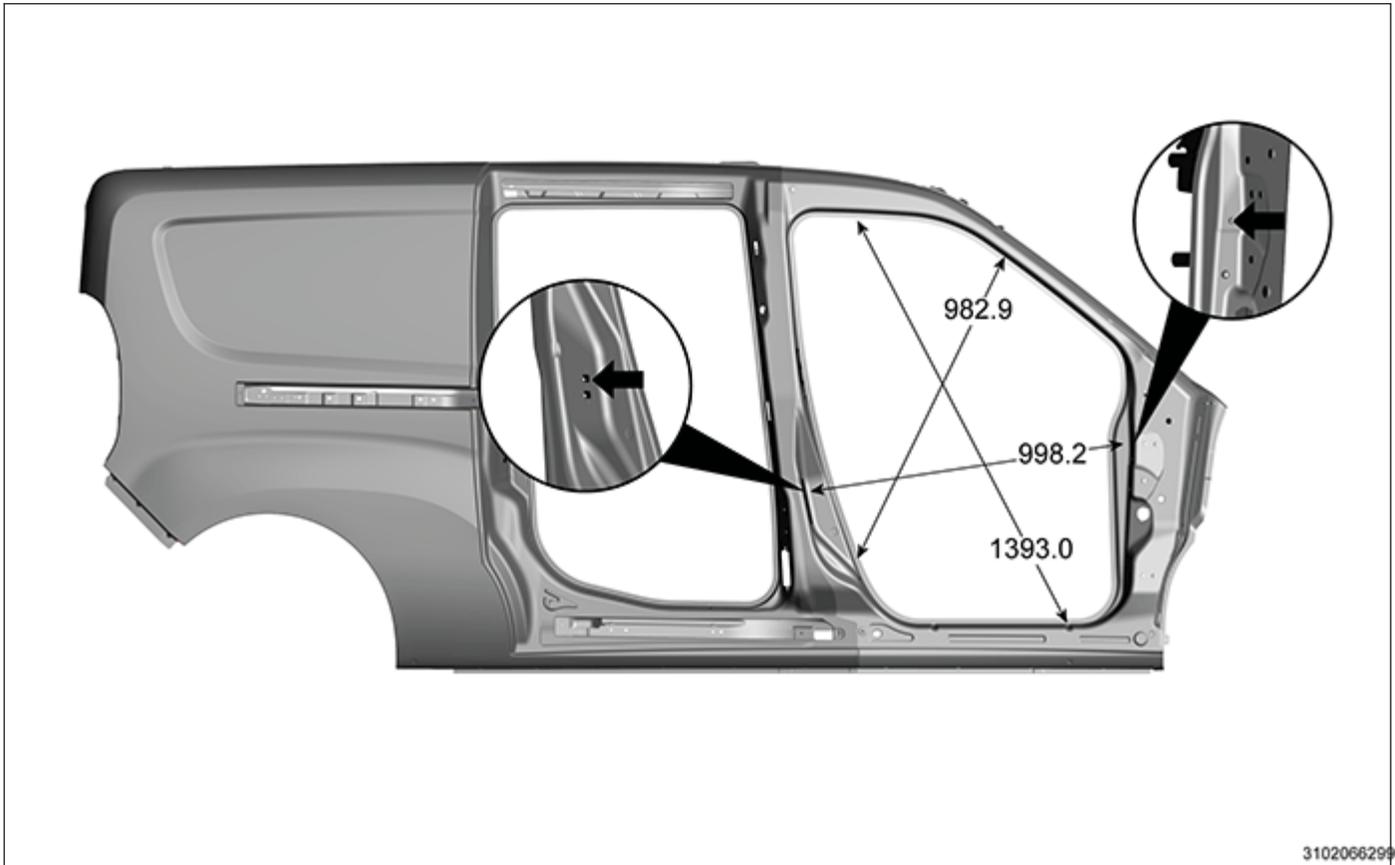
VEHICLE PREPARATION –

Position the vehicle on a level work surface. Remove any weatherstrips, door strikers or any other parts that may interfere with the reference point.

DESCRIPTION	FIGURE
WINDSHIELD OPENING	Figure 1
FRONT DOOR OPENING	Figure 2
SLIDING DOOR OPENING	Figure 3
REAR DOOR OPENING	Figure 4

