Uniform Procedures For Collision Repair UPCR

R001S
Welded Roof Panel

 v.4.0

1. Description

This procedure describes the repair and complete replacement of a steel, welded-on roof panel. Inspection and evaluation requirements are also included.

2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of steel, welded-on roof panels. This procedure is intended for use by professionals who are qualified through training and experience.

3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

CP01S Corrosion Protection
MG31 Sun- And Moon-Roof
PS01 Personnel Safety
RF01S Surface Preparation
RF41 Finish Application
SG01 Adhesively Bonded
SG02 Mechanically Fastened
SG11 Gasket-Mounted
ST01S Stress-Relieving Heat Limitations
ST21S Metal Repair
ST31 Body Fillers
WE01S GMA (MIG) Plug Weld
WE11S GMA (MIG) Fillet Weld
WE51S Squeeze-Type Resistance Spot Weld

3.2 Other Information

Equipment-specific information
Product-specific information
Recycled parts information
Vehicle-specific repair information

4. Equipment And Material Requirements

4.1 Welding Equipment

Use GMA (MIG) welding equipment as described in **WE01S** or **WE11S**.

Use squeeze-type resistance spot welding (STRSW) equipment as described in **WE51S**.

Note: Some vehicle makers recommend against the use of STRSW for replacing spot welds.

5. Damage Analysis

5.1 General Damage

Inspect a welded roof panel for these types of damage:

- ❏ visible damage
- ❏ corrosion
- ❏ misalignment with adjacent panels
- ❏ improper previous repairs
- ❏ broken or damaged welds
- ❏ separation from the reinforcements
- ❏ cracked seam sealers
- ❏ air and water leaks
- ❏ damage to sun- or moon-roof or mounting parts (see **MG31**)

Determine if the roof panel is to be repaired or replaced. Verify the availability of replacement parts.

6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Welding Safety

Welding safety information is in **WE01S**, **WE11S**, or **WE51S**.

7. Environmental Safety

Does not apply.

8. Vehicle Protection

8.1 Stress-Relieving

If heat is used for stress-relieving, use temperature-measuring methods as described in **ST01S**.

Note: Some vehicle makers recommend against the use of heat for stress-relieving.

8.2 Electronic Parts

To protect computers and other sensitive parts from damage:

- ❏ Follow the vehicle maker's recommendations for recording and resetting electronic memories.
- ❏ Ensure that the ignition switch is in the LOCK position, and the key is removed.
- ❏ Disconnect and isolate the negative battery cable, and disarm the passive restraint system. Follow the vehicle maker's recommendations.
- ❏ Carefully remove computer modules when welding or heating within 300 mm (12"), or a greater distance when recommended by the vehicle maker.
- ❏ Protect computer modules, connectors, and wiring from dirt, heat, static electricity, and moisture.
- ❏ Loosen or remove any wiring harnesses or electrical parts that could be damaged during the repair process.

8.3 Roof Panel And Adjacent Areas

Protect the roof panel, adjacent panels, glass, upholstery, and other cosmetic surfaces from welding, grinding, and cutting sparks. Remove interior trim and adjacent parts that cannot be protected.

9. Repair Procedure

9.1 Straightening

To straighten a welded roof panel:

- ❑ 1. Remove glass, trim, and the headliner, if required.
- ❑ 2. Repair damage using metal repair and heat shrinking procedures. Weld tears or punctures in the roof panel as required. If heat is used for relieving stress, follow the vehicle maker's temperature and time recommendations. If the part cannot be identified as mild steel, treat it like high-strength steel (HSS).
  Note: Some vehicle makers do not recommend the use of heat for stress-relieving.
- ❑ 3. Inspect the roof inner bow structure for separation of the bonding material. Reapply the bonding material, if required.
- ❑ 4. Apply corrosion-resistant primer to all interior and exterior surfaces and other areas damaged by the collision or repairs.
- ❑ 5. Apply seam sealers to seal the joints and restore the appearance. Reprime if required by the product maker.
- ❑ 6. Replace any damaged or missing sound-deadening pads.
- ❑ 7. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish cosmetic surfaces after all body repairs are complete.
- ❑ 8. Reinstall any glass. To avoid damage, it may be necessary to place semi-rigid headliners inside the vehicle before reinstalling the glass.
- ❑ 9. Test for water leaks.
- ❑ 10. Reinstall the headliner and trim.
- ❑ 11. Continue vehicle reassembly.

