



SG02

Mechanically Fastened

**Uniform
Procedures For
Collision Repair
UPCR**

© Copyright 1999 National Glass Association

v.4.0



1. Description

This procedure describes replacement, inspection and testing requirements for mechanically fastened stationary glass. Methods for correcting air and water leaks are also included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality replacement of mechanically fastened stationary glass. 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
- CP01S Corrosion Protection
- HM01 Hazardous Materials
- PS01 Personnel Safety
- RF01P Surface Preparation
- RF01S Surface Preparation
- RF41 Finish Application

3.2 Other Information

- Equipment-specific information
- Motor Vehicle Safety Standards
- National Auto Glass specifications
- Product-specific information
- Recycled parts information
- Vehicle-specific repair information

Note: The National Glass Association (NGA) acknowledges both the role of the vehicle and adhesive makers in the replacement of glass parts. At times, their published replacement procedures may conflict.

The NGA does not warrant published adhesive procedures by either the vehicle or adhesive maker, but acknowledges the validity of both in the replacement of vehicle glass. It is the responsibility of the business owner and installing technician to determine the applicability of published information to the installation and business environment.



4. Equipment And Material Requirements

4.1 Equipment

The use of this equipment is included in this procedure:

- caulking gun
- cutout knife (cold knife)
- finger rack
- glass stand
- long-reach utility knife
- vehicle-specific rear-view mirror tools
- rivet gun
- rivet head removal tool
- vacuum or suction cups
- window retaining-nut removal tool
- windshield wire handles
- cutout wire
- digital volt-ohmmeter (DVOM)
- approved air nozzle
- electronic leak detector

4.2 Power Tools

The use of these power tools is included in this procedure:

- adhesive cutout knife
- drill
- caulking gun
- vacuum cleaner

4.3 Materials

The use of these materials is included in this procedure:

- adhesives and primers
- glass cleaners
- clips and fasteners
- leak-trace powder



5. Damage Analysis

5.1 Glass

Inspect the glass for these conditions:

- visible damage
- damaged integrated radio antenna
- damaged defroster grid
- delamination
- optical distortion
- improper tint or shade
- improper previous installation

Plan to reinstall or replace the glass if any of these conditions are present.

5.2 Mechanical Fasteners

Inspect fasteners for these conditions:

- visible damage
- broken clips
- stripped threads
- loose imbedded bolts
- missing fasteners

Plan to replace any damaged fasteners with the same size, grade, and type.

5.3 Pinchweld

Inspect the pinchweld area for these conditions:

- visible damage
- corrosion
- paint failure
- improper previous repairs

It may not be possible to do a complete inspection of the pinchweld until the damaged glass has been removed.

All above-mentioned conditions must be corrected before installing the replacement glass.

5.4 Mounting Hardware

Inspect mounting hardware such as fasteners and moldings, etc. Determine if the parts will be replaced or reused.

(cont'd)



5. Damage Analysis (cont'd)

5.5 Adjacent Areas

Inspect the operation and condition of adjacent areas, such as instrument panels, body panels, seats, wiper arms and blades, antennas, electrical wiring, etc. Determine if the parts will be repaired, replaced, or reused.

Plan the replacement based upon fastener design, type of molding, hardware and trim accessibility, use of adhesives, etc. Follow the vehicle maker's recommendations for the use of adhesive systems and lubrication.



6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Glass Safety

To avoid injury when handling glass, follow these safety precautions:

- Wear the appropriate eye and hand protection.
- Inspect the edges for slivers and rough or sharp edges before handling.
- Never carry glass under your arm or over your head. Hold the glass with palms outward so that it can only fall away from you. Keep your pathway free of obstacles.
- When carrying glass with vacuum cups, stay on the side with the vacuum cups. Keep vacuum cups clean.



7. Environmental Safety

Hazardous material safety information is in **HM01**.



8. Vehicle Protection

8.1 Adjacent Surfaces

To protect the glass, fasteners, and adjacent surfaces when replacing mechanically fastened stationary glass:

- Place protective coverings or tape around the work area, including the fenders, hood, roof, instrument panel, air ducts, floor, seats, etc.
- Remove any jewelry or belt buckles which may cause damage to the vehicle.
- Lubricate using clear water as necessary.