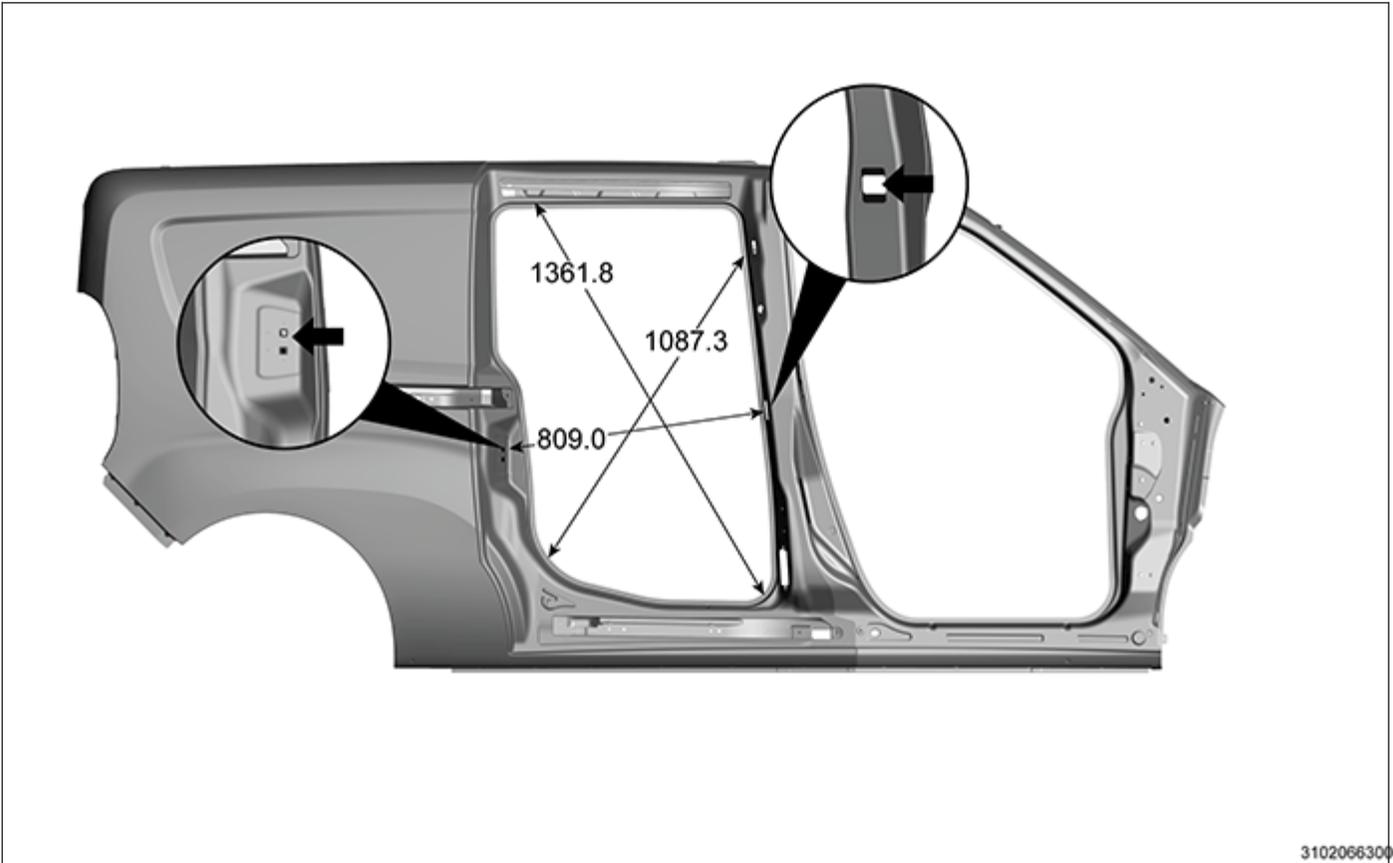


Windshield Opening



Front Door Opening

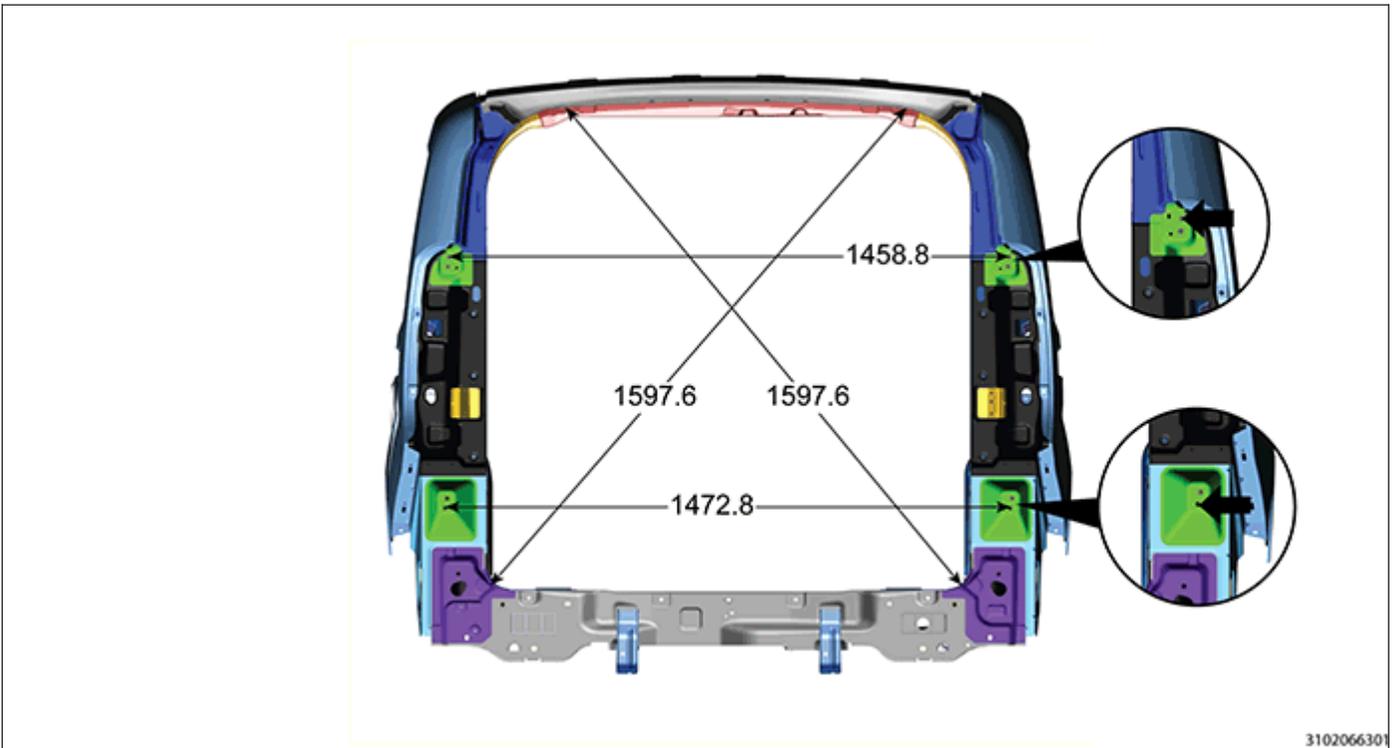
NOTE: Right side shown. Left side typical.



3102066300

Sliding Door Opening

NOTE: Right side shown. Left side typical if equipped.



3102066301

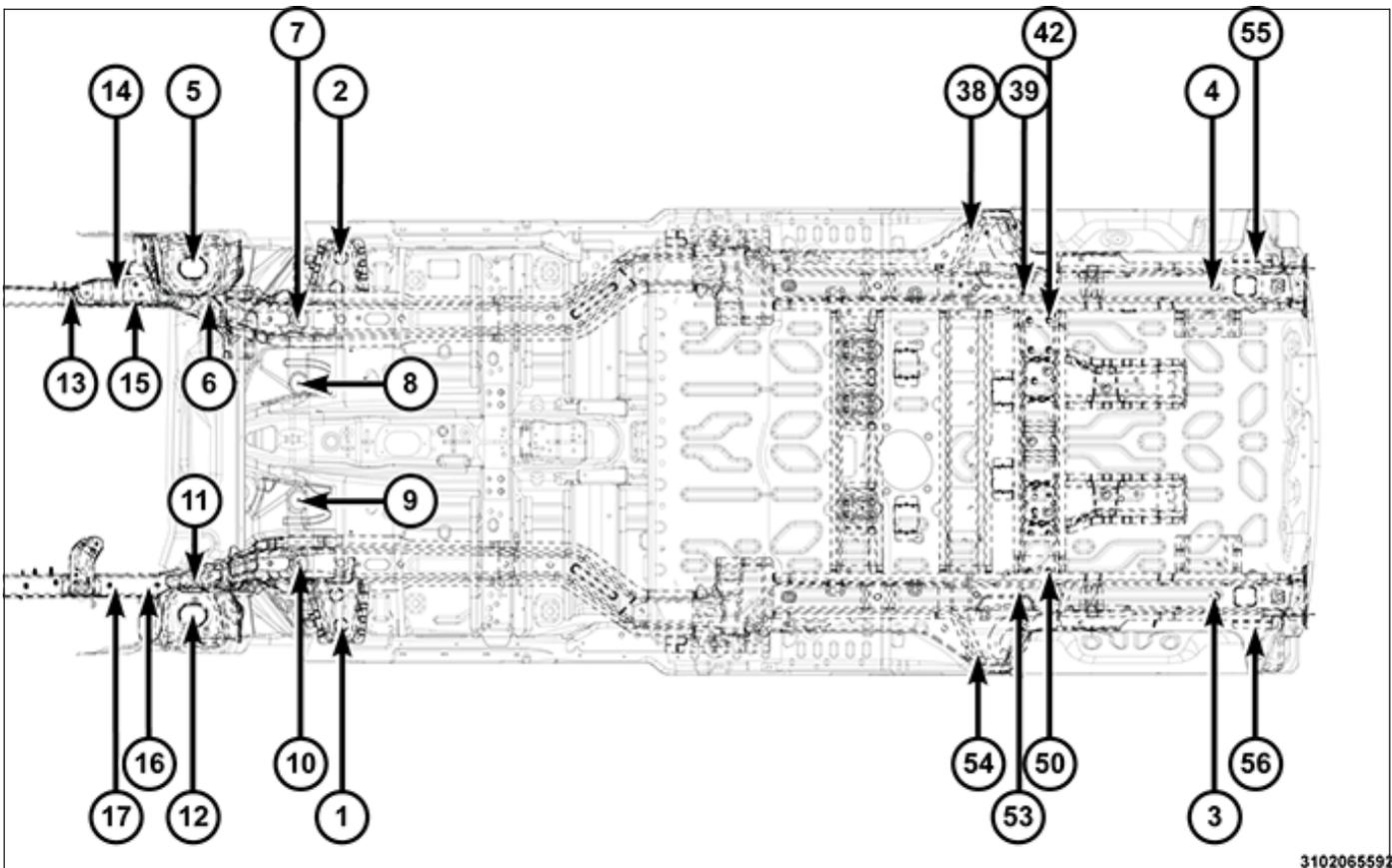
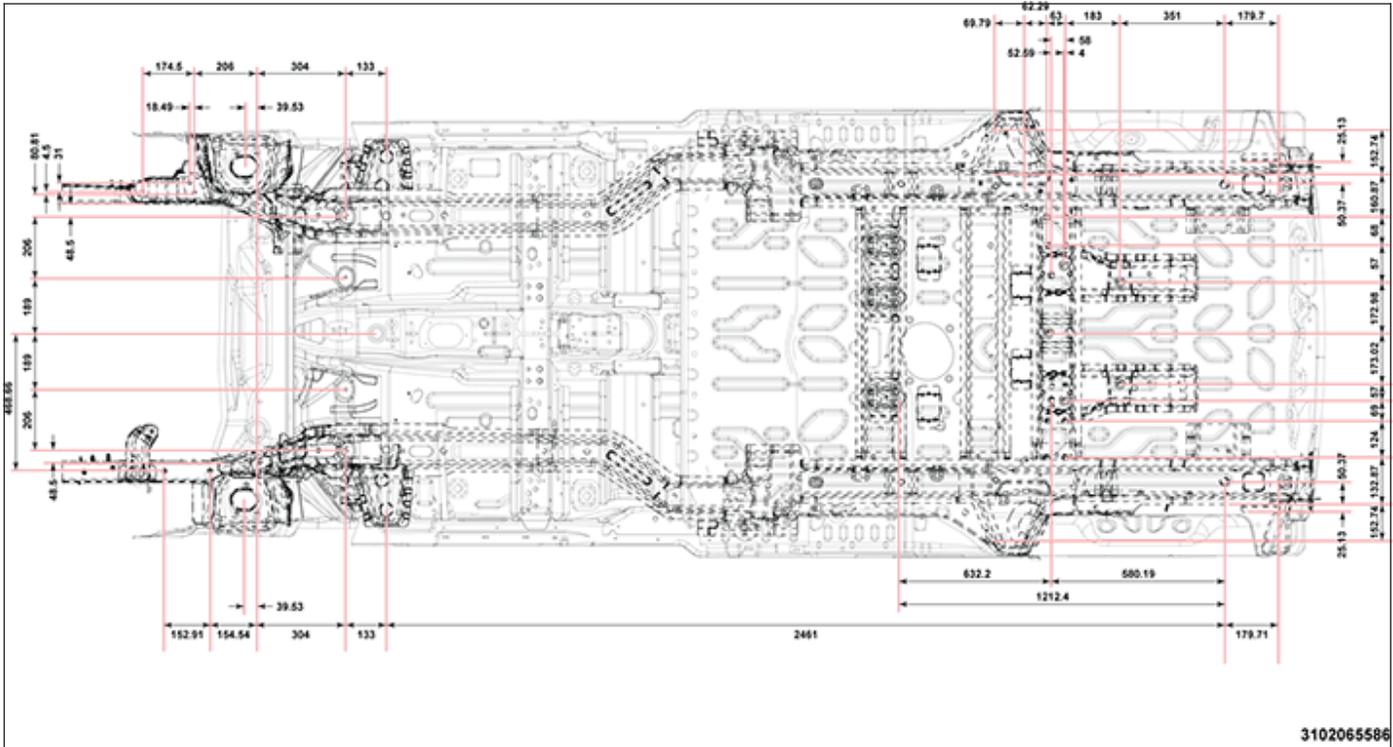
Rear Door Opening

