

## SECTION 10-1

# GENERAL BODY SERVICE

**CAUTION:** This vehicle is equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in SECTION 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in SECTION 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury or otherwise unneeded SIR system repairs.

**NOTICE:** If the vehicle has been exposed to extensive water intrusion, such as water leaks, window left open, driving through high water and so forth, the Sensing and Diagnostic Module (SDM) and the SDM connector may need to be replaced. With the ignition "OFF," inspect the area under the front seat and the area around the SDM, including the carpet. If any significant soaking or evidence of significant soaking is detected, the water must be removed, water damage repaired and the SDM and the SDM connector MUST be replaced. Before attempting any of these repairs, the SIR system must be disabled. Refer to SECTION 9J under "ON-VEHICLE SERVICE" for instructions on how to disable the SIR system and replace the SDM and SDM connector.

**NOTICE:** Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. General Motors will call out those fasteners that require a replacement after removal. General Motors will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and joint clamping force, and may damage the fastener. When you install fasteners, use the correct sequence and tightening specifications. Following these instructions can help you avoid damage to parts and systems.

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## 10-1-2 GENERAL BODY SERVICE

### GENERAL DESCRIPTION

The information contained in this section applies to the vehicle as a whole. References will be made to sections that deal with specific areas of the vehicle.

### FASTENERS

Many aluminum components are used on present models. Aluminum in contact with steel may corrode rapidly if not protected by special finishes or isolators.

**NOTICE:** Refer to "NOTICE" on page 10-1-1.

### LUBRICATION

Mechanical parts having contact with surfaces in relative motion with other body parts are lubricated during assembly. To maintain ease of operation, refer to SECTION 0B for the maintenance service schedule and a list of parts to be lubricated and their proper lubricants.

### STRIPES AND DECALS

Stripes and decals adhere to a painted surface using pressure sensitive adhesive.

The use of a wetting solution aids the technician in lifting and positioning the stripe or decal during installation. A wetting solution also ensures a better bond between stripe or decal and panel(s).

Stripe or decal replacement involving collision damage, or damage to underlying painted surface, requires that metal repair and/or refinishing operations be completed before stripes or decals are installed.

**NOTICE:** Freshly painted surfaces must be allowed to dry thoroughly before installing stripe or decal. Residual solvents in fresh painted surfaces can lead to subsequent blistering problems if stripe or decal is applied before complete release of solvents. The striping material will highlight vehicle surface imperfections. All dings, rough metal, paint defects and uneven two-tone paint break lines must be eliminated before stripe/decal application can take place.

Body surfaces and decals must be maintained between 21 to 38° C (70 to 100° F) prior to installation. Auxiliary heat sources to warm the body surfaces and decals are required if the temperature is below 21° C (70° F). **NEVER APPLY DECALS WHEN TEMPERATURES ARE BELOW 21° C (70° F).** If the body surface temperature is below 21° C (70° F), the decal may not adhere to the body surface properly.

Stripes and decals may be applied to the vehicle surface with or without the use of a wetting solution. A wetting solution must be used when applying large stripe and decal packages.

Stripes or decals that are applied on flexible surfaces (fascias, etc.) must be applied using a wetting solution. Flexible materials often release gases which will cause bubbles to form under the decal. The use of a wetting solution during application of decals will help reduce the formation of bubbles.

### STRIPE AND DECAL REMOVAL

1. Remove necessary moldings or trim, molding attaching clips, handles, side marker lamps and/or other stripe or decal overlapping parts.
2. Clean repair surfaces, adjacent panels and openings as required.

**NOTICE:** To avoid damaging underlying paint finish, do not use pointed or sharp instruments for removal of stripe or decal from panel.

3. Remove stripe or decal by starting at one edge and peeling stripe or decal from panel surface. Application of heat to stripe or decal at point of removal will aid the removal operation.
4. Remove all traces of adhesive residue from painted surfaces with a silicone, wax or grease remover solvent such as Prep-Sol, Acryli-Clean, Pre-Kleano, or equivalent.
5. If a new stripe or decal is not being applied, replace any moldings, trim, clips, handles, side marker lamps or any other parts that may have been removed for stripe or decal removal.

### STRIPE OR DECAL INSTALLATION

The following equipment and materials are necessary in making a quality stripe or decal application. Equivalent products may be used.

- Wetting solution—a foaming type window cleaner that does not contain ammonia or prepare a solution by mixing 7.4 ml (0.25 fl. oz.) of liquid detergent per 0.95 liter (1 quart) of water.
- Silicone, wax or grease remover—Prep-Sol, Pre-Kleano, Acryli-Clean, or equivalent.
- Isopropyl alcohol.
- Squeegee—75 to 100 mm (3 to 4 - inches) wide, with a plastic or hard rubber construction. Deburr any sharp or rough edges to prevent scratching of the stripe or decal.
- Water bucket and sponge or spray bottle.
- Sandpaper—#600 grit or finer, wet or dry type.
- Heat gun or infrared heat lamp.
- Clean, lint-free wiping rags.
- Sharp knife or razor blade.
- Scissors.
- Fine pin or needle.
- Marking pencil.

**NOTICE:** To prevent possible vehicle, stripe or decal damage, always refer to manufacturer's packaged instructions to avoid damage.

1. Remove necessary moldings or trim, molding attaching clips, handles, side marker lamps and/or other stripe or decal overlapping parts.

2. Clean painted surface with a silicone, wax and grease removing solvent such as Prep-Sol, Acryli-Clean, Pre-Kleano, or equivalent. Wipe surface with a clean cloth and allow to dry.

### Important

- If area where stripe or decal is to be applied has been refinished, remove any imperfection that would show through the stripe or decal.
3. Clean area where stripe or decal is to be applied with a 50-50 mixture (by volume) of isopropyl alcohol and water.
  4. Wipe panel surface with a clean cloth while solvent is still wet and allow to dry.
  5. Apply wetting solution to area where stripe or decal is to be installed. Remove backing material of stripe or decal as necessary; put wetting solution on adhesive side of stripe or decal.
  6. Apply stripe or decal to panel. Wetting solution will allow movement of stripe or decal for proper positioning.
  7. Working from the center where possible, squeegee stripe or decal into position. Application of additional wetting solution may be necessary to ease installation of stripe or decal. Application of the soapy wetting solution on the top side of the stripe or decal will ease the pull of the squeegee on the stripe or decal and help to eliminate damage to the stripe or decal.
  8. Apply heat to stripe or decal at recessed areas. Press stripe or decal into recess to obtain firm bond.
  9. Inspect stripe or decal from critical angle using adequate light reflection to detect any irregularities that may have developed during installation. Remove all air bubbles by piercing with a safety pin, needle or tool with the same size piercing tip. NEVER use a razor blade or knife edge. Pierce the bubble on its outer edge and force the air out from the opposite edge with the blade of the squeegee.
  10. Install previously removed parts and clean as required.

## ADHESIVE MOLDINGS

Body side moldings that are attached to body panels with adhesive tape require preparation prior to replacement. To ensure a good molding replacement (new or old moldings), the panel surface should be warm, 21 to 32° C (70 to 90° F), clean and free of any wax or oily film. Emblems are attached to the body panels in the same manner as body side moldings. To replace or secure loose emblems, follow the service procedures used for body side moldings.

## SECURING LOOSE MOLDINGS

Figure 1

**NOTICE:** Care should be taken not to use any harsh chemicals when cleaning areas around exterior lamps. Suggested cleaners are a mild soap and water, or Varnish Makers and Painters (VM&P) Naptha. VM&P naptha is a specific type of naptha and should not be substituted by any other naptha.

1. Wash affected area with soap and water and wipe dry. Wipe panel and adhesive side of molding with a clean rag using oil-free naphtha or alcohol. If molding has pulled loose from adhesive backing (tape remains on body panel), do not remove tape from body. Clean back of molding and tape on body with oil-free naphtha or alcohol.
2. To be certain that the molding is straight, masking tape may be applied as a molding guide (Figure 1). A straightedge may also be used in most cases.
3. Apply Loctite® 414 adhesive GM P/N 12345093, or equivalent, to back of molding and press in place. Apply constant pressure to molding for 30 seconds or until a firm bond has been made.

## MOLDING REPLACEMENT

Figure 1

1. Wash affected panel area with soap and water and wipe dry. Remove all traces of adhesive from body panel and back of molding using oil-free naphtha or alcohol.
2. Mark proper position of molding with a length of masking tape (Figure 1). Use adjacent moldings as a guide if applicable.
3. If vehicle body is below 21° C (70° F) due to shop temperature or outside temperature, warm the body panel with a heat gun before proceeding with next step.

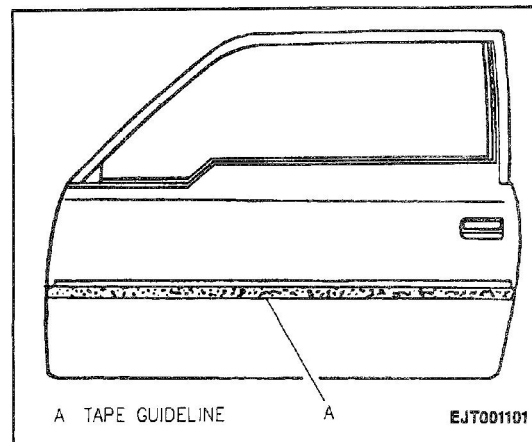


Figure 1—Adhesive Body Side Molding Repair

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4. Apply a double-coated acrylic foam tape such as 3M Super Automotive Attachment Tape P/N 06380 (which has a white backing) or P/N 06382 (which has a gray backing), or equivalent, to the molding.
5. Align molding to tape guideline and press firmly in place.

