



H021A Hood

**Uniform
Procedures For
Collision Repair
UPCR**

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v.4.0



1. Description

This procedure describes the repair and replacement of an aluminum hood. Inspection and evaluation requirements are also included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for producing high-quality repair of aluminum hoods. 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
- HO01 Hinge, Bolted-On
- HO11 Hinge, Welded-On
- PS01 Personnel Safety
- RF41 Finish Application
- ST01A Stress-Relieving Heat Limitations
- ST21A Metal Repair
- ST31 Body Fillers
- WE01A GMA (MIG) Plug 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**.

4.2 Welding Filler Wire

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

4.3 Special Equipment

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.



5. Damage Analysis

5.1 General Damage

Inspect an aluminum hood for these conditions:

- visible damage
- corrosion
- misalignment with adjacent panels
- collapsed areas in crush zones
- excessive filler or paint thickness
- reinforcements that have separated from the hood panel
- cracks at spot welds, or damaged fasteners
- damaged or missing trim, labels, insulators, seals, etc.
- missing or damaged anti-flutter materials
- damage or binding of the hood hinges, latch, and safety catch

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**.

6.2 Welding Safety

Welding safety information is in **WE01A**.

6.3 Safety With Power Tools And Electrical Equipment

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

6.4 Hood Repair Safety

Make sure a raised hood is properly supported to prevent accidental closure. Use special caution when working on spring-loaded hood hinges.



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 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 near an area to be welded or heated.

8.2 Adjacent Areas

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

8.3 Anti-Theft Label

Protect the anti-theft label during repair and refinishing operations.

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.

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8. Vehicle Protection (cont'd)

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

9.1 Hood Repair

If damage to collapse zones on the underside of the hood cannot be corrected during the straightening process, or if there is damage to the hinge- or striker-mounting areas, the hood must be replaced.

To remove minor damage from an aluminum hood:

- 1. Inspect the hood surface for dents and stretched areas.
- 2. Remove or reposition the hood insulator, windshield washer hoses, lamps and other parts required for access or to prevent damage.
- 3. Remove the hood and place it on a stand, if this will make repairs easier. See **9.2**.
- 4. Repair dents and stretched areas using aluminum repair and heat shrinking procedures. If heat is to be used, see **8.6**.
Note: Some vehicle makers recommend against welding tears in aluminum alloys.
- 5. Replace trim-mounting studs or drill holes, if required.
- 6. Apply body fillers, if required. The panel must be within 3 mm ($\frac{1}{8}$ ") 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.
- 7. Apply corrosion-resistant primer to all interior and exterior surfaces and other areas damaged by the collision or repairs.

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9. Repair Procedure (cont'd)

- 8. Replace any anti-flutter material between the frame and skin, if damaged or removed during repair.
- 9. Apply corrosion protection to enclosed surfaces.
- 10. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance.
- 11. Continue vehicle reassembly.
- 12. Refinish cosmetic surfaces after all body repairs are complete.
- 13. Complete the final assembly after refinishing is complete. See 9.4.

9.2 Hood Removal

To remove an aluminum hood:

- 1. Raise and support the hood. Avoid damaging the windshield, cowl, or fenders.
- 2. Disconnect the support rods, electrical connectors, windshield washer hoses, and the insulator, if required.
- 3. Mark the hinge positions on the hood and body side before removal.
- 4. Unbolt the hood from the hinges. Plan to transfer or replace any shims or spacers, washers, isolators, etc., required to prevent contact between dissimilar metals.
- 5. Carefully lift the hood from the vehicle.

9.3 Hood Installation

To install an aluminum hood:

- 1. Verify that the proper parts are being installed by checking the part number and performing a trial fit.
- 2. If installing a replacement hood, refinish the underside and edges of the hood before installation.
- 3. Protect the windshield and cowl.
- 4. Support the hood on the hinges. Reinstall any spacers, washers, isolators, etc., used to prevent contact between dissimilar metals.
- 5. Install the fasteners. If the fasteners are being replaced, use fasteners that are the same size, type, and strength as the original fasteners, and have an equivalent anti-corrosion coating.
- 6. Install any required shims.
- 7. Lower the hood slowly. Make sure it does not contact the cowl or fenders. It may be helpful to remove the latch.
- 8. Check the horizontal alignment with the cowl and fenders. Adjust the position at the hinges as needed.
- 9. Adjust the height at the hinges as needed. Adjust the height at the front, using the adjustable stops.
- 10. Raise the hood and install the support rods. Properly torque all fasteners to the vehicle maker's recommendations.

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9. Repair Procedure (cont'd)

- 11. Close the hood and recheck the alignment.
- 12. Reinstall the latch.

9.4 Final Reassembly

To complete the reassembly after refinishing is complete:

- 1. Lubricate the hinges and latch. Follow the vehicle maker's recommendations.
- 2. Test for proper latching. Lower the hood slowly to see if the striker squarely enters the latch assembly without forcing the hood out of alignment. Align the latch assembly, or the striker as needed.
- 3. Reconnect any hoses and electrical connectors.
- 4. Install the hood insulator. Replace fasteners as required.
- 5. Install trim, labels, insulators, weatherstripping, seals, etc.



10. Use Of Recycled (Salvage) Parts

10.1 Condition Of Salvage Parts

Do not install a salvage aluminum hood that has any of these defects:

- unrepairable damage
- corrosion that has caused pitting or perforation of the part
- non-repairable damage in collapse zones or mounting locations
- damage caused by fire
- improper previous repairs
- cracks at spot welds or fasteners
- reinforcements that have separated from the hood panel
- excessive filler thickness
- damaged safety stops

Replace any damaged or missing trim, labels, insulators, seals, latches, safety catches, etc. Confirm that labels or information decals match the original; replace as required.

10.2 Preparation Of Salvage Parts

To prepare a salvage aluminum hood for installation:

- Make any required repairs.
- Remove any trim or moldings that are to be reused or replaced.
- Drill or fill trim-attachment holes, if required.
- Remove any corrosion.
- Apply corrosion protection as required.



11. Inspection And Testing

11.1 Inspection Of A Repaired Or Replaced Aluminum Hood

After installation or repair, inspect an aluminum hood for these conditions:

- alignment with attached and adjacent parts
- proper latching and release, including the safety catch
- proper application of corrosion protection
- proper finish appearance and film thickness
- proper installation of all trim, labels, and fasteners
- proper operation of the support rods
- proper installation of hoses and electrical connectors
- proper application of anti-flutter material
- proper operation of the windshield washer nozzles
- proper operation of the underhood lamp, if applicable
- proper alignment of hood safety stops
- ease of operation
- proper operation of the hood release
- proper lubrication of hinges and latch
- proper installation of any spacers, washers, isolators, etc., required to prevent contact between dissimilar metals

Correct any defects.