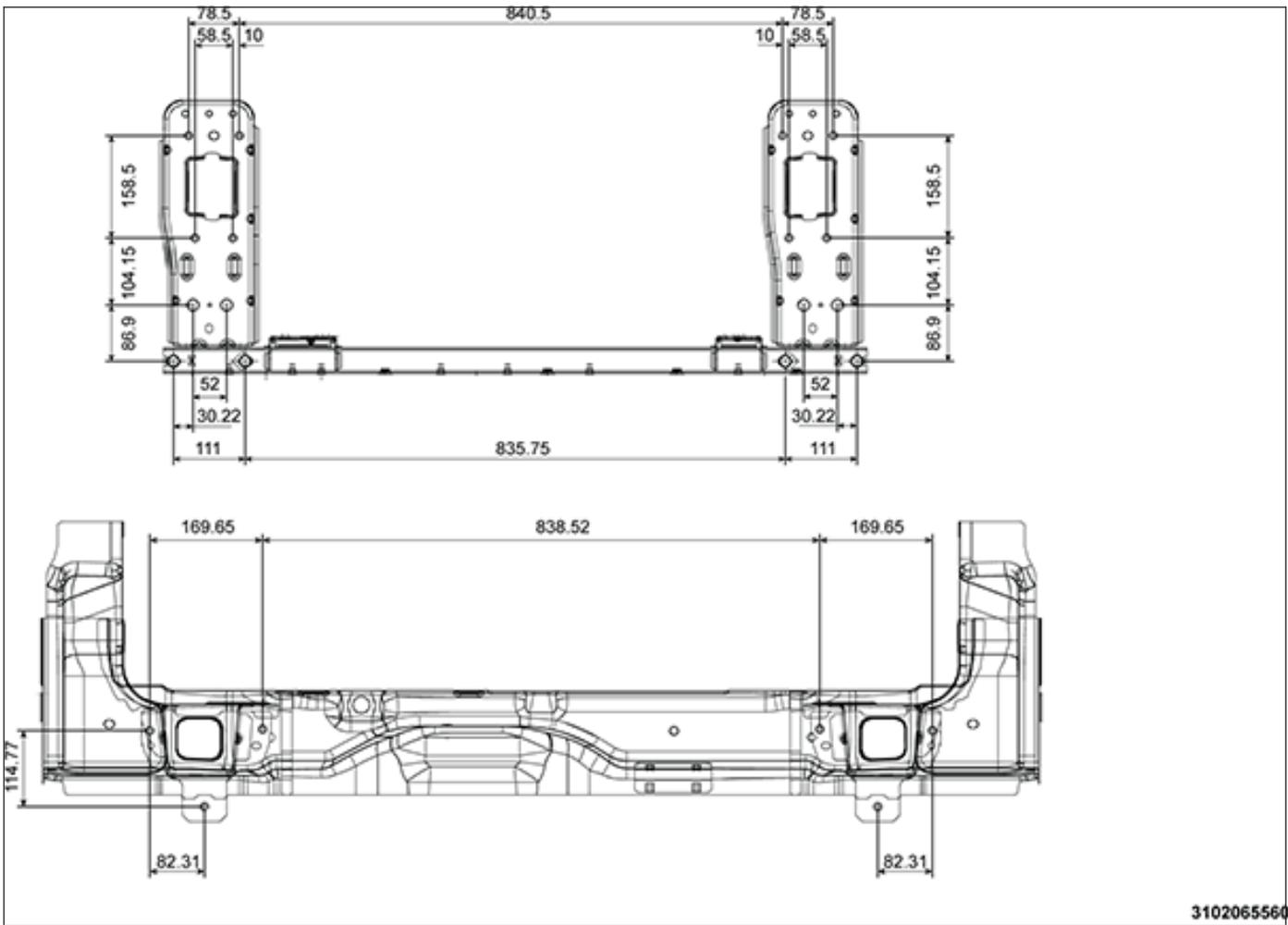
FRAME DIMENSIONS

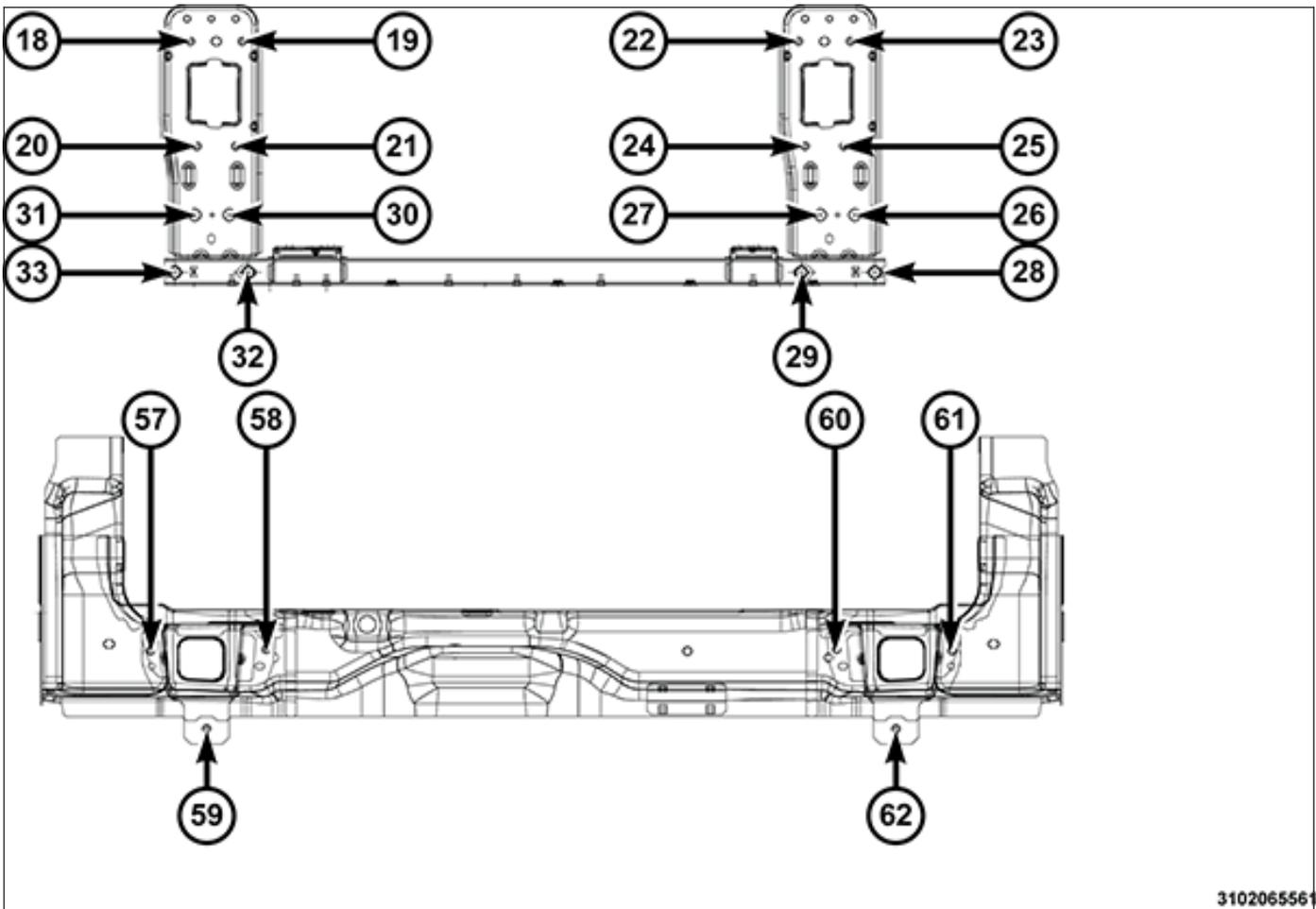
NOTE: Frame dimensions are listed in metric scale millimeter (mm). All dimensions are from center to center of Principal Locating Point (PLP), or from center to center of PLP and fastener location.