### WATERLEAK DIAGNOSIS AND REPAIR

Figure 2

**NOTICE:** If the vehicle has been exposed to extensive water intrusion, such as water leaks, window left open, driving through high water and so forth, the Sensing and Diagnostic Module (SDM) and the SDM connector may need to be replaced. With the ignition "OFF," inspect the area under the front seat and the area around the SDM, including the carpet. If any significant soaking or evidence of significant soaking is detected, the water must be removed, water damage repaired and the SDM and the SDM connector **MUST** be replaced. Before attempting any of these repairs, the SIR system must be disabled. Refer to SECTION 9J under "ON-VEHICLE SERVICE" for instructions on how to disable the SIR system and replace the SDM and SDM connector.

GM vehicles are designed to operate under normal environmental conditions. The design criteria for sealing materials and components takes into consideration the sealing forces required to withstand natural elements. These specifications do not, and cannot, take into consideration all artificial conditions (i.e., high-pressure car washes).

The watertest procedure has been correlated to natural elements and will determine the ability of a car to perform under normal operating conditions.

Repairing body waterleaks is a problem of proper testing, diagnosis, and repair through adjustment of misaligned components and/or application of proven repair materials. The first step in waterleak diagnosis is finding the conditions under which the leak occurs (for example, leak noticed only when parked on an inclined drive or water in spare tire compartment).

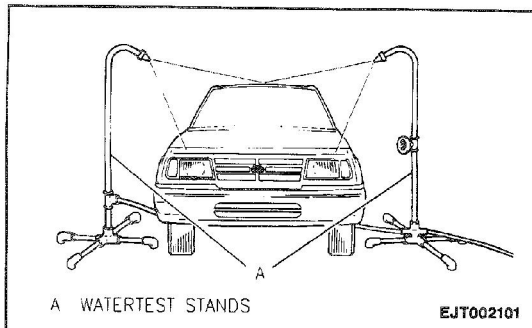


Figure 2—Watertest Stands Positioned for Front End Watertest

If the general leak area can be found, the exact entry point can be quickly isolated by use of a localized test such as a water hose or air hose. If the leak source is not obvious, the generalized testing method using watertest equipment such as watertest stands (Figure 2) should be used. It may be necessary to remove some interior trim panels or components to locate and confirm repairs.

### GENERALIZED TESTING

Figure 3

Specifications for construction and placement of the watertest stands are found in figure 3.

If the specified water pressure of 155 kPa (22 psi) cannot be obtained because of a local situation, both test stands may be moved toward the body until water spray overlap can be obtained.

### LOCALIZED TESTING (SPOT TEST)

Localized testing may be made with either water or air. Begin test at the base of the suspected area and continue up slowly until the leak is located.

#### Important

- Pinpoint the leak area before any repair is made. Random repair may only temporarily restrict water entry and make future diagnosis and repair more difficult. Continue localized testing in the same general area to confirm that all leaks have been located.

### Water Hose Test

Figures 4 and 5

1. Have an assistant inside the car to detect the actual leak points.
2. Use an unrestricted water flow (no nozzle) (Figures 4 and 5).
3. Begin at base of suspected leak area and move upward slowly.

### Air Hose Test

Figure 6

1. Apply bubble solution (liquid soap) to suspected area.

**CAUTION:** Standard shop practices, particularly eye protection, should be followed during these operations to avoid personal injury.

2. Apply air pressure with an air hose from inside the vehicle. Do not exceed 205 kPa (30 psi) (Figure 6).
3. Watch for outside bubbles at suspected leak area.



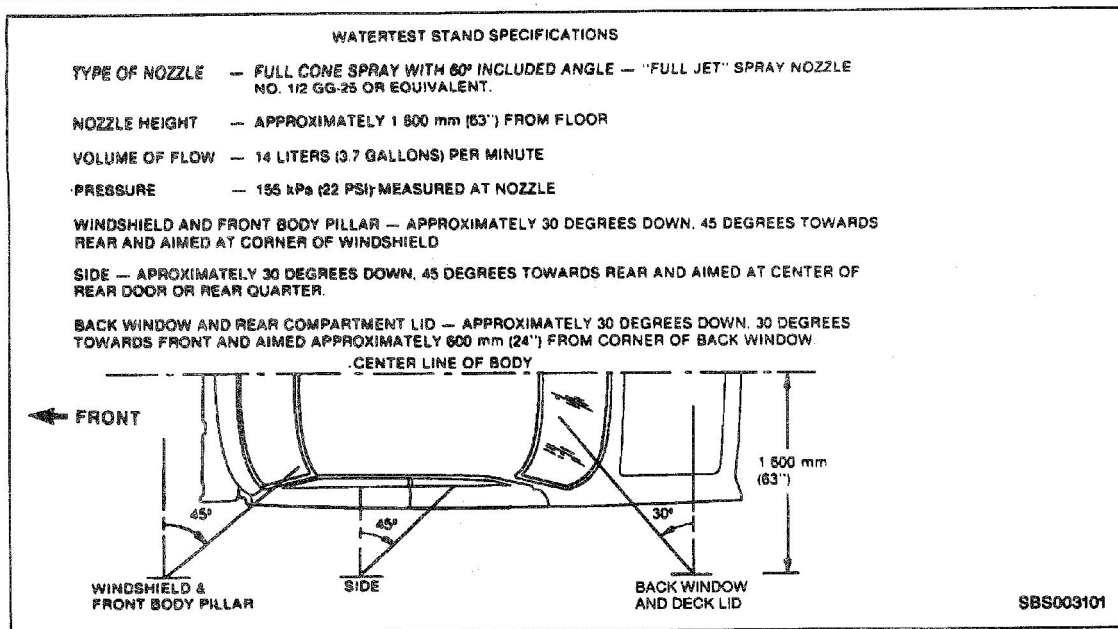


Figure 3—Watertest Stand Specification

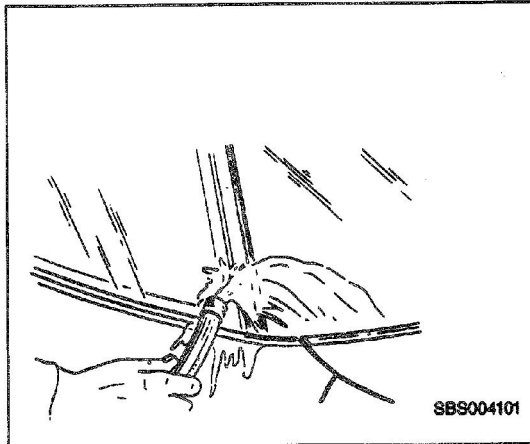


Figure 4—Water Hose Test of Windshield Pillar

### WATERLEAK REPAIR

To locate the exact leak point or to repair the leak, it may be necessary to remove some interior trim panels or components. Refer to the "Recommended Materials" chart for proper repair materials.

After completion of any waterleak repair, the general area should be retested using the watertest stand. Do not use air hose or water hose to test repaired areas as the repair material may dislodge under abnormal pressure.

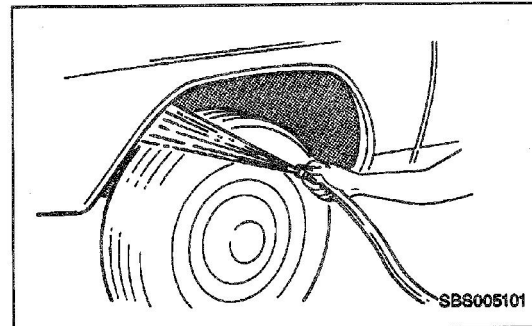


Figure 5—Water Hose Test of Wheelhouse

| RECOMMENDED MATERIALS                      |   |
|--|---|
| LEAK AREAS                                 | REPAIR MATERIALS  |
| Windshield, Rear Window and Quarter Window | Urethane Adhesive Caulking Kit P/N 12346284 or Equivalent |
| Metal Joints                               | Brushable Seam Sealer Which Can Be Painted                |
| Ventilation Ducts and Drip Moldings        | 3M Auto Bedding and Glazing Compound or Equivalent        |
| Small Cracks and Pin Holes                 | 3M Drip-Check Sealer or Equivalent                        |
| Large Holes                                | 3M All Around Autobody Sealant P/N 8500 or Equivalent     |
| Weatherstrips                              | Weatherstrip Adhesive                                     |
| Bolts, Studs and Screws                    | Strip Caulk   |

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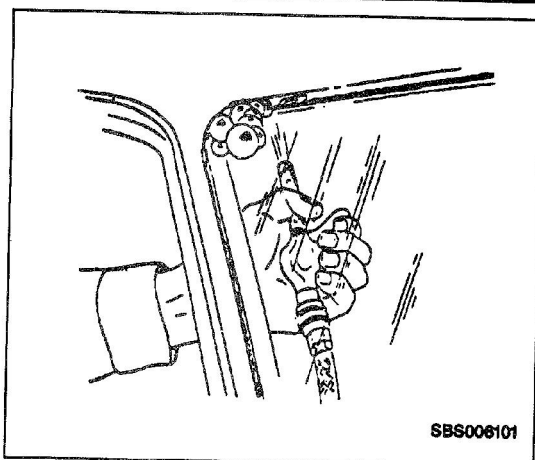


Figure 6—Air Hose and Bubble Solution Test of Windshield Sealant

### WINDNOISE DIAGNOSIS AND REPAIR

Figure 7

**CAUTION:** For safety reasons, an assistant should drive the vehicle while the technician checks for the location of the reported condition.

To analyze a reported windnoise condition, a test drive in the vehicle is necessary due to the many variables that could singularly or collectively be attributed to creating the objectionable noise condition.

#### Important

- Often there is one primary leak source and one or more secondary leaks that contribute to the noise condition. Repairing only one of the contributing leak sources may not completely repair the total condition, only reduce it.

The following items should be taken for utilization by the technician during the test drive to aid in pinpointing and marking area(s) of the leak:

- Mechanic's stethoscope or vacuum hose.
- Masking tape—51 mm (2-inches) wide.
- Strip caulk.
- Screwdriver.

A regular route for the road test should already have been chosen. The test road should include smooth and straight streets that run in all four directions, (north, south, east, and west). It should be an area where there is little traffic or noise that would interfere with the test.

The vehicle should be driven at the speed in which the noise was noticed by the customer or until it is heard. However, safe, legal speeds should never be exceeded.

