

# Uniform Procedures For Collision Repair

## D031A—Skin

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v.3.1



### 1. Description

This procedure describes the complete or partial replacement of an aluminum door skin. Inspection and evaluation requirements are also included.



### 2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality replacement of aluminum door skins. 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**

CP01A Corrosion Protection  
DO01 Hinges  
DO21 Door  
PS01 Personnel Safety  
RE22 Airbag Systems, Side  
RF41 Finish Application  
ST21A Metal Repair  
ST31 Body Fillers  
WE01A GMA (MIG) Plug Weld  
WE11A GMA (MIG) Fillet Weld

### **3.2 Other Information**

Equipment-specific information  
Product-specific information  
Vehicle-specific repair information



## 4. Equipment And Material Requirements

### 4.1 Welding Equipment

Use **GMA (MIG) welding** equipment as described in **WE01A** or **WE11A**.

### 4.2 Welding Filler Wire

Welding filler wire must be compatible with the base metal alloy being joined. See **WE01A** or **WE11A**.

### 4.3 Equipment

The use of this equipment is included in this procedure:

- heat gun
- flanging tool
- front-edge crimping tool

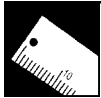
Use tools and materials, such as abrasives, that are designated for use only on aluminum, to avoid surface contamination.

A stainless steel wire brush, dedicated for use on aluminum, is recommended for cleaning aluminum before making a weld.

### 4.4 Materials

The use of these materials is included in this procedure:

- sound-deadening pads and foams
- hinge and latch lubricant



## 5. Damage Analysis

### 5.1 General Damage

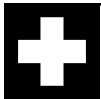
Inspect an aluminum door skin for these conditions or types of damage:

- excessive filler or paint film thickness
- separation of the skin from the inner structure
- visible damage
- corrosion**
- improper previous repairs
- damaged or missing trim, labels, seals, etc.
- damaged or missing energy-absorbing foam panels

Determine whether the door skin should be repaired or replaced. See **DO21** for door removal and installation. Follow the vehicle maker's recommendations for the use of door-skin bonding adhesives.

Note: Some vehicle makers recommend against welding tears in aluminum alloys.

Verify the availability of replacement parts.



## 6. Personnel Safety

### 6.1 General Safety

General safety information is in **PS01**.

Make sure the door is properly supported, and use proper lifting techniques during removal and installation.

### 6.2 Welding Safety

Welding safety information is in **WE01A** or **WE11A**.

### 6.3 Metal Repair Safety

Metal repair safety information is in **ST21A**.

### 6.4 Hinge Safety

Door hinge safety information is in **DO01**.

### 6.5 Safety With Power Tools And Electrical Equipment

Power tool and electrical equipment safety information is in **ST21A**.



## 7. Environmental Safety

Does not apply.



## 8. Vehicle Protection

### 8.1 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 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.

### 8.2 Door Hem Flanges

To prevent cracking when forming door hem **flanges**:

- Avoid hammering the hem flange flat.
- Apply limited heat.

### 8.3 Door And Cosmetic Areas

When removing or replacing doors:

- Protect the door from damage during removal, storage, and installation.
- Protect adjacent areas from damage.
- Remove or protect glass, upholstery, and other **cosmetic surfaces** from damage caused by welding or cutting sparks. Remove interior or exterior trim and adjacent parts that cannot be protected.

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## 8. Vehicle Protection (cont'd)

### 8.4 Aluminum Surfaces

To prevent damaging aluminum surfaces:

- Ensure that all tools are cleaned before, or are dedicated for, use on aluminum.
- Use an orbital or dual-action sander. Do not use a hand-held grinder.
- Use 80-grit or finer, open-coat sanding discs.
- Use foam backing pads instead of stiff backing pads.
- Apply less pressure than when sanding steel.
- Do not operate a sander continuously in the same area.
- Keep sanding discs and other abrasives separate from those used for steel repairs.
- Make sure the faces and edges of metal hammers and dollies are smooth and polished and have rounded edges.
- Make sure the points of picks do not have sharp points. File or grind the tips until they are rounded or flat. An option is to use a tip made of rubber or plastic, or cover the tip with tape.
- Use a dull file.
- Do not use shrinking hammers.