VEHICLE PREPARATION –

Position the vehicle on a level work surface. Using screw or bottle jacks, adjust the vehicle PLP heights to the specified dimension above a level work surface. Vertical dimensions can be taken from the work surface to the locations indicated were applicable.







3102065561

Typical Bodywork Measurements

Reference	Description	Value Referencing to main point 02			Value Referencing to main point 03		
		X	Y	Z	X	Y	Z
		1	Main point	0.0	-1200	0.0	-2461
2	Main point	0.0	0.0	0.0	-2461	1105.5	-183.5
3	Auxiliary	2461	-1105.5	183.3	0.0	0.0	0.0
4	Main point	2461	-94.5	183.5	0.0	1011	0.0
5	Front right shock absorber	-476.5	-34	640	-2937.5	1071.5	456.5
6	Suspension crossmember on right strut	-437	-156.5	181.5	-2898	949	-2
7	Front suspension crossmember	-133	-205	4.5	-2594	900.5	-179
8	Front suspension crossmember	-133	-410.5	31.5	-2594	695	-152

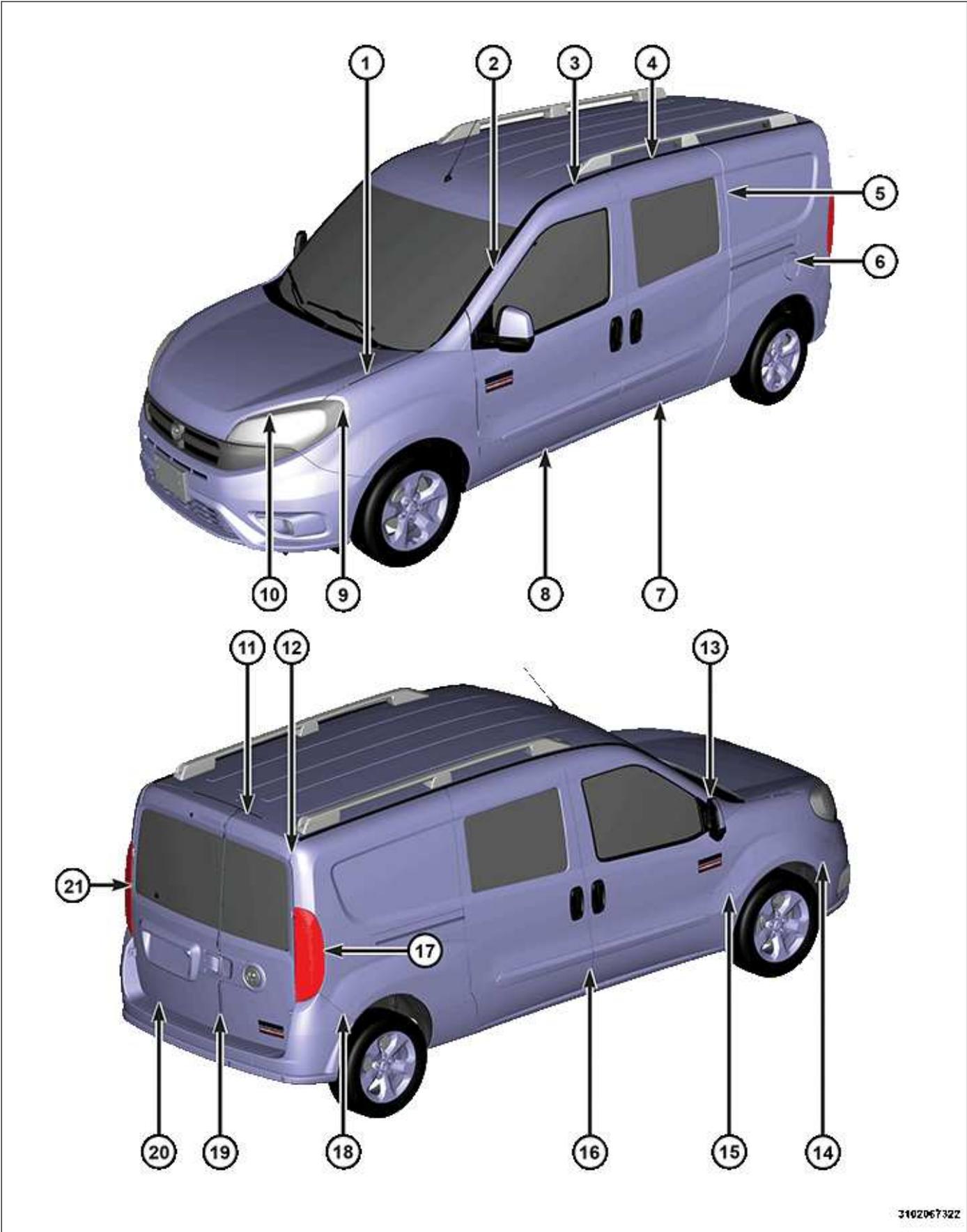
Reference	Description	Value Referencing to main point 02			Value Referencing to main point 03		
		X	Y	Z	X	Y	Z
9	Front suspension crossmember	-133	-789.5	31.5	-2594	316	-152
10	Front suspension crossmember	-133	-995	4.5	-2594	110.5	-179
11	Suspension crossmember on left strut	-437	-1043.5	-181.5	-2898	62	-2
12	Front left shock absorber	-476.5	-1166	640	-2937.5	-60.5	-456.5
13	Right side engine mount	-796.5	-137	404	-3257.5	968.5	220
14	Right side engine mount	-651.5	-106	404	-3112.5	999.5	220
15	Right side engine mount	-633	-141.5	404	-3094	964	220
16	Gearbox side engine mounting	-581.5	-1054.5	340.5	-3042.5	51	157
17	Gearbox side engine mounting	-734.5	-1054.5	340.5	-3195.5	51	157
18	Right side front crash box crossmember	-1093	-94.5	376	-3554	1011	192.5
19	Right side front crash box crossmember	-1093	-173	376	-3554	-932.5	192.5
20	Right side front crash box crossmember	-1093	-104.5	217.5	-3554	1001	34
21	Right side front crash box crossmember	-1093	-163	217.5	-3554	942.5	34
22	Left side front crash box crossmember	-1093	-1013.5	376	-3554	92	193
23	Left side front crash box crossmember	-1093	-1092	376	-3554	13.5	193