First determine if the noise is an objectionable windnoise as opposed to normal sounds.

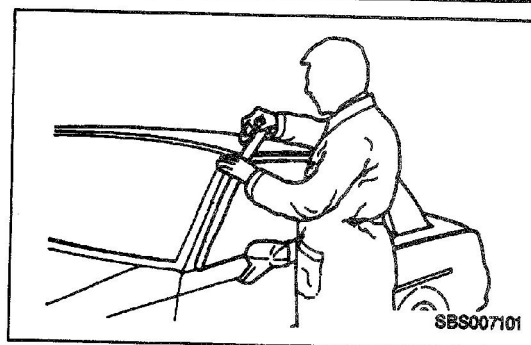


Figure 7—Temporary Repair With Masking Tape

If noise can be heard with the door window lowered while the vehicle is being driven, it is external windnoise.

Locating an external windnoise condition can be accomplished by taping various moldings and gaps until the noise is eliminated to pinpoint the exact cause of the noise.

If the noise cannot be heard with the windows lowered, a body seam is leaking or a sealing surface such as a window-to-weatherstrip or door weatherstrip-to-door is poorly sealed. Internal windnoise is air leaving the body.

The first step in locating the source of internal windnoise is to tape off the body lock pillar pressure relief valves. This will cause air pressure to build up inside the vehicle and enhance the windnoise. Trace the suspected seal using the stethoscope to locate the leak area.

Temporarily repair the condition with masking tape (Figure 7). Adjust tape as required. Continue testing to determine if noise has been eliminated or other leak areas exist.

When all reported leak conditions have been located, return to shop and make permanent repairs utilizing proper alignment techniques and sealing materials as required.

### SQUEAK AND RATTLE DIAGNOSIS AND REPAIR

Squeaks and rattles are caused by improperly controlled relative motion between components. There are three ways to prevent the squeak or rattle:

- Attach component securely so there is no relative motion during operation.
- Separate components so there is no contact under operating conditions.
- Insulate components so that no squeaks or rattles occur with relative motion between components. Low uniform friction surfaces can be provided to eliminate "stick-slip" motion.

## ANTI-CORROSION TREATMENT

**CAUTION:** When applying sound deadeners, or anti-corrosion materials due care and preventative measures must be exercised to prevent any materials from being sprayed into door and quarter panel mechanisms such as door locks, window run channels, window regulators and seat belt retractors, as well as any moving or rotating mechanical or suspension parts on the underbody. After material application, be sure all body drain holes are open. Improper application may increase chance of corrosion damage or limit the operation of moving parts, resulting in personal injury.

To provide for rust resistance, special anti-corrosion materials are used on interior and exterior surfaces of metal panels. These materials include special metals such as one-sided and two-sided galvanized zincrometal and zinc-iron alloy steels.

Special metal conditioners and primers are used on interior and exterior surfaces along with protective waxes on interior surfaces in areas where moisture might accumulate. Sealers are applied along exposed joints and moisture-repelling asphaltic sound deadeners are applied inside wheelhousings and doors and on some underbody components.

Any procedure that disturbs these special treatments, such as panel replacement or collision damage repair operations, may leave the metal unprotected and result in corrosion. Therefore, proper recoating of these surfaces with service-type anti-corrosion material is essential.

Metal conditioners and primer coatings are applied to all metal panels at the time of manufacture. After repair and/or replacement parts are installed, all accessible bare metal surfaces must be treated with metal conditioner and reprimed using an acrylic chromate material. This operation is to be performed prior to the application of sealers, waxes, deadeners, or antirust compounds.

Sealers are applied to specific joints during manufacturing. These sealers are intended to prevent water and dust from entering the car and also perform as anti-corrosion barriers. Sealers are applied to such areas as door hem flanges, wheelhousings, quarter panels, floor, cowl, roof and various other panel-to-panel attaching points. The originally sealed joints are obvious, and any damage to these sealed locations should be corrected by resealing.

Attaching points of new replacement panels should be resealed. Replacement panels and doors will also require sealing in the hem flange areas.

Flanged joints, overlap joints, and seams should be sealed using a quality sealer of medium-bodied consistency. Sealer used must retain its flexible characteristics after curing.

Open joints which require bridging of sealer to close a gap should be sealed using a heavy body caulking material. Follow label directions for material selected.

Color application may be required to restore repaired areas such as hood, fenders, doors, quarters, and roof to original appearance. When this is necessary, conventional refinishing preparation, undercoat buildup, and color application techniques should be followed.

Deadening materials (spray-on type) are used on various metal panels to provide corrosion resistance, joint sealing and to control the general noise level inside the passenger area of the car. When deadeners are disturbed because of damage, removed during repair operations, or a new replacement panel is installed, the deadener material must be replaced by a service equivalent material. The application pattern and location of deadener materials can be determined by following the original production installation.

**CAUTION:** Foam sound deadeners must be removed from areas within six inches of where flame is to be used for body repairs. When reinstalling foam sound deadeners, avoid inhaling fumes as bodily injury may result.

Anti-corrosion compounds are light-bodied materials designed to penetrate between metal-to-metal surfaces, such as pinch-weld joints, hem flanges, and integral panel attaching points where metal surfaces are difficult to coat with conventional undercoating materials. Materials suited for this type of application are 3M Rust Fighter-1 P/N 08892, or equivalent.

The sequence of application steps for anti-corrosion materials is as follows:

1. Clean metal before primer application.
2. Apply primer (acrylic chromate).
3. Apply sealers (at all previously sealed joints).
4. Apply color in areas where color is required, such as hem flanges, exposed joints, and underbody components.
5. Apply deadeners (as indicated by original application pattern).
6. Apply anti-corrosion compounds.
7. Apply underbody rustproofing material.

Cleaning of interior and underbody panel surfaces is necessary when galvanized or other anti-corrosion materials have been burned off during welding or heating operations. Removal of the residue left from burning will require additional care in such areas as interior surfaces of box-type construction and when configurations of the metal panels limit access to interior surfaces. One or more of the following methods will remove the residue.

**CAUTION:** Standard shop practices, particularly eye protection, should be followed during these operations to avoid personal injury.

- Scraping can be used where access is possible. If a standard putty knife or scraper will not fit into the affected area, fabricate a small, flexible scraper from a narrow piece of sheet metal.

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- A jet of compressed air will remove most residue and could be most effective in limited-access areas. Eye protection is absolutely necessary in an operation of this type.
- Sandblasting is most effective and should be used when the equipment is available and when the metal panel to be worked on is easily accessible. Sandblasting is an excellent method for cleanup and preparation of open joints, underbody components, and hem flange areas.
- Wire brushing (power and by hand).
- Sandpaper and steel wool can be used when the metal panel can be accessed easily.

### CORROSION REPAIR

Prior to replacing exterior body parts or assemblies, check condition of paint on all covered or hidden interior surfaces. If corrosion is found in these areas, proceed as follows:

1. Remove corrosion with suitable wire brush, abrasive or liquid corrosion removing agent. Follow label directions.
2. If necessary, wash with detergent, rinse and dry.
3. Apply a heavy coating of anti-corrosion compound, or equivalent, to all cleaned hidden surfaces before installing exterior body parts. Also, apply anti-corrosion compound to all inner surfaces of exterior body parts being installed.

### ANTI-CHIP COATING MATERIAL

A chip resistant plastisol material is applied to specific lower areas of the body prior to color coat application. If the production applied material requires replacement, a chip resistant air dry vinyl plastisol that is solvent borne and sprayable is available for field use.

The following material can be used for refinishing operations. Follow material manufacturer's label directions for application.

1. Acme Gravel Guard #559, or equivalent—1 quart container.
2. Rodgers Vinyl Gravel Guard #4559, or equivalent—1 quart container.
3. Sherwin-Williams Vinyl Gravel Guard #G1W295, or equivalent—1 quart container.
4. Tuff-Kote #1077, or equivalent—1 quart container.

In addition to the previous materials, the following equipment is necessary for repair:

1. Sandpaper—#80 grit.
2. Portable heat lamp or heat gun.
3. Extension cord.
4. Clean shop towel.
5. Conventional hand spray gun with pressure feed cup attached (DeVilbiss, J.G.A., Binks, or equivalent).
6. Putty knife.

## METAL PART REFINISHING—BASECOAT/CLEARCOAT

**CAUTION:** Many paint repair systems require additives containing isocyanates. It is essential that all recommendations and warnings listed on the container label for materials selected be followed. It is mandatory that adequate respiratory protection such as air line respirators with a full hood be worn. Such protection should be worn during the entire painting process. Persons with respiratory problems or those allergic to isocyanates must not be exposed to isocyanate vapors or spray mist.

Basecoat/clearcoat paint is factory applied in three layers: a cathodic immersion primer, base color of high solids acrylic enamel (basecoat), and a clear acrylic top coat (clearcoat) to give the finish a high-gloss look.

### CLEARCOAT REPAIR—WITHOUT REPAINTING

#### Figure 8

If the damage or imperfections can be sanded or polished out without reaching the color coat, you do not have to repaint (Figure 8).

1. Thoroughly wash repair area with a mild detergent.
2. Apply a small amount of medium to fine machine rubbing compound to repair area and smear evenly with compounding pad.
3. With polisher running at approximately 1,700 rpm, compound repair area. Keep pad flat against panel while applying light pressure. Feature lines and panel edges should be hand-rubbed to avoid burn-through. Check repair area frequently and if necessary, add more compound.
4. If sanding is required, proceed to Step 6. If not, apply polish to repair area and smear evenly with polishing pad.
5. Keep pad flat to panel and allow weight of polisher to do the work. Use polish sparingly to achieve original shine. Machine or hand polish repair area first, then blend in with rest of panel.
6. If repair is near adjacent panels, mask adjacent panel to protect against sand scratches and burn-through of panel edges.
7. Saturate a piece of micro-fine sandpaper in a container of water and attach to a sanding pad. The addition of a small amount of liquid detergent to the water will improve wet-out and sanding performance.
8. Keep repair area wet while sanding. Sand lightly and evenly in one direction only, using straight strokes.