### 8.5 Galvanic Corrosion

To prevent galvanic corrosion when straightening aluminum parts:

- Thoroughly remove steel particles from power tools before use.
- Keep hand tools separate from those used for steel repairs.
- Keep sanding discs and other abrasives separate from those used for steel repairs.

### 8.6 Use Of Heat

The application of heat on aluminum alloys can greatly reduce their strength. Determine if the vehicle maker recommends against the use of heat for aluminum parts. If heat is used during aluminum repairs, stay within the recommended temperatures to prevent permanent loss of strength. Use a minimum of 200°C (400°F), and a maximum of 300°C (570°F), unless otherwise directed by the vehicle maker. Use temperature-measuring methods as described in **ST01A**.



## 9. Repair Procedure

For replacing a door skin, see **9.1** and **9.2** for bolted-on hinges, or **9.3** and **9.4** for welded-on hinges.

### 9.1 Door Skin Removal, Bolted-On Hinges

To remove a complete or partial aluminum door skin:

- 1. Straighten the door to ensure proper alignment to the door opening.
- 2. Support and remove the door from the vehicle.
- 3. Disconnect and remove all attached exterior parts.
- 4. Protect or remove the door glass.
- 5. Identify and mark **sectioning** locations forward and rearward of the window opening, at or above the belt line, if required.
- 6. Cut the sectioning joints, if required.
- 7. Remove any welds along the belt line, if required.
- 8. Grind off the hem flanges. Do not damage the door frame.
- 9. Remove the door skin.
- 10. Remove the hem flange from the door frame.
- 11. Remove any sealant or foam remaining on the door intrusion beam. Avoid damaging the corrosion protection.
- 12. Remove any remaining adhesives, burrs, or spot weld **nuggets** from the door frame.
- 13. Straighten the edge of the door frame, if required to ensure a proper fit-up with the replacement part.
- 14. Check the fit of the door frame to the door opening.

### 9.2 Door Skin Installation, Bolted-On Hinges

To install a complete or partial aluminum door skin:

- 1. Verify that the proper part is being installed by checking the part number and performing a trial fit.
- 2. Apply corrosion-resistant primer to the door frame.
- 3. Install sound-deadening pads to the replacement door skin, if required.
- 4. Cut the replacement door skin to match the sectioning joints on the door, if required.
- 5. Partially flange the front edge of the replacement door skin.
- 6. Test-fit the replacement door skin. Mark the location of the skin before removal.
- 7. Prepare the weld mating surfaces along the hem flange, belt line and the sectioning joints, if welding is required.

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## 9. Repair Procedure (cont'd)

- 8. Apply non-shrinking **seam sealer** or foam to the replacement door skin or door intrusion beam, if required. Follow the product maker's recommendations. Some foams may need to be applied after the door skin is positioned.
- 9. Apply door-skin bonding primer and adhesive to the replacement part flange areas and sectioning joints. If a door-skin bonding adhesive is to be used, follow the vehicle and adhesive makers' recommendations.
- 10. Position the door skin on the door frame. Ensure that the front flange is around the door frame.
- 11. Position the door skin, ensuring that all remaining flange areas are properly positioned around the door frame.
- 12. Partially flange the door skin around the door frame.
- 13. Verify that the door skin is properly aligned to the door frame and the sectioning joints. Adjust if required.
- 14. Complete the flanging process of the door skin around the door frame. Avoid hammering the hem flange flat to prevent cracking.
- 15. Support the door while aligning the hinges.
- 16. Install the hinge mounting fasteners loosely.
- 17. Install all removed shims in their original locations. Transfer or replace any spacers, washers, isolators, etc., required to prevent contact between dissimilar metals.
- 18. Reinstall the hinge pins and bushings, if required.
- 19. Close the door enough to check the alignment of the door and the door skin to the adjacent panels. Adjust if required.
- 20. Torque the hinge mounting fasteners to the vehicle maker's recommendations.
- 21. Recheck the door skin alignment to the door opening and the sectioning joints. Adjust if required.
- 22. 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. Visually inspect and destructively test the welds before welding on the vehicle.
- 23. Make any required welds along the hem flange, belt line, and the sectioning joints. Make all fillet welds in the sectioning joints as long as possible to avoid cold start defects. If the door skin is a weld-on type, follow the vehicle maker's welding recommendations. If no recommendations exist, make welds in the same locations used by the vehicle maker.
- 24. Dress and metal-finish the welds, if required to restore the appearance.