Reference	Description	Value Referencing to main point 02			Value Referencing to main point 03		
		X	Y	Z	X	Y	Z
24	Left side front crash box crossmember	-1093	-1023.5	218	-3554	82	34
25	Left side front crash box crossmember	-1093	-1082	218	-3554	23.5	34
26	Front left pedestrian impact crossmember	-1093	-1098.5	113.5	-3554	7	-70
27	Front left pedestrian impact crossmember	-1093	-1046.5	113.5	-3554	59	-70
28	Front left pedestrian impact crossmember	-1093	-1129	26.5	-3554	-23.5	-157
29	Front left pedestrian impact crossmember N/A	-1093	-1018	26.5	-3554	87.5	-157
30	Front right pedestrian impact crossmember	-1093	-153.5	113.5	-3554	952	-70
31	Front right pedestrian impact crossmember	-1093	-101.5	113.5	-3554	1004	-70
32	Front right pedestrian impact crossmember N/A	-1093	-182	26.5	-3554	923.5	-157
33	Front right pedestrian impact crossmember	-1093	-71	26.5	-3554	1034.5	-157
34	Right side fuel tank	1248.5	-490	188.5	-1213	616	5
35	Right side fuel tank N/A	1880	-403	216.5	-581	702.5	33
36	Left side fuel tank N/A	1881	-827.5	216.5	-580	278	33

Reference	Description	Value Referencing to main point 02			Value Referencing to main point 03		
		X	Y	Z	X	Y	Z
37	Left side fuel tank N/A	1248.5	-744.5	188.5	-1212	361	5
38	Rear right suspension attachment	1732	108.5	185	-729	11249	2
39	Rear right suspension attachment	1802	-44	185	-659	1061.5	2
40	Right ant-roll bar attachment N/A	1864	-205	215	-597	900.5	32
41	Right ant-roll bar attachment	1869	-302	216.5	-592	803.5	33
42	Right ant-roll bar attachment	1927	-205	215	-534	900.5	32
43	Right ant-roll bar attachment N/A	1927	-302	216.5	-534	803.5	33
44	Rear right suspension attachment N/A	1923	-370	216.5	-538	735.5	33
45	Rear right suspension attachment N/A	2110	-427	216.5	-351	678.5	33
46	Rear center suspension attachment N/A	1870.5	-600	216.5	-590.5	505.5	33
47	Rear left suspension attachment N/A	2110	-733	216.5	-351	332.5	33
48	Rear left suspension attachment	1923	-830	216.5	-538	275.5	33
49	Left anti-roll bar attachment	1927	899	216.5	-534	206.5	33
50	Left anti-roll bar attachment	1927	-1023	215	-534	82.5	32
51	Left anti-roll bar attachment N/A	1864	-1023	215	-597	82.5	32

Reference	Description	Value Referencing to main point 02			Value Referencing to main point 03		
		X	Y	Z	X	Y	Z
52	Left anti-roll bar attachment N/A	1869	-899	216.5	-592	206.5	2
53	Rear left suspension attachment	1802	-1156	185	-659	-50.5	2
54	Rear left suspension attachment	1732	-1308.5	185	-729	-203	2
55	Rear right shock absorber	2641	-19	253	180	1086.5	69
56	Rear right shock absorber	2641	-1181	253	180	-75.5	69
57	Rear right bumper	2752	-1189	218	291	-83.5	34
58	Rear right bumper	2752	-1019	220	291	86	36
59	Rear right bumper	2752	-1106.5	103	291	-1	-80.5
60	Rear left bumper	2752	-	220	291	925	36
61	Rear left bumper	2752	-11	218	291	1094.5	34
62	Rear left bumper	2752	-93.5	103	291	1012	-80.5

BODY GAP AND FLUSH MEASUREMENTS



NOTE: All dimensions are in millimeters.

- O/F = Over Flush
- U/F = Under Flush
- U/D = Up/Down
- F/A = Fore/Aft

DIMENSION	DESCRIPTION	GAP	FLUSH
1	Hood to Fender	3.0 +/- 0.5 Parallel within 1.0	Glass U/F 1.3 +/- 1.6 Parallel within 1.7
2	Front Door to Windshield	8.5 +/- 1.0	—
3	Front Door to Roof	8.5 +/- 1.0	—
4	Sliding Door to Roof	8.7 +/- 1.0	—
5	Sliding Door to Roof	4.0 +/- 0.8	—
6	Gas Door to Body Side	2.5 +/- 1.2 Parallel within 1.2	0.7 +/- 0.7
7	Sliding Door to Sill	5.0 +/- 1.0	—
8	Front Door to Sill	5.0 +/- 1.2	—
9	Headlamp to Fender	2.0 +/- 1.0 Parallel within 0.7	Headlamp U/F 0.7 + 0.7 - 0.9 Parallel within 0.8
10	Headlamp to Hood	4.0 +/- 1.3 Parallel within 1.0	Headlamp U/F 0.6 +/- 1.4 Parallel within 1.7
11	Rear Door to Roof	6.0 +/- 1.4 Parallel within 1.0	—
12	Rear Door to Body Side	4.0 +/- 1.2 Parallel within 0.8	Door U/F 2.1 +/- 1.0
13	Mirror to Door	1.5 +/- 0.8 Parallel within 0.7	—
14	Front Fascia to Fender	0.0 + 0.5 / - 0.0 Parallel within 0.5	Fascia O/F 0.7 +/- 0.7 Parallel within 0.8
15	Fender to Front Door	4.0 +/- 0.6 Parallel within 0.6	Fender O/F 0.0 + 1.0
16	Front Door to Sliding Door	4.0 +/- 0.8	Front Door O/F 0 + 1.0
17	Taillamp to Body Side	1.2 +/- 1.2 Parallel within 0.7	Taillamp U/F 0.6 + 1.0 /- 0.7
18	Rear Fascia to Body Side	0.0 + 0.7 / - 0.0 Parallel within 0.5	Fascia U/F 0.7 +/- 0.7 Parallel within 0.8
19	Left Rear Door to Right Rear Door (Lower)	5.0 +/- 1.0 Parallel within 1.0	0.0 +/- 1.0
20	Rear Door to Rear Fascia	5.0 +/- 1.6 Parallel within 1.0	—
21	Taillamp to Rear Door	4.0 +/- 1.6 Parallel within 0.8	—

PAINT CODES

Because of late model changes to the available paint colors for each vehicle the current color codes can be found on the Vehicle Certification Label. (Refer to 00 - Vehicle Data/Vehicle Information/Vehicle Certification Label - Description)

EXTERIOR COLORS

EXTERIOR COLOR	PAINT CODE
Silver Metallic	PAF (VR 612/A)
Quartz Grey Metallic	PAJ (VR695/A)
Blue Night Metallic	PBZ (VR 487/B)
Deep Red Metallic	PRD (VR 293/A)
Bright Red	PRS (VR 168)
Bright White	PW7 (VR 850/B)
Black Metallic	PXQ (VR 632)
Earth Brown	P18 (VR 612/A)
Broom Yellow	P67 (VR 259/A)
Bright White	(VR 268/A)

INTERIOR COLORS

INTERIOR COLOR	CHRYSLER CODE
Black	X9

VEHICLE CERTIFICATION LABEL



3102025241

A vehicle certification label is attached to every Chrysler Group LLC vehicle. The label certifies that the vehicle conforms to all applicable Federal Motor Vehicle Standards. The label also lists:

- Month and year of vehicle manufacture.
- Gross Vehicle Weight Rating (GVWR). The gross front and rear axle weight ratings (GAWR's) are based on a minimum rim size and maximum cold tire inflation pressure.
- Vehicle Identification Number (VIN).
- Type of vehicle.
- Type of rear wheels.
- Bar code.
- Month, Day and Hour (MDH) of final assembly.
- Paint and Trim codes.
- Country of origin.

The label is located on the driver-side door shut-face.

Locations

SEALERS AND SOUND DEADENERS

Terminology

- **Work Time** : The length of time a sealer can continue to be applied or tooled effectively.
- **Set Time** : Time when there is no longer product transfer.
- **Handling Time** : The time when a part can be safely transported and sealer can no longer be tooled or repositioned.
- **Full Cure Time** : Time when a sealer has reached full strength.
- **Paintable Time** : Established time when refinish materials can safely be applied to a sealer.