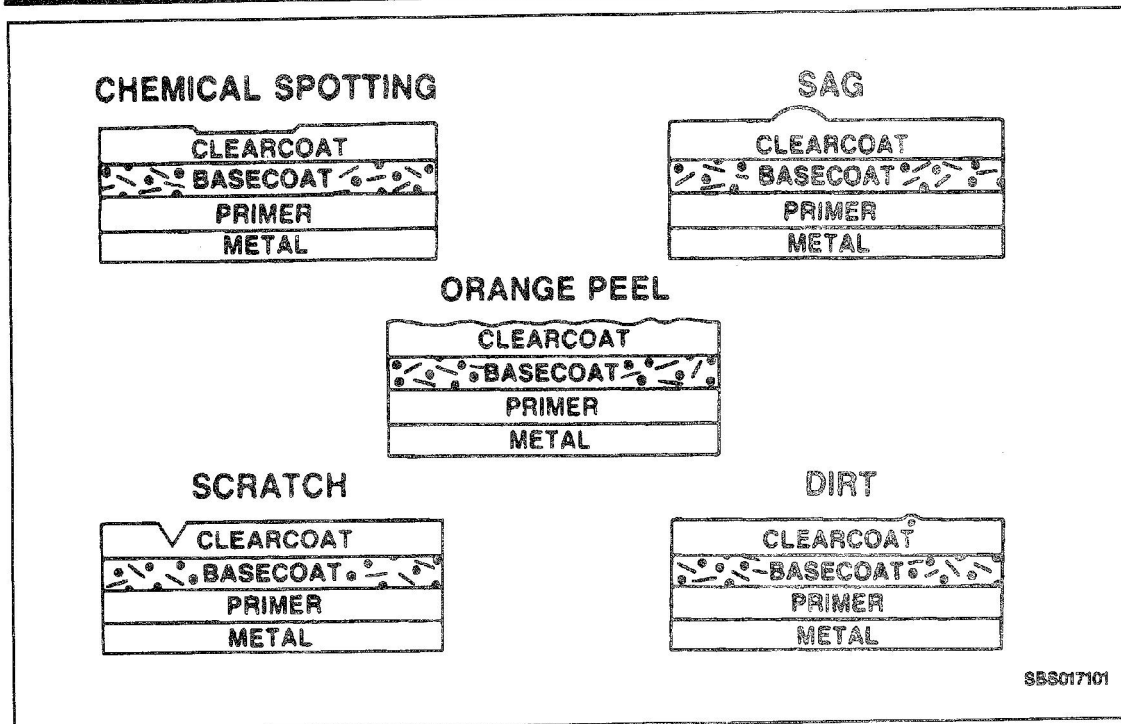


Figure 8—Minor Paint Defects That Can Be Repaired Without Repairing

### ! Important

- Frequently wipe or squeegee repair area to determine when defect has been removed. Sand only enough clearcoat to remove defect. Sanding below clearcoat requires repainting.
- 9. Using a clean cloth, wipe repair area clean of water and clearcoat residue.
- 10. Compound and polish as necessary. Often, hand compounding and polishing of a small repair area is all that is necessary to restore appearance.

### BASECOAT/CLEARCOAT PREPARATION

**CAUTION:** Many paint repair systems require additives containing isocyanates. It is essential that all recommendations and warnings listed on the container label for materials selected be followed. It is mandatory that adequate respiratory protection such as air line respirators with a full hood be worn. Such protection should be worn during the entire painting process. Persons with respiratory problems or those allergic to isocyanates must not be exposed to isocyanate vapors or spray mist.

1. Wash affected area with detergent and water.
2. Clean with grease, wax and silicone removing solvent such as Acryli-Clean, Pre-Kleano, Prep-Sol, or equivalent.
3. Repair and featheredge damaged areas.
4. Treat metal surface with metal conditioner and conversion coating. Allow to dry.
5. Apply primer-surfacer. Dry 20 to 30 minutes.
6. Sand basecoat paint area with #400 grit sandpaper. (For clearcoat only, wet sand with #600 grit or finer sandpaper or hand compound.)
7. Clean with solvent and tack wipe.

### ! Important

- Do not do Step 8 if the basecoat enamel used for repair does not require it. Always refer to basecoat enamel manufacturer's label directions.
- 8. Apply one or two coats of adhesion promoter:
  - Within moldings or breaklines.
  - On adjacent panel 102 to 105 mm (4 to 6-inches) if repair is not confined and is beyond area to be covered by clearcoat.
  - Allow to flash dry at least 30 minutes before applying clearcoat.

## 10-1-10 GENERAL BODY SERVICE

### BASECOAT APPLICATION — POLYURETHANE ENAMEL

**CAUTION:** Many paint repair systems require additives containing isocyanates. It is essential that all recommendations and warnings listed on the container label for materials selected be followed. It is mandatory that adequate respiratory protection such as air line respirators with a full hood be worn. Such protection should be worn during the entire painting process. Persons with respiratory problems or those allergic to isocyanates must not be exposed to isocyanate vapors or spray mist.

1. Activate enamel material per manufacturer's instructions.
2. Mix thoroughly.
3. Reduce basecoat per manufacturer's instructions.
4. Check viscosity with a Zahn number 2 viscosity cup, or equivalent.
5. Spray two or more medium wet coats, 15 to 20 minutes apart to achieve full hiding and color match.
6. Cure per manufacturer's instructions.

### CLEARCOAT APPLICATION — POLYURETHANE ENAMEL

**CAUTION:** Many paint repair systems require additives containing isocyanates. It is essential that all recommendations and warnings listed on the container label for materials selected be followed. It is mandatory that adequate respiratory protection such as air line respirators with a full hood be worn. Such protection should be worn during the entire painting process. Persons with respiratory problems or those allergic to isocyanates must not be exposed to isocyanate vapors or spray mist.

1. Activate materials per manufacturer's instructions.
  2. Mix thoroughly.
  3. Reduce clearcoat per manufacturer's instructions.
  4. Check viscosity with a Zahn number 2 viscosity cup, or equivalent.
  5. Spray at 345 kPa (50 psi) gun pressure. Apply two medium-wet coats, 15 to 20 minutes apart.
- Cover entire panel wherever possible.
  - When there are no breaklines, blend the spray within the adhesion promoter area.

#### Important

- Clean the spray equipment with lacquer thinner immediately after use.

## PLASTIC PARTS IDENTIFICATION

### HOW TO IDENTIFY PLASTIC PARTS

#### Figures 9 and 10

To identify specific plastics used on this vehicle, refer to Figures 9 and 10 and to the following charts; "Handling Precautions for Plastics" and "Chart of Plastic Parts Identification and Refinishing Systems." To identify other plastics, use the following procedure:

1. Look on the back side of the part for the International Organization for Standardization Code marking (Figure 9). If no code marking is found on the part, refer to Figure 10 for the locations and types of exterior plastic trim parts.
2. Once the code is identified, move to the "Typical Paint Repair System" column of the chart "Chart of Plastic Parts Identification and Refinishing Systems" and use the applicable repair system procedures.
3. If no code is found, group the plastic parts in the following manner:
  - When there is doubt regarding the makeup of rigid exterior plastic parts, they should be treated as fiberglass.
  - Flexible (semi-rigid) exterior plastic parts require the addition of a flexible additive to the paint material.