8.2 Electronic Parts

To protect computers and other sensitive parts from damage:

- Ensure that the ignition switch is in the LOCK position and the key is removed.
- 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.
- Examine the pinchweld to ensure that there are no hidden electrical parts.



9. Replacement Procedure

9.1 Mechanically Fastened Glass Replacement

Some mechanically fastened installations also use an adhesive. Follow the vehicle and adhesive makers' recommendations for product use.

Upgrade the adhesive to an automotive-grade urethane adhesive or equivalent, if the original adhesive was not urethane.

To replace the glass and mechanical fasteners:

1. Remove or reposition parts, as necessary for access to the glass parts, and to prevent damage.
2. Remove moldings, if applicable, using the proper tool. Set them aside for inspection and possible reinstallation.
3. Remove mechanical fasteners using the appropriate tools.
4. Tape off the vents to prevent glass and adhesive from entering.
5. Cut the adhesive bond between the pinchweld and the glass, using the appropriate cutout tool. Try to leave 2 mm ($\frac{1}{16}$ ") of urethane adhesive for a good bonding surface.

(cont'd)



9. Replacement Procedure (cont'd)

- ❑ 6. Lift the glass assembly away from the vehicle. If the glass is to be reused, store it properly to prevent damage. If the glass is being replaced, remove any parts, labels, stickers, etc., if possible, for later transfer.
- ❑ 7. Use a dry brush to clean the pinchweld and remaining urethane adhesive thoroughly to remove loose adhesive, dirt, glass fragments, corrosion, etc. Follow the adhesive maker's recommendations for the application of any activators to the urethane adhesive bed.
- ❑ 8. Repair any damage to the pinchweld, and refinish as necessary, following the vehicle maker's recommendations. Do not apply body fillers to the pinchweld where glass will be installed.
- ❑ 9. Remove any adhesive and primer from the glass assembly.
- ❑ 10. Clean the glass thoroughly, removing any grease, wax, etc. Follow the adhesive maker's recommendation for the type of cleaner. Make sure there is no remaining adhesive or primer on the glass.
- ❑ 11. Vacuum the repair area thoroughly, if required to remove all traces of adhesive or glass.
- ❑ 12. Apply adhesive primer to the pinchweld and glass, following the adhesive maker's recommendations. Remove excess primer from the pinchweld and glass.
- ❑ 13. With the glass laying on a flat surface, apply a bead of adhesive or sealant, if applicable, around the outer edge.
- ❑ 14. Install the glass assembly into the pinchweld opening. Apply even pressure to the glass to set the glass fully in place.
- ❑ 15. Install the mechanical fasteners.
- ❑ 16. Install the moldings, if applicable.
- ❑ 17. Clean any excess adhesive from the glass or surrounding area. Follow the adhesive maker's recommendation for the type of cleaner.
- ❑ 18. Reinstall any parts previously removed or repositioned, duplicating the original mounting method.
- ❑ 19. As soon as possible, check the installation for water and air leakage. See **11.2** and **11.3**. Do not wait for the adhesive to cure.
- ❑ 20. Transfer any previously removed parts, labels, stickers, etc. Give the vehicle owner a list of any items that could not be transferred.



10. Use Of Recycled (Salvage) Parts

10.1 Condition Of Salvage Parts

Do not install salvage mounting hardware or moldings having any of these conditions:

- visible damage
- distortion
- deterioration

Do not install salvage glass parts having any of these conditions:

- visible damage
- optical distortion
- delamination
- improper tint or shade

All adhesive primer must be removed from glass parts before installation.



11. Inspection And Testing

11.1 Appearance And Performance

Inspect replaced glass for these conditions:

- optical distortion
- pits or scratches
- improper tint or shade
- delamination

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 glass from the outside of the vehicle, starting at the bottom and working up.
3. Look for water dripping in the interior.

Correct any water leaks, and repeat the test.

(cont'd)



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 glass and trim molding from outside of the vehicle. A leak-trace powder may also be used.
- 2. Use a NIOSH-approved air nozzle to apply compressed air around the perimeter of the glass and trim molding from inside the vehicle.

Note: Bubbles or powder movement 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 switch 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 glass and trim molding for air leaks outside the vehicle. A short length of hose or a stethoscope may 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 glass and trim molding 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.