Sealers

- **Brushable** : Single component sealer applied with a brush.
- **Flowable** : Sealer with low viscosity and self-leveling characteristics.
- **Pumpable** : A two component or one component sealer that seals interior and exterior joints and voids.
- **Resistance Weld-through** : Sealer / adhesive that can be used in conjunction with resistance spot welding.
- **Sealer Tape** : Preformed sealer.
- **Sprayable** : Sealer applied with a pneumatic dispenser to duplicate original textured appearance.
- **Thumb Grade** : Heavy bodied sealer for sealing large gaps and filling voids. Should remain soft and pliable.

Sound Deadeners

- **Non-Structural Flexible Acoustical** : Flexible foam with sealing and sound deadening properties.
- **Non-Structural Ridged Acoustical** : Ridged foam with sealing and sound deadening properties.
- **Mastic Pads** : Sound deadener pad that is preformed to fit a specific area.

Identifying Sealers

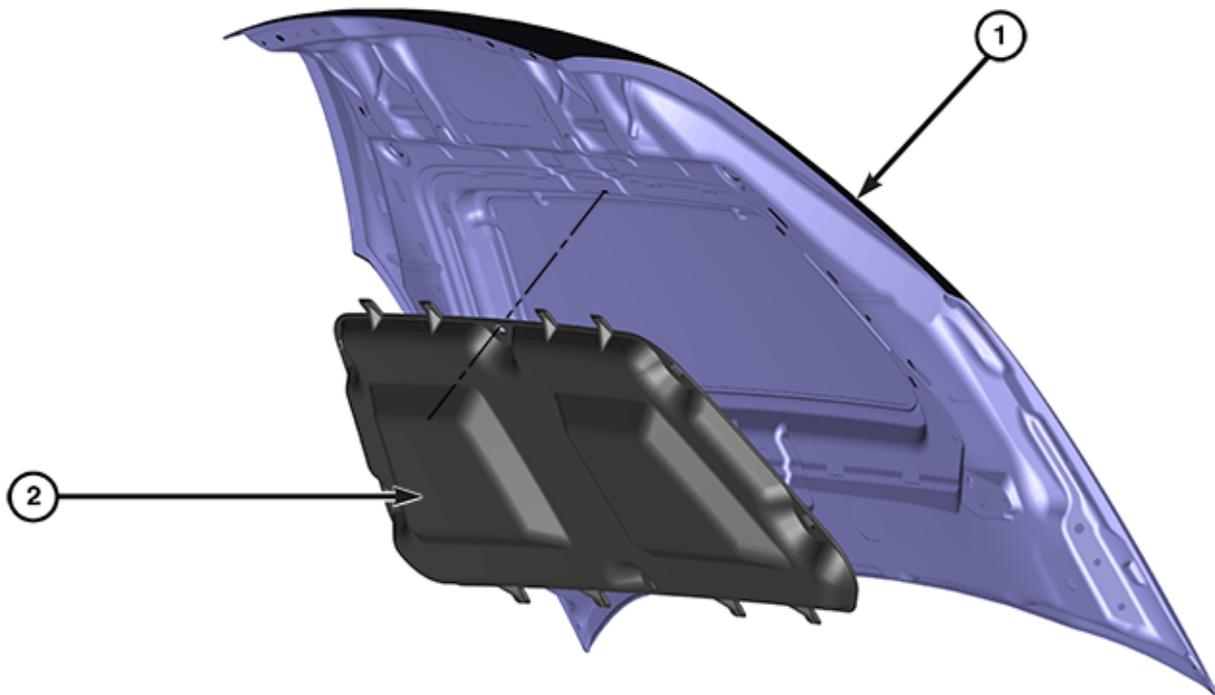
- Several types of sealers and sound deadeners are used during assembly. Therefore, specific applications may not be identified in this publication. General applications and the various types of products for repair will be featured to identify and replace OEM sealers and sound deadeners.

Helpful Sealer Tips

- Check shelf life or expiration date prior to beginning sealer applications.
- Be sure "work time" is appropriate for sealer application.
- Temperature, humidity and thickness of sealer will affect the work, set and paintable times.
- Test fit replacement panels prior to installation to insure tight fit and proper seal.
- Equalize 2K Products according to adhesive manufacturer's recommendations.
- Always follow manufacturer's recommendations for storage, usage and application to achieve best performance of the product.

SOUND DEADENER LOCATIONS

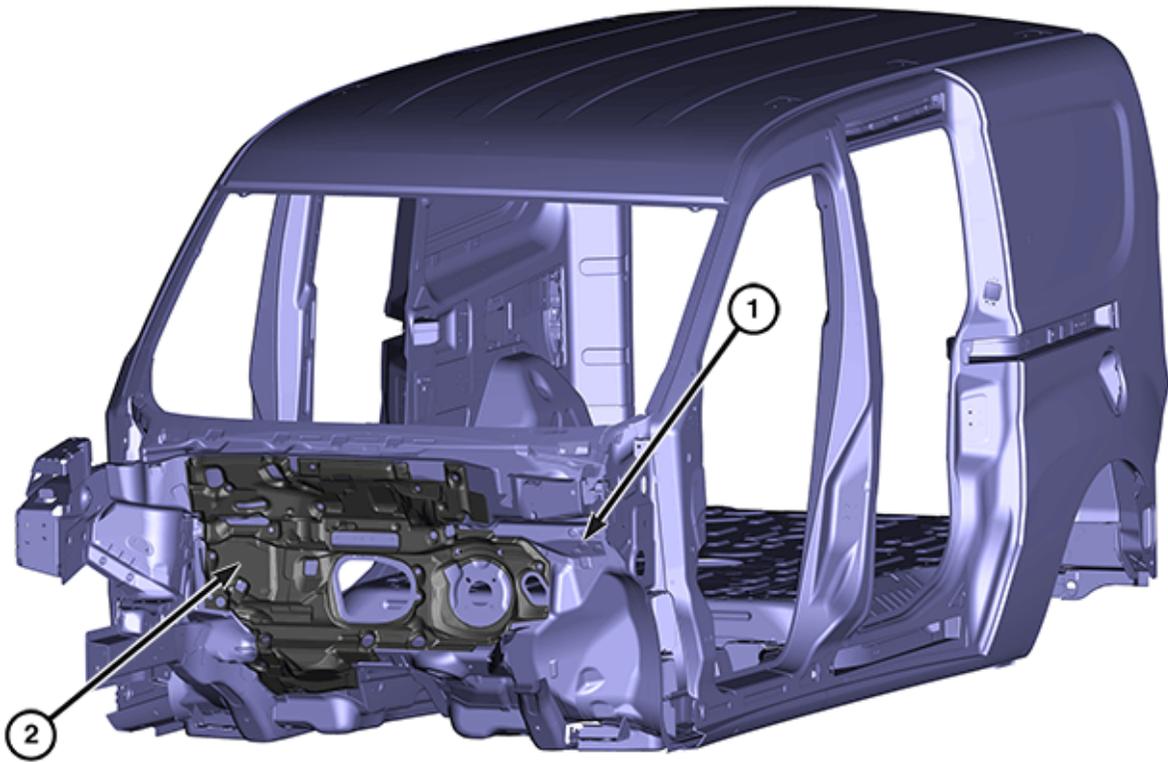
DESCRIPTION	FIGURE
HOOD	FIGURE 1
DASH PANEL (EXTERIOR)	FIGURE 2
DASH PANEL (INTERIOR)	FIGURE 3
FRONT FLOOR (1 of 2)	FIGURE 4
FRONT FLOOR (2 of 2)	FIGURE 5
REAR TUNNEL	FIGURE 6
REAR FLOOR (FRONT)	FIGURE 7
REAR FLOOR (REAR)	FIGURE 8