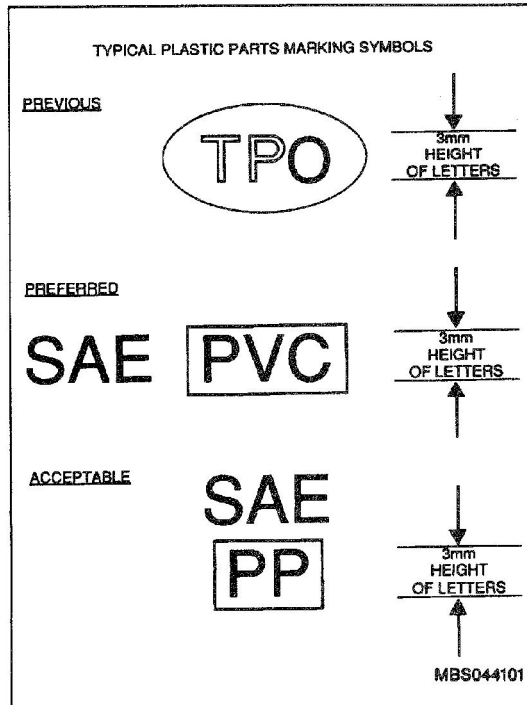


Figure 9—Typical Plastic Parts Marking Symbol



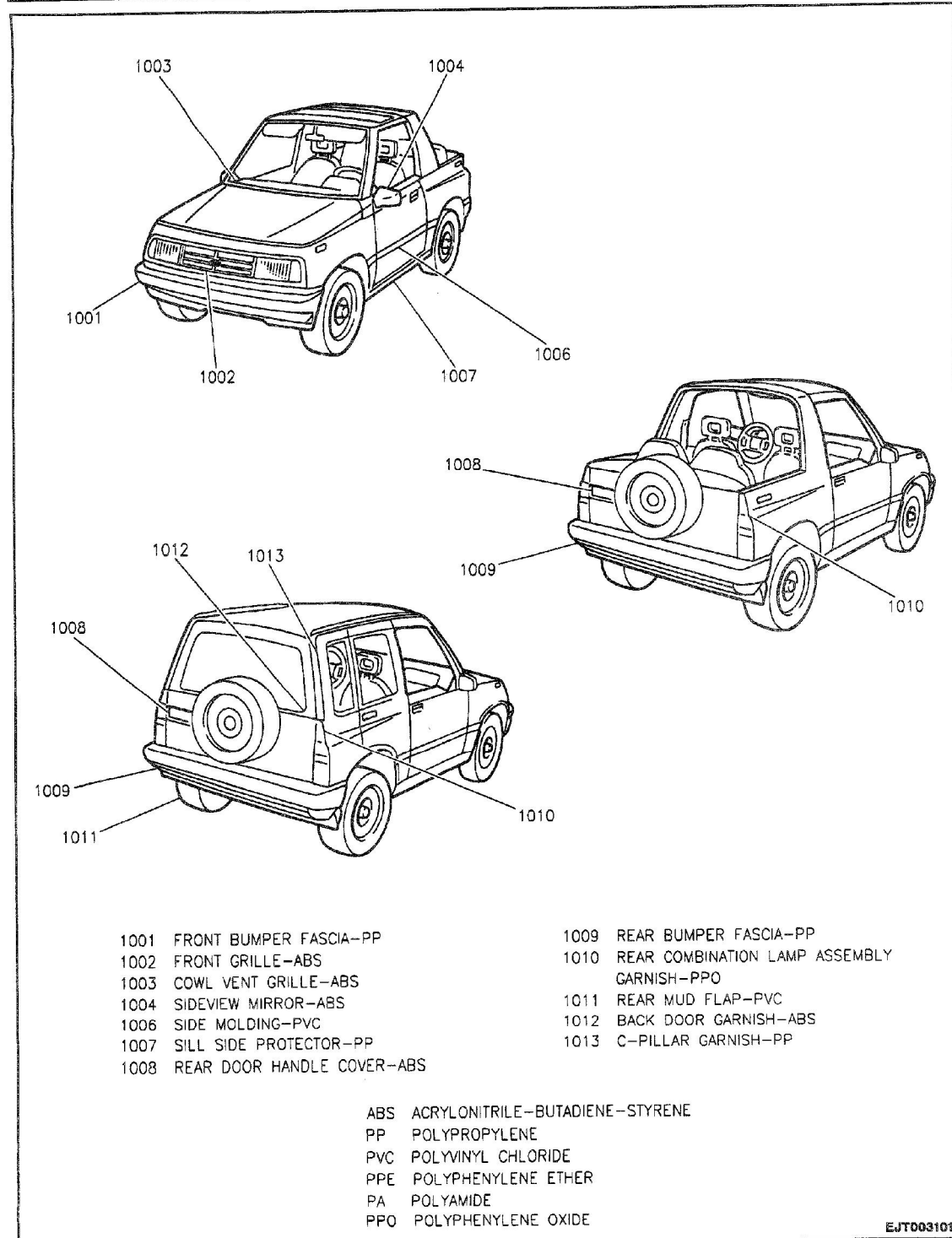


Figure 10—Locations and Types of Exterior Plastic Parts

## 10-1-12 GENERAL BODY SERVICE

- Rigid interior plastic parts can be painted. The majority of hard plastic parts require a polypropylene primer prior to applying the primer-surfacer, color and/or clearcoat.
- Flexible (soft) interior plastic parts require the use of a vinyl interior color paint material. As a second choice, use an acrylic lacquer interior color paint with a flexible additive.
- Interior soft vinyl (PVC) parts require a vinyl interior color paint material also.

**CAUTION:** General Motors does NOT recommend using a plastic "Burn Test" to distinguish different types of plastics. This test produces vapors that can be harmful to your health.

### Abrasion Test

Certain plastics, of the polyolefin family (commonly identified by the symbols TPO, E/P, PP and EPDM), require the use of 3M Polyolefin Adhesion Promoter P/N 05907, or equivalent, after sanding operations and before the application of structural adhesive (bonding epoxy). One test to determine whether or not a substrate is a polyolefin is the sanding or abrasion test. Sand an area near the damaged area and study the sanding characteristics. If the material sands cleanly, the material is not polyolefin. If the material melts or smears when sanded, then a polyolefin adhesion promoter is required.

| CHART OF PLASTIC PARTS IDENTIFICATION AND REFINISHING SYSTEMS |  |  |  |  |
|---|--|--|--|--|
| Identifying Symbol<br>- Old Symbol in ()                      | Chemical<br>Composition or<br>Plastic "Family"<br>Name | Typical Area(S)<br>Where Part Used   | Examples of<br>Common and/or<br>Trade Names                            | Repair Procedure<br>and Paint Refinish<br>System |
| UP  | Polyester/Thermoset                                    | Fascia Extensions,<br>Hood, Roof, Rear<br>Compartment Lid,<br>Instrument Housings,<br>Ventilation Grids, Air<br>Scoops and Air<br>Spoilers                                     | SMC, Premi-glass,<br>Selectron, Vibrinmat,<br>"Fiberglass"             | Rigid #1 and #4                                  |
| PE  | Polyethylene   | Inner Fender Panels,<br>Valances, Spoilers,<br>Interior Trim Panels,<br>Seat Belt Covers and<br>Fuel Tank Shields  | Dylan, Foriflex, Marlex,<br>Alathon, Hi-fax,<br>Hosalen and Paxon      | Rigid #7   |
| PS  | Polystyrene  | Dash Panels and Door<br>Panels   | Lustrex, Dylan, Styron,<br>Durathon, Polystyrol                        | Flexible #7                                      |
| PPE (PPO)   | Polyphenylene Ether                                    | Chromed Plastic Parts,<br>Headlamp Doors,<br>Ornaments and Bezels  | Noryl, Oleflo, Prevex  | Rigid #7   |
| PP  | Polypropylene  | Door Panels, Load<br>Floors, Kick Panels,<br>Deflector Panels, Cowl<br>Panels, Wheel Covers,<br>Interior Moldings,<br>Radiator Shrouds, Inner<br>Fenders and Bumper<br>Fascias | Profax, Oleflo, Marlex,<br>Azdel, Novolen, Tenite,<br>Daplen, Escorene | Flexible #2, #3, #5 and<br>#7                    |
| TPU (TPUR)  | Polyurethane,<br>Thermoplastic                         | Bumper Fascias, Soft<br>Filler Panels, Window<br>Moldings and Gravel<br>Deflectors   | Pellethane, Estane,<br>Rolyar, Toxin                                   | Flexible #2, #3, #5 and<br>#7                    |
| PUR   | Polyurethane,<br>Thermoset<br>(Unsaturated)            | Bumper Fascias, Front<br>and Rear Body Panels<br>and Filler Panels   | Castethane, Bayflex,<br>(Commonly referred to<br>as RIM and RRIM)      | #2 and #5  |

| CHART OF PLASTIC PARTS IDENTIFICATION AND REFINISHING SYSTEMS (cont'd) |  |  |  |  |
|--|--|--|--|--|
| Identifying Symbol<br>- Old Symbol In ( )                              | Chemical<br>Composition or<br>Plastic "Family"<br>Name           | Typical Area(S)<br>Where Part Used   | Examples of<br>Common and/or<br>Trade Names                        | Repair Procedure<br>and Paint Refinish<br>System |
| ABS  | Acrylonitrile,<br>Butadiene-Styrene                              | Instrument Clusters,<br>Trim Moldings,<br>Consoles, Armrest<br>Supports, Steering<br>Column Brackets and<br>Steering Column<br>Jackets | ABS, Cycolac, Abson,<br>Kralastic, Lustran,<br>Absafil, Dyel       | Rigid #1, #4 and #6                              |
| ABS + PC   | Acrylonitrile/Butadiene-<br>Styrene +<br>Polycarbonate           | Instrument Panels and<br>Instrument Clusters   | Baybland, Proloy,<br>Cycoloy, KHA                                  | Rigid #1, #4 and #6                              |
| ABS/PVC  | ABS/Vinyl (Soft)   | Head Restraint Covers,<br>Instrument Panel Pads,<br>Trim Moldings and<br>Trim Panels   | ABS Vinyl  | Flexible #7 and #8                               |
| TEO (EP, EPM, TPO)   | Ethylene/Propylene<br>(Rubber)                                   | Bumper Fascias,<br>Valance Panels, Air<br>Dams   | TPO, TPR<br>(Thermoplastic Rubber)<br>EPI, EPII                    | Flexible #2, #3 and #5                           |
| EPDM   | Ethylene Propylene<br>Diene Monomer                              | Bumper Impact Strips,<br>Body Panels   | EPDM, Nordel   | Rigid #2, #3 and #5                              |
| EVA (EVAC)   | Ethylene/Vinyl Acetate   | Head Restraint Cover,<br>Miscellaneous Soft<br>Trim Components   | Elvax, Microthane  | Flexible #7 and #8                               |
| PA + PPE   | Polymide +<br>Polyphenylene Ether                                | Fenders and Exterior<br>Trim   | GTK  | Rigid #2, #3 and #5                              |
| PVC  | Polyvinyl Chloride<br>(Vinyl)                                    | Interior Soft Trim,<br>Instrument Panel Skins<br>and Roof Covers   | Geon, Vinylite, Pliovic,<br>"Vinyl," Vinoflex,<br>Unichem          | Flexible #8                                      |
| SAN (SA)   | Styrene-Acrylonitrile  | Center Consoles, Glove<br>Box Doors and Interior<br>Trim Panels  | Lustran, Tyril, Foracryl   | Rigid #6 and #7                                  |
| PC + PETP  | Polycarbonate +<br>Polybutylene,<br>Terephthalate                | Bumper Fascias   | Xenoy, Valox,<br>Macroblend  | Flexible #1, #2, #4 and<br>#5                    |
| PA, PAG, PAGG  | Polyamide  | Headlamp Bezels,<br>Quarter Panel<br>Extensions and Exterior<br>Finish Trim Panels   | Nylon, Capron, Zytel,<br>Rilsan, Minlon,<br>Vydyne, Wellamid       | Rigid #1 and #4                                  |
| PBT + TEEE (PBTP +<br>EEBC)  | Polybutylene,<br>Terephthalate + Ether,<br>Ester Block Copolymer | Rocker Panel Moldings<br>and Fascias   | Bexloy "M"   | Rigid #1 and #4                                  |
| PC   | Polycarbonate  | Interior Hard (Rigid)<br>Trim Panels and<br>Valance Panels   | Lexan, Merlon, Calibre   | Rigid #1, #4 and #6                              |
| PF   | Phenol-Formaldehyde  | Ash Trays  | Phenolic, Bakelite,<br>Durez, Genal, Resinox,<br>Amberol, Plyophen | Rigid #6   |