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## 9. Repair Procedure (cont'd)

- 25. Apply corrosion-resistant primer to the weld areas or areas damaged by the collision or repairs.
- 26. Apply and finish **body fillers** in the sectioning locations, if required. The panel must be within 3 mm (1/8") of its original contour for most body filler applications. Follow the filler maker's recommendations. Ensure that the body filler used is compatible with aluminum. Some vehicle and product makers recommend the application of a two-part epoxy primer before applying body fillers to aluminum.
- 27. Apply seam sealers, if required to restore the hem flange seal and appearance.
- 28. Apply **anti-corrosion compounds**.
- 29. Refinish the door opening, door frame, and areas where trim and hardware will be installed, as required to restore the appearance.
- 30. Install the door on the vehicle.

### 9.3 Door Skin Installation, Welded-On Hinges

To install a complete or partial aluminum door skin:

- 1. Verify that the proper part is being installed by checking the part number and performing a trial fit.
- 2. Apply corrosion-resistant primer to the door frame.
- 3. Install sound-deadening pads to the replacement door skin, if required.
- 4. Cut the replacement door skin to match the sectioning joints on the door, if required.
- 5. Partially flange the front edge of the replacement door skin.
- 6. Test-fit the replacement door skin. Mark the location of the skin before removal.
- 7. Prepare the weld mating surfaces along the hem flange, belt line, and the sectioning joints, if welding is required.
- 8. Apply non-shrinking seam sealer or foams to the replacement door skin or door **intrusion beam**, if required. Follow the product maker's recommendations. Some foams may need to be applied after the door skin is positioned.
- 9. Apply door-skin bonding primer and adhesive to the replacement part flange areas and sectioning joints. If a door-skin bonding adhesive is to be used, follow the vehicle and adhesive makers' recommendations.
- 10. Position the door skin on the door frame. Ensure that the front flange is around the door frame.
- 11. Position the door skin, ensuring that all remaining flange areas are properly positioned around the door frame.

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## 9. Repair Procedure (cont'd)

- 12. Partially flange the door skin around the door frame.
- 13. Verify that the door skin is properly aligned to the door opening and the sectioning joints. Adjust if required.
- 14. Complete the flanging process of the door skin around the door frame. Avoid hammering the hem flange flat to prevent cracking.
- 15. Support the door while aligning the hinges.
- 16. Install the hinge pins and bushings.
- 17. Close the door enough to check the alignment of the door and the door skin to the adjacent panels. Adjust if required.
- 18. Recheck the door skin alignment to the door opening and the sectioning joints. Adjust if required.
- 19. 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. Visually inspect and destructively test the welds before welding on the vehicle.
- 20. Make any required welds along the hem flange, belt line, and the sectioning joints. Make all fillet welds in the sectioning joints as long as possible to avoid cold start defects. If the door skin is a weld-on type, follow the vehicle maker's welding recommendations. If no recommendations exist, make welds in the same locations used by the vehicle maker.
- 21. Dress and metal-finish the welds, if required to restore the appearance.
- 22. Apply corrosion-resistant primer to the weld areas or areas damaged by the collision or repairs.
- 23. Apply and finish body fillers in the sectioning locations, if required. The panel must be within 3 mm ( $1/8$ " ) of its original contour for most body filler applications. Follow the filler maker's recommendations. Ensure that the body filler used is compatible with aluminum. Some vehicle and product makers recommend the application of a two-part epoxy primer before applying body fillers to aluminum.
- 24. Apply seam sealers, if required to restore the hem flange seal and appearance.
- 25. Apply anti-corrosion compounds.
- 26. Refinish the door opening, door frame, and areas where trim and hardware will be installed, as required to restore the appearance.
- 27. Install the door on the vehicle.