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Hood

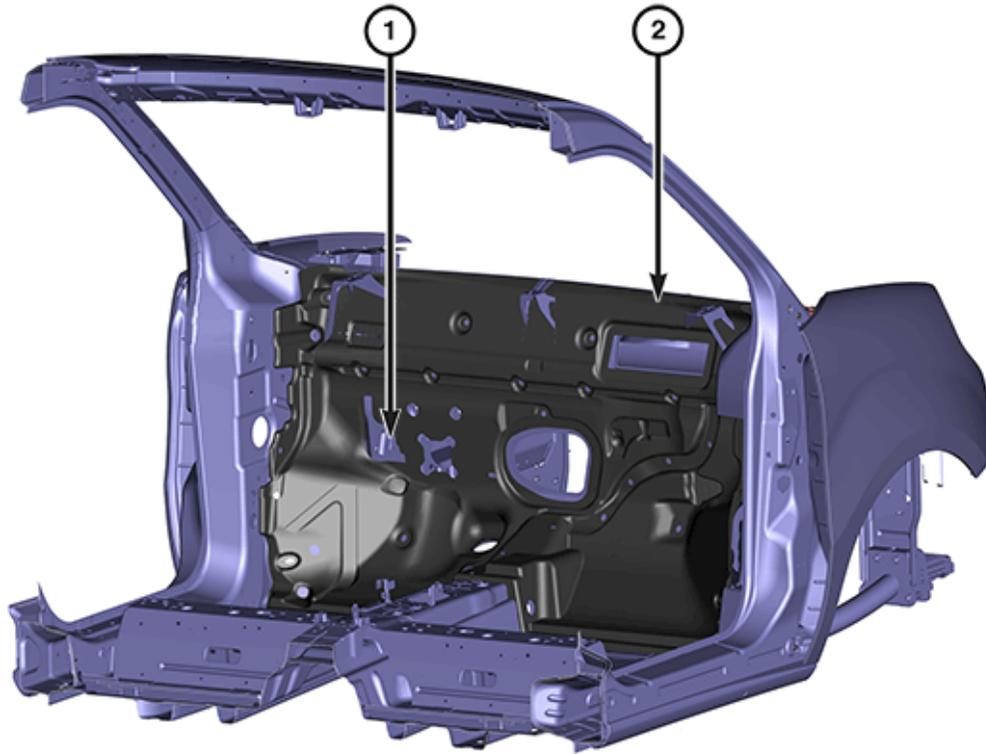
- 1 - HOOD
- 2 - HOOD SILENCER PAD



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Dash Panel (Exterior)

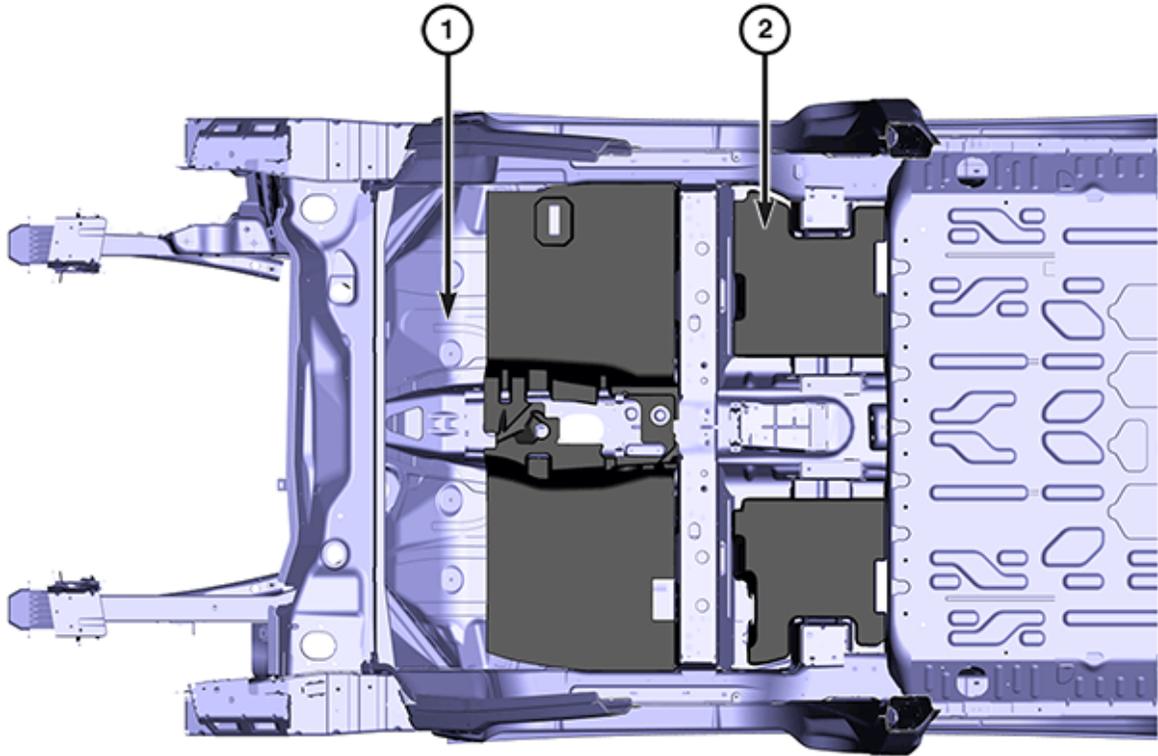
- 1 - DASH PANEL
- 2 - DASH SILENCER PAD



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Dash Panel (Interior)

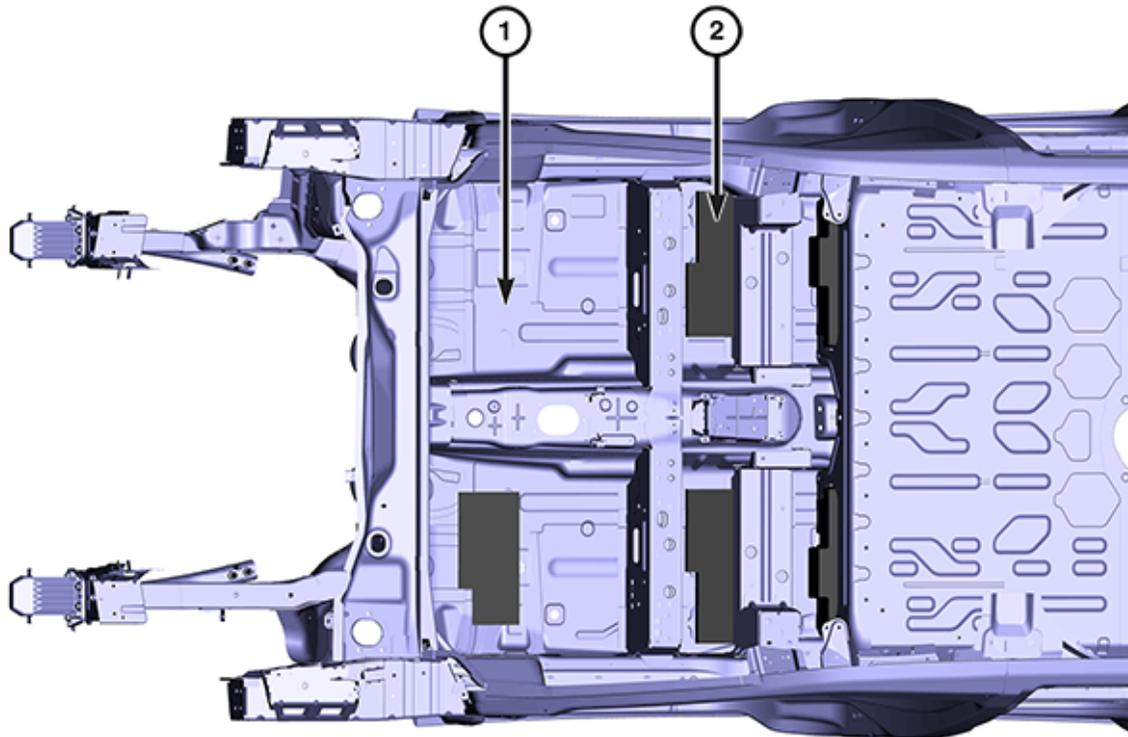
- 1 - DASH PANEL
- 2 - DASH SILENCER PAD



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Front Floor (1 of 2)