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| CHART OF PLASTIC PARTS IDENTIFICATION AND REFINISHING SYSTEMS (cont'd)   |  |                                    |   |  |
|--|--|------------------------------------|---|--|
| Identifying Symbol<br>- Old Symbol in ( )  | Chemical<br>Composition or<br>Plastic "Family"<br>Name | Typical Area(S)<br>Where Part Used | Examples of<br>Common and/or<br>Trade Names | Repair Procedure<br>and Paint Refinish<br>System |
| <p>For symbols not listed in this chart, contact the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001 For a copy SAE J1344.</p> <p>( ) = Old Identifying symbols in the above charts.</p> <p>PVC = Typical ISO marking symbol found on plastic parts.</p> <p>SAE PVC = Typical new SAE marking symbol found in plastic parts.</p> <p><b>SUGGESTED PLASTIC PARTS PAINT REPAIR SYSTEMS</b></p> <p>SYSTEM #1 (Exterior)<br/>Conventional Lacquer/Enamel Acrylic Urethane*</p> <p>SYSTEM #2 (Exterior)<br/>Flexible/Lacquer/Enamel* Acrylic Urethane*</p> <p>SYSTEM #3 (Exterior)<br/>Polypropylene Primer and Special Topcoat*</p> <p>SYSTEM #4 (Exterior)<br/>Base Color Coat with Acrylic Lacquer or Acrylic Urethane Clear Coat*</p> <p>SYSTEM #5 (Exterior)<br/>Base Color Coat with Flexible Urethane Clear Coat*</p> <p>SYSTEM #6 (Exterior)<br/>Conventional (Standard) Interior Acrylic Lacquer</p> <p>SYSTEM #7 (Exterior)<br/>Polypropylene Primer and Standard Interior Topcoat</p> <p>SYSTEM #8 (Exterior)<br/>Vinyl Interior Color</p> <p>(*) Contains Isocyanates - Use recommended respiratory protection.</p> |  |                                    |   |  |

| HANDLING PRECAUTIONS FOR PLASTICS |                                       |                                    |  |                                   |
|-----------------------------------|---------------------------------------|------------------------------------|--|-----------------------------------|
| Abbreviation                      | Material Name                         | Heat Resisting Temperature °C (°F) | Resistance to Gasoline and Solvents  | Other Cautions                    |
| PE                                | Polyethylene                          | 80 (176)                           | Gasoline and most solvents are harmless  | Flammable                         |
| PVC                               | Polyvinyl chloride                    | 90 (194)                           | Gasoline and most solvents are harmless if applied for a very short time (wipe up quickly) | Poison gas is emitted when burned |
| PP                                | Polypropylene                         | 90 (194)                           | Gasoline and most solvents are harmless  | Flammable                         |
| ABS                               | Acrylonitrile butadiene-styrene resin | 90 (194)                           | Avoid gasoline and solvents  | Avoid brake fluid                 |
| AES                               | Acrylonitrile ethylene styrene        | 90 (194)                           | Avoid gasoline and solvents  | Avoid brake fluid                 |
| PMMA                              | Polymethyl methacrylate               | 90 (194)                           | Avoid gasoline and solvents  | Avoid brake fluid                 |
| PUR                               | Polyurethane                          | 90 (194)                           | Gasoline and most solvents are harmless  | Avoid brake fluid                 |
| AAS                               | Acrylonitrile acrylic rubber styrene  | 95 (203)                           | Avoid gasoline and solvents  | Avoid brake fluid                 |
| PPE                               | Polyphenylene ether                   | 110 (230)                          | Avoid gasoline and solvents  |                                   |
| POM                               | Polyacetal                            | 120 (248)                          | Gasoline and most solvents are harmless  | Avoid battery acid                |
| PC                                | Polycarbonate                         | 120 (248)                          | Avoid gasoline and solvents  |                                   |
| PA, PAG, PAGG                     | Polyamide (Nylon)                     | 150 (302)                          | Gasoline and most solvents are harmless  | Avoid immersing in water          |
| FRP                               | Fiber reinforced plastics             | 170 (338)                          | Gasoline and most solvents are harmless  |                                   |
| PPC                               | Polypropylene composite               | 115 (239)                          | Gasoline and most solvents are harmless  | Flammable                         |
| PBT                               | Polybutylene terephthalate            | 140 (284)                          | Gasoline and most solvents are harmless  |                                   |
| TPR                               | Thermoplastic rubber                  | 80 (176)                           | Avoid gasoline and solvents  |                                   |
| TPE                               | Thermoplastic elastomer               | 80 (176)                           | Avoid gasoline and solvents  |                                   |

## PLASTIC PARTS REPAIR

Soft plastic parts used for exterior or cosmetic application are compounded of resins that have flexible characteristics in order to absorb minor impact without sustaining damage. Typical examples include bumpers, front end fascia or side panels such as fenders. These parts are generally fabricated of thermosetting plastics which, when cured, cannot be melted with application of heat such as through hot air welding. However, if the impact force is great enough to create damage, thermoplastic can be successfully repaired with structural adhesives.

Briefly, the repair system amounts to filling, and where necessary, a reinforcing operation. After curing,

the patch is dressed to conform to the surrounding contour.

## GOUGE OR PUNCTURE REPAIR

**Figures 11 through 17**

1. Clean the repair area with a silicone, wax, or grease removing solvent such as Prep-Sol, Pre-Kleano, Acryli-Clean, or equivalent. Use a clean 51 to 76 mm (2 to 3-inches) #80 grit disc to enlarge the gouge or puncture in order to ensure removal of grease, oil, or dirt from the area to be contacted by the repair material (Figure 11). This action should also create at least a 38 mm (1.5-inches) taper around the repair material and

## 10-1-16 GENERAL BODY SERVICE

substrate. Remove all dust and loose particles from the repair area.

### ! Important

- 3M Polyolefin Adhesion Promoter P/N 05907, or equivalent, must be applied to E/P, TPO, PP or EPDM plastic parts after any sanding operation.
2. With a random orbit sander fitted with a #180 grit disc, taper the paint film surrounding the repair area to be filled (Figure 12). The repair material should not overlap the painted surface. Wipe with a clean dry rag and blow off with an air hose.
  3. Apply 3M Aluminum Autobody Repair Tape P/N 06935, P/N 06936, or equivalent, to the back side of the puncture to support the repair material (Figure 13).
  4. On a clean, flat surface of nonporous material such as metal, glass or plastic, deposit two equal length beads (1 bead for each component) of 3M Flexible Parts Repair Material P/N 05900, or equivalent (Figure 14). With a paddling motion, mix the two components until a uniform color and consistency is achieved.
  5. Apply the mixed repair material with a squeegee or plastic spreader (Figure 15). Apply a light coat over the entire area; then continue application to a level slightly above the surrounding contour. Make sure that all trapped air is forced out. Allow the mixture to cure 20 to 30 minutes at 16 to 27°C (60 to 80°F).