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## 9. Repair Procedure (cont'd)

### 9.4 Final Reassembly

To complete the reassembly after refinishing is complete:

- 1. Transfer or install replacement parts such as energy-absorbing foam panels, door handles, locks, window regulators and tracks, latch assemblies, etc. Include spacers, washers, isolators, etc. required to prevent contact between dissimilar metals.
- 2. Install all exterior trim, labels, weatherstripping, etc.
- 3. Install the striker pin.
- 4. Check the door for proper latching. Align the striker and latch assembly.
- 5. Reroute any electrical wiring and mirror cables to their original locations.
- 6. Reconnect all electrical connectors.
- 7. Lubricate the hinges and latch. Follow the vehicle maker's recommendations.
- 8. Verify the proper operation of the door glass and all electrical accessories.
- 9. Perform air and water leak tests to ensure proper door-to-body and glass-to-door seals. See **11.2** and **11.3**.
- 10. Install all removed interior trim.
- 11. Ensure that final reassembly steps are completed in all appropriate procedures.



## 10. Use Of Recycled (Salvage) Parts

Does not apply.



## 11. Inspection And Testing

### 11.1 Appearance And Performance

After door skin installation, inspect the doors for these conditions:

- proper finish appearance and film thickness
- proper alignment with attached and adjacent parts
- proper latching and release
- weld quality
- proper application of corrosion protection
- proper operation of the door checks or brakes
- proper installation of all interior trim, labels, weatherstripping, and fasteners
- proper operation of the electrical accessories; such as interior lighting, key chime, door ajar warning lamp, and security system
- proper operation of mirrors, door glass, and door locks
- ease of operation
- proper lubrication
- open drain holes
- proper installation of any spacers, washers, isolators, etc., required to prevent contact between dissimilar metals
- proper operation of the passive restraint system

Correct any defects.

### 11.2 Water-Leak Test

To test for water leaks:

1. Protect the vehicle interior.
2. Apply water at low pressure around the perimeter of the deck lid, the key cylinder, rear lamps, etc. from the outside of the vehicle, starting at the bottom and working up.
3. Look for water leaks on the inside.

Correct any water leaks, and repeat the test.

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## 11. Inspection And Testing (cont'd)

### 11.3 Air-Leak Tests

To test for air leaks using compressed air:

- 1. Apply a mixture of liquid soap and water, or foam glass cleaner around the perimeter of the door, from outside of the vehicle.
- 2. Use a NIOSH-approved air nozzle to apply compressed air around the perimeter of the door and weatherstripping from inside the vehicle.

Note: Bubbles appearing on the outside indicate leak areas.

To test for air leaks using internal pressure:

- 1. Close all windows.
- 2. Cover air exhausts or pressure-relief vents with masking tape.
- 3. Set the heater or air conditioner to the highest fan speed.
- 4. Start the engine to move any vacuum-operated air doors into position.
- 5. Turn the ignition to ACCESSORY, to keep the blower running while the engine is shut off.
- 6. Close the doors and allow the pressure to build up.
- 7. Slowly feel around the perimeter of the door and weatherstripping for air leaks outside the vehicle. A short length of hose or a stethoscope can be used to listen for leaks.
- 8. Mark any locations where air is escaping.
- 9. Uncover the relief vents.

To test for air leaks using an ultrasonic leak detector:

- 1. Place the signal generator unit inside the closed vehicle.
- 2. Use the detecting unit to probe around the perimeter of the door or weatherstripping on the outside of the vehicle.
- 3. Mark any locations where a leak is detected by the probe.

Correct any air leaks, and repeat the test.