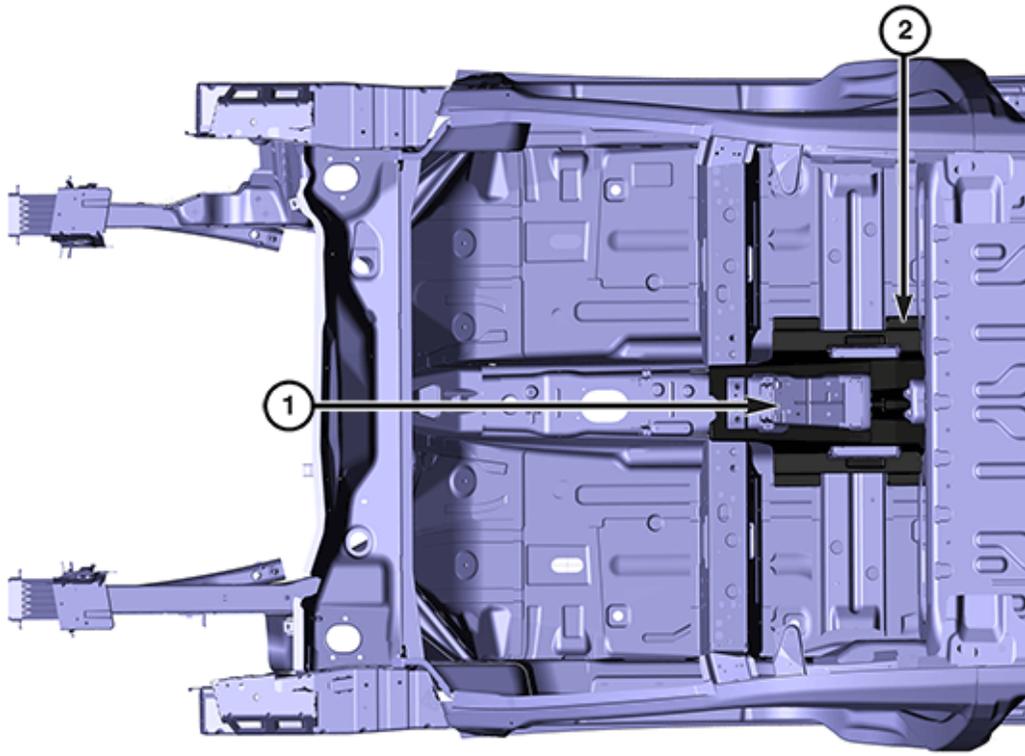
- 1 - FRONT FLOOR
- 2 - FRONT FLOOR SILENCER PAD



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Front Floor (2 of 2)

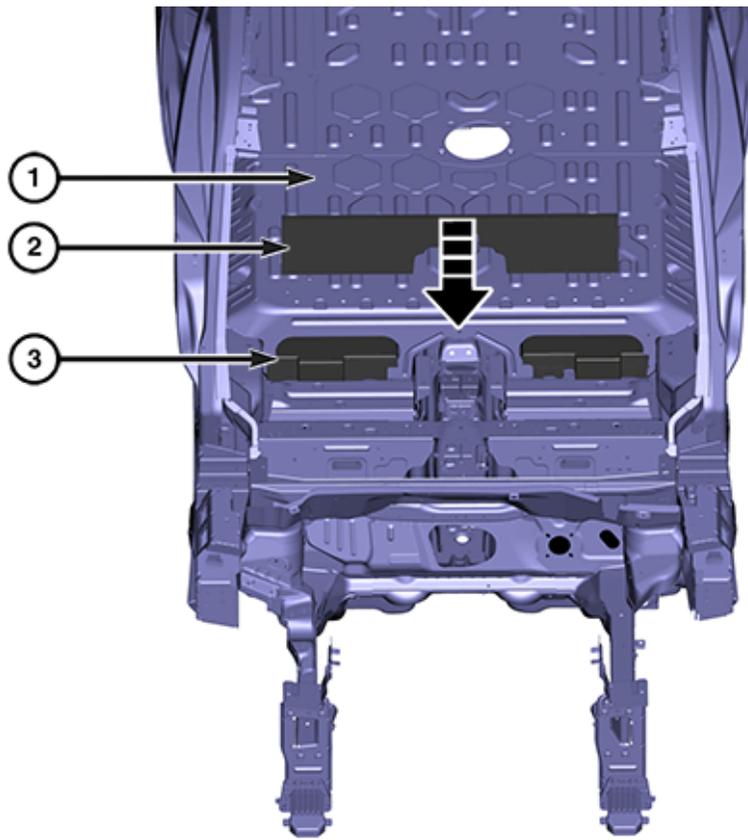
- 1 - FRONT FLOOR
- 2 - FRONT FLOOR INSULATOR



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Rear Tunnel

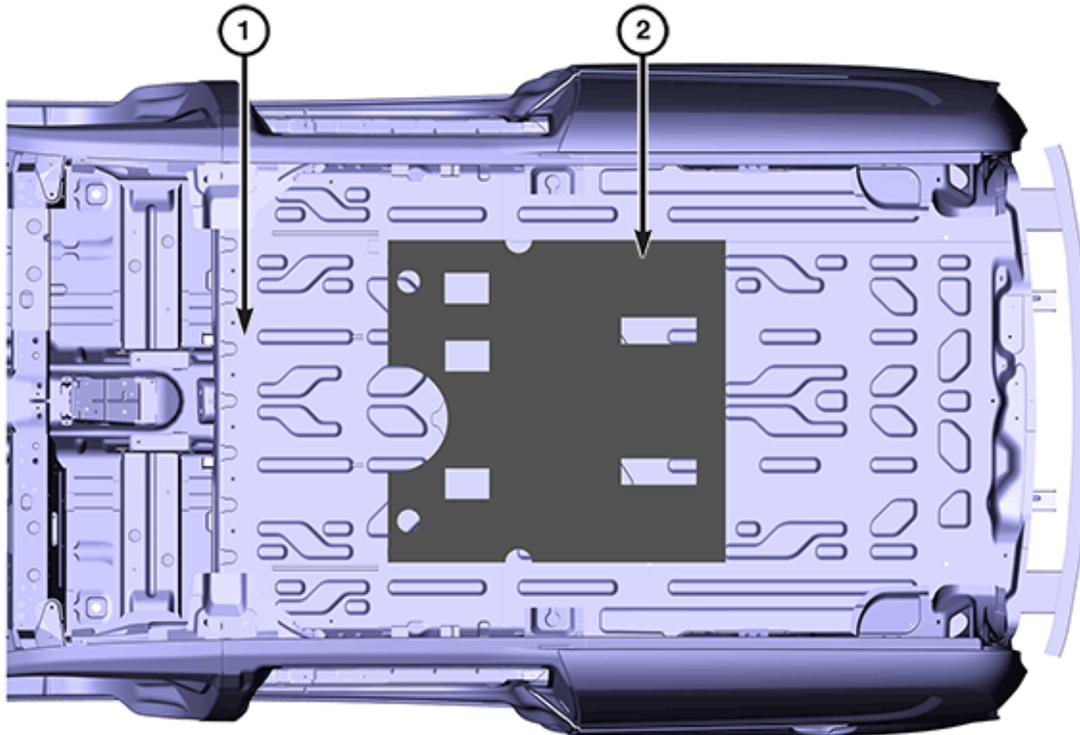
- 1 - REAR TUNNEL
- 2 - REAR TUNNEL INSULATOR



2314065486

Rear Floor (Front)

- 1 - REAR FLOOR (FRONT)
- 2 - REAR FLOOR FILLER FOAM
- 3- REAR FLOOR INSULATION



2314065488

Rear Floor (Rear)

- 1 - REAR FLOOR (REAR)
- 2 - REAR FLOOR INSULATION

STRUCTURAL ADHESIVE, FLEXIBLE ADHESIVES AND SEAM SEALER LOCATIONS

Structural adhesives, flexible adhesives and seam sealers should only be applied by trained technicians. Follow the manufactures instructions for proper applications of products.

- **Structural adhesives** are applied by itself or in conjunction with Squeeze Type Resistance Spot Welds and is to be re-assembled in the same manner as vehicle build. Any situation where it is undetermined weather it is structural adhesives or seam sealer always default to structural adhesive .
- **Anti-flutter adhesives** are applied to areas of the vehicle where adhesive properties with flexibility are required. Typically found on supports and braces throughout the closure panels, roof and body side gas fill areas.
- **Seam sealers** are only to be used topically, never within weld flanges or hem flanges. All sealers being replaced should duplicate the factory style sealer in shape and size.

For additional information on Corrosion Protection, and Sealer and Sound Description, (**Refer to Collision Information - Standard Procedure**).

Chrysler approved replacement materials include -

- **Structural Adhesives** : Fusor 112B, 3M 08116.
- **Anti-Flutter Adhesives (flexible)** : Fusor 121 (Flexible Foam), 3M 04724 (NVH dampening material) and Crest- CFF Flexi-Foam.
- **Seam Sealer** : Mopar #04318026, Fusor 129, 3M 08308.