



## 1. Description

This procedure describes methods for bonding parts with adhesives. Inspection and evaluation requirements are also included.



## 2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality adhesive bonding. 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

HM01 Hazardous Materials  
PS01 Personnel Safety  
RF01P Surface Preparation  
RF01S Surface Preparation

### 3.2 Other Information

Product-specific information  
Vehicle-specific repair information



## 4. Equipment And Material Requirements

### 4.1 Equipment

The use of this equipment is included in this procedure:

- heat gun
- applicator gun

### 4.2 Repair Materials

The use of these materials is included in this procedure:

- epoxy adhesive
- urethane adhesive
- acrylic adhesive
- wax and grease remover
- self-etching primer
- epoxy primer



## 5. Damage Analysis

Does not apply.



## 6. Personnel Safety

### 6.1 General Safety

General safety information is in **PS01**.

### 6.2 Safety With Adhesives

To prevent injury when working with adhesives:

- Wear the proper NIOSH-approved vapor respirator when applying adhesives or using heat during removal.
- Wear solvent-resistant gloves to avoid skin contact with solvents or vapors.
- Wear eye protection when mixing or applying adhesives.
- Do not eat, drink, or smoke in the work area.
- Do not store flammable materials near heat or ignition sources.
- Do not use thinner, gasoline, or other solvents to clean hands, etc.
- Work in a well-ventilated area.
- Wash hands after handling materials.

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## 6. Personnel Safety (cont'd)

### 6.3 Safety When Machine Sanding

To prevent injury when machine sanding:

- Wear protective clothing, goggles, gloves, and a NIOSH-approved fume respirator or dust mask.
- Work in a well-ventilated and well-lighted area.
- Direct the dust away from the face and toward the floor.
- Be aware of the air hose or electrical cord location at all times.
- Do not stand in water.
- Be aware of sharp edges on all sheet metal.
- Use vacuum sanding equipment, when available.



## 7. Environmental Safety

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



## 8. Vehicle Protection

### 8.1 Application Precautions

To protect the vehicle when applying adhesives:

- Follow the recommendations of the vehicle maker for the use of welds or mechanical fastener on the adhesive joint.
- Avoid excess adhesive squeeze-out by not clamping the flanges together too tightly. Use sheet metal fasteners or shims between the panels, if required for adjusting the panel separation.
- Follow the vehicle and adhesive maker's surface preparation recommendations.
- Make sure the adhesive completely covers or seals the joint.
- Follow the vehicle and adhesive maker's recommendations for application thickness and width.
- Follow the adhesive maker's recommendations for working (wet) time, after which the panel cannot be moved without weakening the bond.
- Avoid open flame when heating the adhesive for removal. Do not heat above 200°C (400°F).
- Follow the adhesive maker's cure time and temperature specifications. Avoid forced heat, including spraybooths, for curing unless recommended by the adhesive maker.

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## 8. Vehicle Protection (cont'd)

### 8.2 Adjacent Areas

Protect adjacent areas while removing and applying the adhesive.

Avoid damaging trim, supports, intrusion beams, and other interior parts when cutting a window in the bonded panel to access the adhesive bond. Remove parts if they cannot be protected.



## 9. Repair Procedure

Use adhesive bonding for replacing panels only when recommended by the vehicle maker. If recommendations for replacing a panel do not exist, install the replacement part using the same method that was used by the vehicle maker.

### 9.1 Adhesive Selection

Follow the vehicle maker's recommendations for the type of adhesive to use. If the product number is not available, and an equivalent product is not identified, use these factors when selecting an equivalent adhesive:

- substrate compatibility
- rigidity
- fill properties
- cure rate
- working time
- heat resistance
- tensile strength
- lap shear strength

### 9.2 Removing An Adhesively Bonded Panel

Follow the vehicle maker's recommendations for removing panels bonded with adhesive. If recommendations are not available, use the following steps.

To remove an adhesively bonded panel:

- 1. Make sure all adjacent parts are in alignment before removing the bonded panel, if applicable.
- 2. Cut an access window in the panel, if required for access to the adhesive bond.
- 3. Remove any fasteners or spot welds securing the panel.
- 4. Use a windshield removal saw or heat the adhesive to soften the material. Do not heat above 200°C (400°F). Do not use an open flame.

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## 9. Repair Procedure (cont'd)

- 5. If heat is used, carefully remove the adhesive with a putty knife or scraper, and pry off the panel, while continuing to heat the material.
- 6. Remove all remaining adhesive, following the adhesive maker's recommendations.

### 9.3 Bonding With An Adhesive

To bond a panel using adhesives:

- 1. Make sure the vehicle is level, and evenly supported at the normal suspension points.
- 2. Perform a trial fit of the replacement part. Mark for proper positioning.
- 3. Prepare the mating surfaces. Follow the vehicle and adhesive makers' recommendations for the positioning of welds or mechanical fasteners.
- 4. Prime the area to be bonded or welded, as required.
- 5. Scuff-sand the area to be bonded, if required by the vehicle or adhesive maker.
- 6. Apply the proper type and amount of adhesive to the flange area to be bonded. Follow the adhesive and vehicle makers' recommendations.
- 7. Position the panel on the vehicle, aligning it to the position marks.
- 8. Verify that the panel is properly aligned. Adjust if required.  
Note: Do not separate the bond when adjusting the panel.
- 9. Securely hold the panel in place. Avoid adhesive squeeze-out by applying proper clamping pressure. Temporarily install clamps, shims, or mechanical fasteners to adjust the separation between panels, if required. Some panels require the use of permanent mechanical fasteners or spacers.
- 10. Perform welds as directed by the vehicle maker recommendations or other tested procedures.
- 11. Clean any excess adhesive from the panel or adjacent areas. Follow the adhesive maker's recommendation for the type of cleaner.
- 12. Allow for the proper cure time. Use heat, if required to reduce the cure time. Follow the vehicle and adhesive maker's recommendations on the use of heat.
- 13. Remove the clamps or temporary mechanical fasteners.



## 10. Use Of Recycled (Salvage) Parts

Does not apply



## 11. Inspection And Testing

### 11.1 Inspection Of An Adhesively Bonded Panel

Inspect an adhesively bonded panel for these conditions:

- no adhesive squeeze-out
- uniform panel separation
- proper panel positioning
- adhesive properly cured
- temporary mechanical fasteners removed and holes sealed

Correct any defects. Improper positioning will require rebonding.