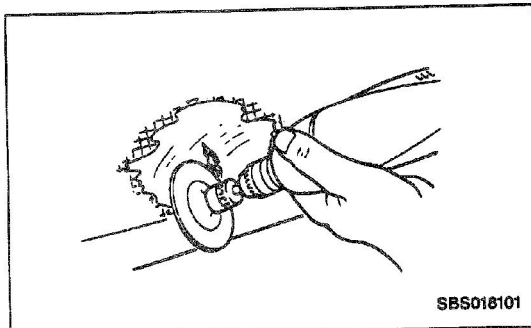


Figure 11—Tapering Substrate Surrounding Damage

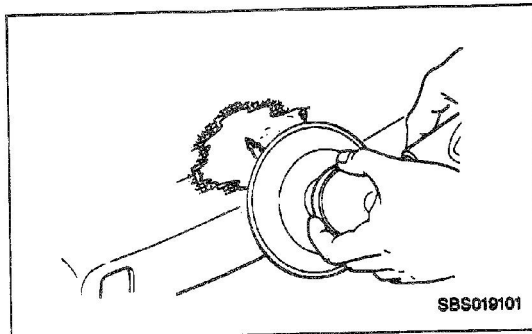


Figure 12—Removing Paint Surrounding Damage

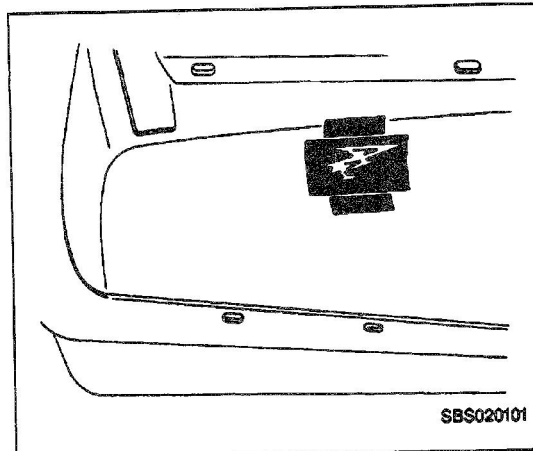


Figure 13—Tape Support for Repair Material

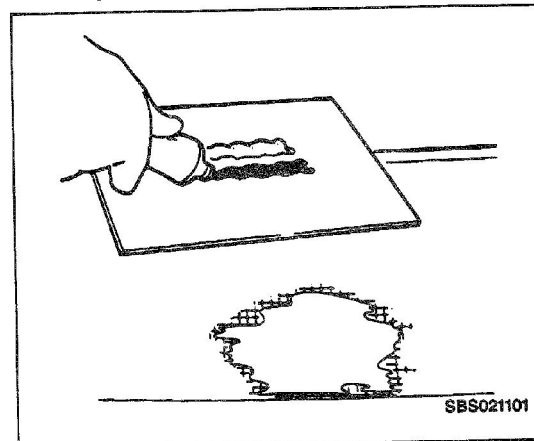


Figure 14—Measuring Two-Component Repair Material

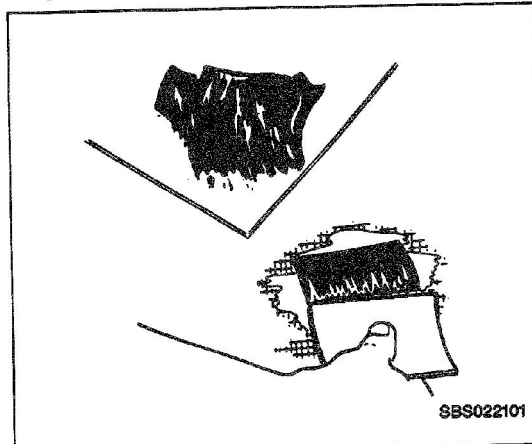


Figure 15—Mixed Repair Material Application



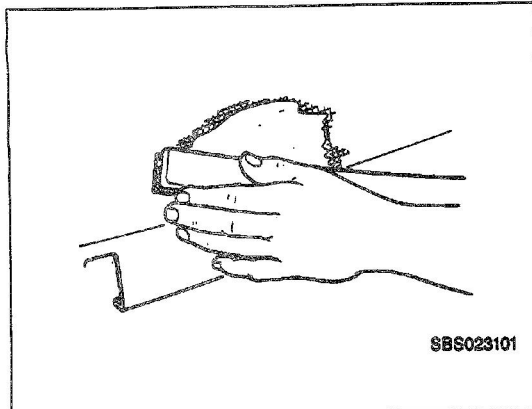


Figure 16—Establishing Rough Contour with Body File

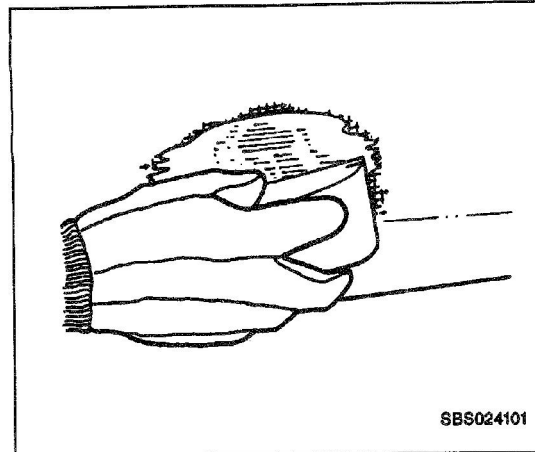


Figure 17—Block Sanding for Accurate Contour

6. Establish rough contour where possible with a curved tooth body file (Figure 16). Follow by block sanding using #220 grit sandpaper to establish accurate level and contour with the surrounding surface (Figure 17). If low areas or pits remain, apply 3M Flexible Parts Putty P/N 05903, or equivalent. Allow flexible parts putty to dry at least 15 minutes. For final feathering, use a random orbit sander with a #320 grit disc.

7. After final feathering, apply a coat of 3M Flexible Parts Coating P/N 05907, or equivalent. Allow to flash dry for ten minutes, and then apply a second coat of flexible parts coating. Let coating dry 45 minutes and lightly scuff sand with #320 grit sandpaper.

## STRUCTURAL REPAIR

### Figures 14 and 18 through 23

When a piece of attaching surface of a part is cracked or broken away, structural strength may be restored as follows:

1. Align and secure the piece on the face side with 3M Aluminum Autobody Repair Tape P/N 06935, P/N 06936, or equivalent, and clamp (Figure 18).
2. Clean the underside of the repair area with a silicone, wax or grease removing solvent such as Prep-Sol, Acryli-Clean, Pre-Kleano, or equivalent. Apply with a water-dampened cloth and wipe dry. With a random orbit sander fitted with a #180 grit disc, remove the paint film in and surrounding the area to be filled (Figure 19). The repair material should not overlap the painted surface. Sand each side of the break with a #80 grit disc.
3. Cut a piece of fiberglass cloth large enough to overlap the break 38 to 51 mm (1.5 to 2.0-inches) (Figure 20).
4. On a clean flat surface of nonporous material such as metal, glass or plastic, deposit equal length beads of 3M Flexible Parts Repair Material P/N 05900, or equivalent (Figure 14). With a paddling motion, mix the two components until a uniform color and consistency is achieved. Apply

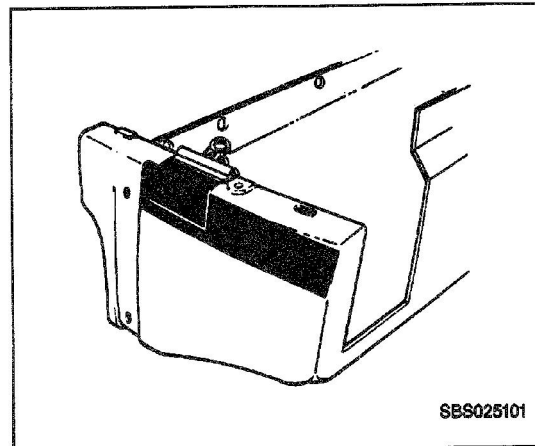


Figure 18—Aligning Damage with Tape Clamp

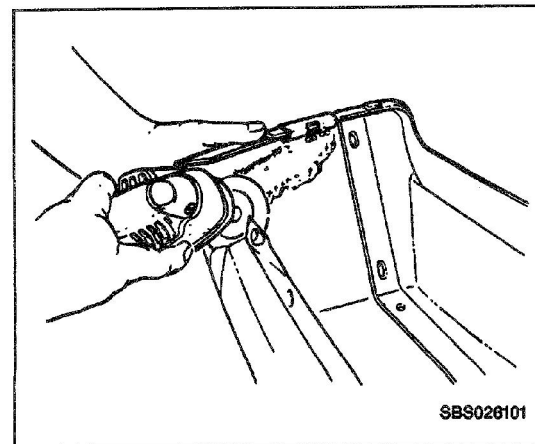


Figure 19—Sanding Back Side of Damage

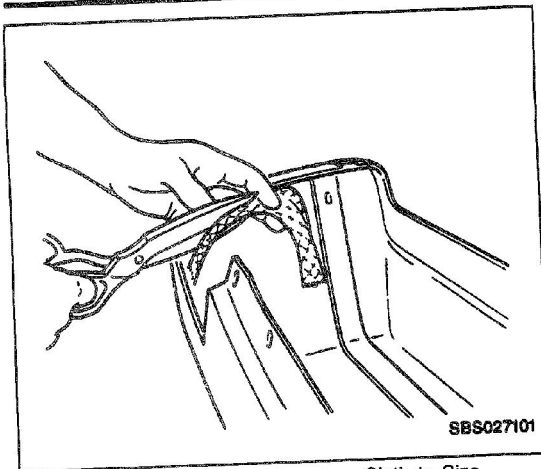


Figure 20—Cutting Fiberglass Cloth to Size

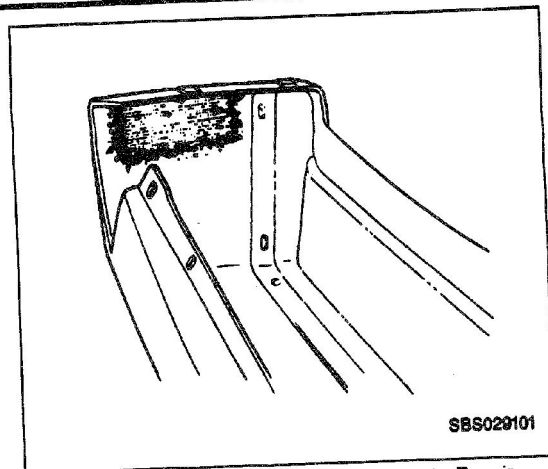


Figure 22—Fiberglass Cloth Application to Repair

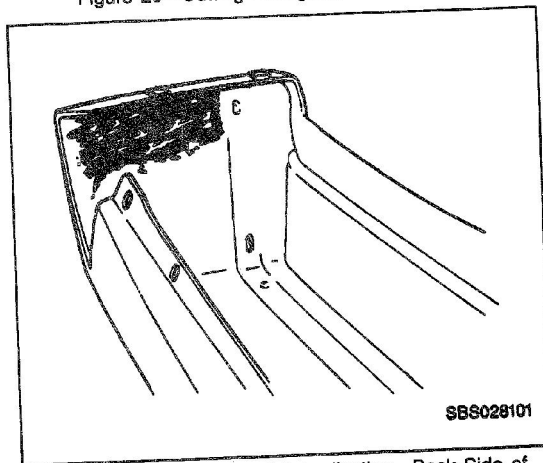


Figure 21—Repair Material Application—Back Side of Damage

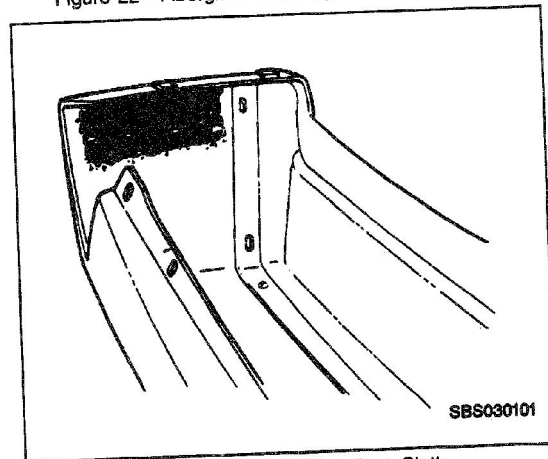


Figure 23—Filling Fiberglass Cloth

## PLASTIC PARTS REFINISHING

- a layer of the mixture approximately 3 mm (0.12-inch) thick on the back side of the part overlapping the break 38 to 51 mm (1.5 to 2.0-inches) (Figure 21).
5. Apply the precut fiberglass cloth to the adhesive and immediately cover the cloth with additional adhesive in sufficient quantity to fill the weave (Figures 22 and 23). Make sure the fiberglass cloth is completely saturated and there are no exposed fibers or trapped air pockets.
  6. Allow 20 to 30 minutes cure time at 16 to 27°C (60 to 80°F). Trim excess repair material at edge if necessary.
  7. Remove clamp and aluminum autobody repair tape from the face side of repair area.
  8. Repair the face side of the area. Refer to "Gouge and Puncture Repair" earlier in this section.