9.2 Welded-On Roof Panel Removal

To remove a welded-on roof panel:

- ❑ 1. Protect the interior and adjacent panels.
- ❑ 2. Remove the windshield and backlite.
- ❑ 3. Remove the headliner and adjacent trim.
- ❑ 4. Remove any roof-mounted glass parts.
- ❑ 5. Disconnect and remove any electrical accessories, if required.
- ❑ 6. Make sure all adjacent parts are in alignment before removing the roof panel.
- ❑ 7. Cut a center section out of the roof panel, if required for access. Avoid cutting into the roof bows or reinforcements, unless a replacement roof panel is available with roof bows and reinforcements pre-installed.
- ❑ 8. Separate the bond holding the roof panel to the reinforcements, if required.
- ❑ 9. Separate the joints from the corner roof panel seams, if required.
- ❑ 10. Identify and mark any spot weld locations.
- ❑ 11. Remove the spot welds.
- ❑ 12. Remove the damaged roof panel.
- ❑ 13. Straighten the roof rail edges, if required to ensure a proper fit-up with the replacement roof panel.

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9.3 Welded-On Roof Panel Installation

To install a welded-on roof panel:

- ❑ 1. Perform a trial fit of the roof panel. Mark for proper positioning.
- ❑ 2. Test-fit the windshield and backlite. Mark for proper positioning.
- ❑ 3. Remove the glass and roof panel from the vehicle.
- ❑ 4. Clean the roof panel. Avoid removing any zinc coating.
- ❑ 5. Refer to the vehicle maker's body repair manual for the recommended welding method. STRSW should be used only when recommended by the vehicle maker.
- ❑ 6. Refer to the vehicle maker's recommendation for the location, number, and size of plug weld holes. If no recommendations are available, punch or drill 8 mm ($^{5}/_{16}$") holes in the replacement panel at the same locations used originally by the vehicle maker. If using a lap joint, allow for a minimum of 6 mm ($^{1}/_{4}$") overlap. If STRSW is used, refer to the vehicle maker's recommendations for the electrode diameter, weld locations and spacing, etc.
- ❑ 7. Apply weld-through primer to all weld-mating surfaces that do not have a zinc coating, or where the zinc coating was removed. Follow the vehicle maker's recommendations. Due to the poor adhesion property of some weld-through primers, it may have to be removed from all exposed surfaces after welding, before applying other coatings and sealants.
- ❑ 8. Apply the proper adhesive to the roof panel, roof bows, and reinforcements with the proper caulking to restore strength and noise reduction. Follow the vehicle and product makers' recommendations.
- ❑ 9. Position the roof panel on the vehicle, aligning it to the position marks.
- ❑ 10. Verify that the roof panel is properly aligned to the opening. Adjust if required.
- ❑ 11. Securely hold the roof panel in position.
- ❑ 12. Make test welds, before welding on the vehicle, using the same type and thickness metal that will be welded on the vehicle. Make the test welds in the same position as the welds on the vehicle, using weld-through primer if applicable. Visually inspect and destructively test the welds before welding on the vehicle.
- ❑ 13. Make the required welds.
- ❑ 14. Dress the welds.
- ❑ 15. Finish the weld areas, if required.
- ❑ 16. Weld the corner joints, as recommended by the vehicle maker.
- ❑ 17. Apply corrosion-resistant primer to all interior and exterior surfaces and other areas damaged by the collision or repairs.
- ❑ 18. Apply seam sealers to seal the joints and restore the appearance. Reprime if required by the product maker.
- ❑ 19. Replace any damaged or missing sound-deadening pads.
- ❑ 20. Refinish areas damaged by the collision, repairs, or anchoring to restore the appearance. Refinish cosmetic surfaces after all body repairs are complete.
- ❑ 21. Reinstall any electrical accessories.
- ❑ 22. Reinstall roof-mounted glass parts.

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9. Repair Procedure (cont'd)

- ❏ 23. Reinstall the windshield and backlite. To avoid damage, it may be necessary to place semi-rigid headliners inside the vehicle before reinstalling the glass.
- ❏ 24. Test for water leaks.
- ❏ 25. Reinstall the headliner and adjacent trim.
- ❏ 26. Continue vehicle reassembly.

10. Use Of Recycled (Salvage) Parts

10.1 Condition Of Salvage Parts

Do not install a salvage roof panel having any of these defects:

- ❏ unrepairable damage
- ❏ corrosion that has caused pitting
- ❏ improper previous repairs
- ❏ missing mounting locations

10.2 Preparation Of Salvage Parts

To prepare a salvage roof panel for installation:

- ❏ Clean the part to remove dirt, wax, grease, corrosion, excessive paint build-up, etc.
- ❏ Trim the part to fit.
- ❏ Remove all heat-affected zones.
- ❏ Make sure the part is not deformed along the weld joints.

11. Inspection And Testing

11.1 Inspection Of A Repaired Or Replaced Welded Roof Panel

Inspect a repaired or replaced welded roof panel for these conditions:

- ❏ proper alignment with adjacent panels
- ❏ weld quality
- ❏ no air or water leaks
- ❏ proper application of corrosion protection
- ❏ proper application of sound-deadening materials
- ❏ proper alignment and operation of roof-mounted glass systems
- ❏ proper operation of the dome light and other electrical parts
- ❏ proper installation of the headliner and attaching parts
- ❏ proper finish appearance and film thickness
- ❏ proper windshield and backlite alignment

Correct any defects.