



# SP01S

## Rail, Front Upper

**Uniform  
Procedures For  
Collision Repair  
UPCR**

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v.4.0



### 1. Description

This procedure describes the repair and complete or partial replacement of a steel front upper rail. 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 front upper rails. 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
- ME01 Three-Dimensional Measuring
- PS01 Personnel Safety
- RF01S Surface Preparation
- RF41 Finish Application
- ST01S Stress-Relieving Heat Limitations
- ST11 Structural Straightening
- ST21S Metal Repair
- WA01 Wheel Alignment, Front
- WE01S GMA (MIG) Plug Weld
- WE11S GMA (MIG) Fillet Weld
- WE51S Squeeze-Type Resistance Spot Weld

### 3.2 Other Information

- Vehicle-specific dimension specifications
- Vehicle-specific repair information



## 4. Equipment And Material Requirements

### 4.1 Straightening And Measuring Equipment

Use straightening equipment as described in **ST11**.

Use measuring equipment as described in **ME01**.

### 4.2 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 front upper rail for these types of damage:

- visible damage
- corrosion
- improper previous repairs
- dimensional misalignment

Determine how much of the front upper rail can be straightened, and the portion that must be replaced. Verify the availability of replacement parts. Refer to the vehicle maker's body repair manual for recommended joint locations.



## 6. Personnel Safety

### 6.1 General Safety

General safety information is in **PS01**.

### 6.2 Straightening Safety

Straightening safety information is in **ST11**.

### 6.3 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.

Remove the battery if it is in an area to be welded or heated.

### 8.3 Adjacent Areas

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



## 9. Repair Procedure

### 9.1 Straightening

To straighten a front upper rail:

1. Make sure the vehicle is properly anchored to the straightening system.
2. Make underhood measurements to determine the location of the upper rail and strut tower.
3. Make underbody and upperbody measurements to determine the location of the surrounding structure.

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## 9. Repair Procedure (cont'd)

- ❑ 4. Use multiple pulls and stress-relieving to return the upper rail and the surrounding structure to proper dimensions. Follow the repair and tolerance recommendations of the vehicle maker. If no recommendations are given, use a tolerance of  $\pm 3$  mm ( $\frac{1}{8}$ " ). Use a three-dimensional measuring system and adjacent panels to verify that the part is properly aligned.
- ❑ 5. 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 recommend against the use of heat for stress-relieving.
- ❑ 6. Plan to replace any areas that are kinked, have stress cracks, or develop cracks during straightening. If complete replacement is required, see 9.2 and 9.3. For sectioning, see 9.4 and 9.5.
- ❑ 7. Apply corrosion-resistant primer to all interior and exterior surfaces damaged by the collision, repairs, or anchoring.
- ❑ 8. Apply seam sealers as necessary to seal the joints and restore the appearance. Reprime if required by the product maker.
- ❑ 9. Replace foam fillers, if necessary. Follow the vehicle maker's recommendations.
- ❑ 10. Apply anti-corrosion compounds to all enclosed areas.
- ❑ 11. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish cosmetic surfaces after all body repairs are complete.
- ❑ 12. Continue vehicle reassembly.

### 9.2 Complete Rail Removal

To remove a complete front upper rail:

- ❑ 1. Perform underhood measurements and adjacent panel alignment and straightening. See 9.1.
- ❑ 2. Identify and mark all spot weld locations.
- ❑ 3. Remove the spot welds. Do not damage the parts attached to the rail which are not to be replaced.
- ❑ 4. Remove the damaged rail.
- ❑ 5. Remove any burrs or spot weld nuggets from the mating surfaces, and repair any damage. Avoid removing any zinc coating.
- ❑ 6. Remove any foam fillers from the weld-joint areas, if necessary. Follow the vehicle maker's recommendations.
- ❑ 7. Straighten the mating panel edges, if necessary to ensure a proper fit-up with the replacement rail.

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## 9. Repair Procedure (cont'd)

### 9.3. Complete Rail Installation

To install a complete replacement front upper rail:

- 1. Perform a trial fit of the replacement parts.
- 2. Clean the mating surfaces. Avoid removing any zinc coating.
- 3. 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.
- 4. Refer to the vehicle maker's recommendation for the location, number, and size of plug weld holes or size of electrode and number and location of STRSW. If no recommendations are available, punch or drill 8 mm ( $\frac{5}{16}$ " ) holes in the outer panel at the same locations used originally by the vehicle maker. If using a lap joint, allow for a minimum of 6 mm ( $\frac{1}{4}$ " ) overlap. If STRSW is used, refer to the vehicle maker's recommendations for the electrode diameter, weld locations and spacing, etc.
- 5. Test-fit the replacement rail, and clamp it in place.
- 6. Remove the replacement rail from the vehicle.
- 7. Apply weld-through primer to all weld mating surfaces that do not have 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 weld-bond adhesive when recommended by the vehicle maker.
- 9. Position the part on the vehicle and clamp it in place.
- 10. Use a three-dimensional measuring system and adjacent panels to verify that the rail is properly aligned.
- 11. Tack weld, or securely hold, the rail in position.
- 12. Recheck the alignment using the measuring system and the adjacent panels.
- 13. 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.
- 14. Make the required welds.
- 15. Use the three-dimensional measuring system and adjacent panels to verify that the rail is still properly aligned.
- 16. Dress the welds, if necessary.
- 17. Apply corrosion-resistant primer to all interior and exterior surfaces and all other areas damaged by the collision, repairs, or anchoring.
- 18. Apply seam sealers, as necessary, to seal the joints and restore the appearance. Reprime if required by the product maker.
- 19. Replace foam fillers, if necessary. Follow the vehicle maker's recommendations.
- 20. Apply anti-corrosion compounds to all enclosed areas.
- 21. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish cosmetic surfaces after all body repairs are complete.
- 22. Continue vehicle reassembly.

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## 9. Repair Procedure (cont'd)

### 9.4 Partial Rail Removal

To remove the damaged portion of a front upper rail for partial replacement:

- 1. Perform underhood measurements and adjacent panel alignment and straightening. See **9.1**.
- 2. Select the cut location based on the repair procedure.
- 3. Measure and mark the cut location.
- 4. Cut the undamaged portion of the rail slightly longer than the final cut location. Avoid creating a large heat-affected zone.
- 5. Remove any foam fillers from the weld joint areas. Follow the vehicle maker's recommendations.
- 6. Identify and mark the spot weld locations of the portion to be removed.
- 7. Remove the spot welds. Do not damage the parts that are attached to the front upper rail if they are not to be replaced.
- 8. Remove the cutout portion of the rail from the vehicle.
- 9. Trim the remaining edges of the rail to the exact cut location.
- 10. Remove all burrs or spot weld nuggets from the mating surfaces, and repair all damage. Avoid removing any zinc coating.
- 11. Straighten the panel edges, if needed to ensure a proper fit-up with the replacement portion.

### 9.5 Partial Rail Installation

To install a partial front upper rail section:

- 1. Compare the replacement part to the original part by visual inspection and measuring. Measure across the area to be sectioned using three or more reference points, such as holes, notches, weld seams, or feature lines. If no reference points exist on the replacement part, make reference marks on both parts.
- 2. Cut the replacement upper rail to the proper length and shape for the type of joint recommended by the vehicle maker.
- 3. Clean the mating surfaces. Avoid removing any zinc coating.
- 4. 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.
- 5. 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 ( $\frac{5}{16}$ " ) 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 ( $\frac{1}{4}$ " ) overlap. If STRSW is used, refer to the vehicle maker's recommendations for the electrode diameter, weld locations and spacing, etc.
- 6. Test-fit the partial rail and clamp it in place.
- 7. Remove the partial rail from the vehicle.

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## 9. Repair Procedure (cont'd)

- 8. Apply weld-through primer to all weld mating surfaces that do not have 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.
- 9. Apply weld-bond adhesive when recommended by the vehicle maker.
- 10. Position the partial rail on the vehicle and clamp it in place.
- 11. Use adjacent panels and a three-dimensional measuring system to verify that the partial rail is properly aligned.
- 12. Tack weld, or securely hold, the partial rail in position.
- 13. Recheck the alignment using the measuring system and the adjacent panels.
- 14. 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.
- 15. Make the required welds.
- 16. Use the three-dimensional measuring system and adjacent panels to verify that the partial rail is still properly aligned.
- 17. Dress the welds, if necessary.
- 18. Apply corrosion-resistant primer to all interior and exterior surfaces damaged by the collision, repairs, or anchoring.
- 19. Apply seam sealers, as necessary, to seal the joints and restore the appearance. Reprime if required by the product maker.
- 20. Replace foam fillers, if necessary. Follow the vehicle maker's recommendations.
- 21. Apply anti-corrosion compounds to all enclosed areas.
- 22. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance.
- 23. Continue vehicle reassembly.



## 10. Use Of Recycled (Salvage) Parts

### 10.1 Inspection Of Salvage Parts

Do not install a salvage front upper rail having any of these defects:

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

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## 10. Use Of Recycled (Salvage) Parts (cont'd)

### 10.2 Preparation Of Salvage Parts

To prepare a salvage front upper rail for installation:

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



## 11. Inspection And Testing

### 11.1 Inspection Of A Repaired Or Replaced Front Upper Rail

Inspect a repaired or replaced front upper rail for these conditions:

- dimensional alignment
- weld quality
- proper finish appearance and film thickness
- proper application of corrosion protection
- proper alignment to adjacent panels

Correct any defects.

A suspension alignment is required after repairing or replacing a front upper rail.