**CAUTION:** Many paint repair systems require additives containing isocyanates. It is essential that all recommendations and warnings listed on the container label for materials selected be followed. It is mandatory that adequate respiratory protection such as air line respirators with a full hood be worn. Such protection should be worn during the entire painting process. Persons with respiratory problems or those allergic to isocyanates must not be exposed to isocyanate vapor or spray mist.

**PAINT REPAIR SYSTEMS****Figures 9 and 10**

There are many finishing systems available for painting and/or repairing plastic parts. The following recommended procedures apply to the plastics used on this vehicle. Refer to Figures 9 and 10 and to the following charts; "Handling Precautions for Plastics" and "Chart of Plastic Parts Identification and Refinishing Systems." Specific refinishing procedures are described below.

**GENERAL PLASTIC PART PROCEDURE****! Important**

- Do not spot repair. Repair only full panels, since thorough sanding and cleaning are necessary for paint adhesion. Repair material can be either enamel or lacquer-based, depending on your preference.

**Surface Preparation****! Important**

- Replacement parts are factory-primed with enamel-based primer.

**Primer is NOT Scratched:**

1. Clean repair area with solvent such as Acryli-Clean, Pre-Kleano, Prep-Sol, or equivalent. Wipe dry.
2. Sand with #600 sandpaper (or a gray "Scotch-Brite®" pad, or equivalent).
3. Reclean and proceed to "Basecoat Application" later in this section.

**If Primer is Scratched or Part is Repaired With Filler:**

1. Clean repair area with solvent such as Acryli-Clean, Pre-Kleano, Prep-Sol, or equivalent. Wipe dry.
2. Featheredge the repair area with #400 sandpaper. Blow off dust and tack wipe.
3. Mix flexible primer-surfacer to manufacturer's instructions.
4. Apply four medium-dry coats of surfacer. Dry one hour or more.
5. Block sand with #600 sandpaper (or a gray "Scotch Brite®" pad, or equivalent) to remove all gloss.

**! Important**

- Clean spray equipment with lacquer thinner immediately after use.

**Basecoat Application**

1. Thoroughly block sand entire part with #600 sandpaper (or gray "Scotch Brite®" pad, or equivalent) to remove all gloss. Clean surface.

2. Mix the base color and thinner to manufacturer's instructions. Use flexible additive if recommended.
3. Apply as many coats as needed for hiding and color match. Allow flash time between coats.
4. Dry 30 to 60 minutes before applying clearcoat.
5. Avoid sanding. If unavoidable, use ultra-fine or finer sandpaper. Clean surface and apply one more basecoat.

**Clearcoat Application**

1. Mix clearcoat material and reducer per manufacturer's label instructions. Use flexible additive if recommended.
2. Apply two to three coats with 240 to 275 kPa (35 to 40 psi) gun pressure. Allow complete flash between coats.
3. Air dry four hours or force-dry 45 minutes with a 62°C (145°F) lamp.
4. Compounding may not be necessary if flexible additive is used in the clearcoat material.

**PROCEDURE 1**

Primer and color coats must contain elastomeric or flexible properties before they are applied to the following types of plastic parts: polyvinyl chloride (PVC), polyurethane, thermoset (PUR), polyurethane thermoplastics (TPU, TPUR), thermoplastic elastomer (TPE), ethylene propylene diene monomer (EPDM), reaction injection molded urethane (RIM), reinforced reaction injection molded urethane (RRIM) and sheet molded compound (SMC).

Previously painted parts that show signs of cracking, peeling, or improper adhesion must be stripped before repainting. The old finish may be removed by soaking the part in any commercially available chlorinated solvent stripper or lacquer thinner.

**! Important**

- To avoid swelling, do not soak parts longer than necessary to remove the old paint.
1. Clean the entire part with a silicone, wax and grease removing solvent such as Prep-Sol, Acryli-Clean, Pre-Kleano, or equivalent. Apply with a damp cloth and wipe dry.
  2. Featheredge the repair with #320 grit sandpaper, blow off dust and tack dry.
  3. Mix and apply four medium coats of flexible primer/surfacer. Allow each coat to flash dry between coats.
  4. Thoroughly sand the entire part with #400 grit sandpaper to achieve an even dull finish. Repeat step 1 to clean surface.
  5. Mix and apply a sufficient number of coats of flexible color paint to achieve complete hiding and the best color match. The topcoat mixture will dry to the touch in approximately one hour.
  6. Color coat the entire component; spot repair is not recommended.

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### PROCEDURE 2

This procedure for painting polypropylene parts (E/P or TPO) involves the use of a special primer. Since polypropylene plastic is rigid, it can be color coated after being primed with conventional paints.

#### ! Important

- Parts must be primed with a coating of special polypropylene primer according to factory recommendations. Failure to do so will result in color coat adhesion problems such as lifting or peeling. Use polypropylene primer, GM P/N 1052364, or equivalent. Color coats MUST have elastomeric or flexible properties.
1. Clean surface thoroughly with enamel reducer. (DO NOT use grease, wax and silicone removers.)
  2. For optimum adhesion to these parts, apply a coat of plastic parts paint adhesion promoter, following manufacturer's label instructions.
  3. Apply a thin, wet coat of polypropylene primer according to manufacturer's label directions. Wetness of the primer is determined by observing the gloss reflection of spray application in adequate lighting. Be sure that the primer application includes all edges. Allow primer to flash dry a minimum of one minute to a maximum of ten minutes.
  4. During the flash time period, apply color coat as required. Application of color during the flash time range promotes best adhesion.
  5. Color coat the entire component; spot repair is not recommended.

### PROCEDURE 3

Rigid/polyamide (PA), polyester/thermoset (UP), polybutylene terephthalate (PBTP), GTX 910, and Xenoy use the same refinishing procedures as on sheet metal parts for any required paint repairs.

### PROCEDURE 4

Rigid or hard acrylonitrile-butadiene-styrene (ABS) requires no primer as conventional color coats adhere satisfactorily to this type of plastic.

1. Wash part thoroughly with a grease, wax and silicone removing solvent.
2. Apply color coat according to trim combination (see paint supplier color chart for trim and color code) and manufacturer's label instructions.

#### ! Important

- When refinishing interior parts, apply only enough color for proper hiding to avoid washout of the "grain" effect.

### PROCEDURE 5

#### ! Important

- This procedure applies to all acrylonitrile-butadiene-styrene (ABS) plastic components except for the front grille. For front grille procedure, refer to "Procedure 6".

The paint procedure for vinyl and flexible acrylonitrile-butadiene-styrene (ABS) plastic involves the use of an interior vinyl color and a clear vinyl top coat. No primer/sealer is required.

1. Wash part with a vinyl cleaning and preparation solvent. Wipe off cleaner while still wet with a clean, lint-free cloth.
2. As soon as the surface has been wiped dry, apply interior vinyl color in wet coats. Follow manufacturer's label instructions. Use proper vinyl color as shown by the interior trim code combination.

#### ! Important

- Apply only enough color for proper hiding to avoid washout of the "grain" effect.
3. Before color flashes completely, apply one wet double coat of vinyl clear top coat. Use top coat with appropriate level of gloss to match adjacent similar components. The clearcoat is necessary to control the gloss requirement and to prevent chalking (rub-off) of the color after drying.

### PROCEDURE 6

#### ! Important

- The following procedures apply only to the acrylonitrile-butadiene-styrene (ABS) plastic front grille. For all other ABS plastic components, refer to "Procedure 5".

#### Pre-primed Replacement Grille

1. Wash grille surface with grease cutting soap and water. Wipe dry with a clean, lint-free cloth.
2. Wipe lightly with gray "Scotch-Brite®" and lightly sand as not to sand through primer but only enough for adhesion.

**NOTICE:** DO NOT sand through primer surface, especially on the leading edges, or it will cause the primer and new paint to peel.

3. Prep the surface with pre-paint primer in light mist coats enough to cover grille surface.

**NOTICE:** DO NOT spray pre-paint primer in heavy wet mists or it will react with the pre-primer and lift it from the grille surface.

4. Seal the surface with catalyzed tintable primer sealer.
5. Apply base color coat.

**! Important**

- Do not overly wet grille surface.
6. Apply clearcoat.

**NOTICE:** Whenever refinishing, always follow the manufacturer's recommended procedures.

**Non-primed Replacement Grille**

1. Wash grille surface with grease cutting soap and water. Wipe dry with a clean, lint-free cloth.
2. Wipe lightly with gray "Scotch-Brite®" and lightly sand for adhesion.
3. Prep the surface with pre-paint primer in light mist coats enough to cover grille surface.
4. Apply plastic parts primer to surface area.
5. Seal with catalyzed tintable primer sealer.
6. Apply base color coat.

**! Important**

- Do not overly wet grille surface.
7. Apply clearcoat.

**NOTICE:** Whenever refinishing, always follow the manufacturer's recommended procedures.

**AVAILABILITY OF COLORS FOR PAINTING INTERIOR PLASTIC PARTS**

Interior colors are color keyed to trim code combination numbers located on the service parts identification label. Refer to SECTION 0A for other information regarding the service parts identification label.

Conventional interior acrylic lacquer colors are designed for use only on hard trim parts, such as:

1. Steel parts (primer and/or sealer required on new service parts).
2. Hard ABS plastic (no primer necessary).
3. Hard polypropylene plastic (special primer required).

Each major paint supplier provides an interior color chart which identifies the stock number, color name, gloss factor and trim code combination number for each conventional interior color.

**BODY PANEL ADJUSTMENT AND ALIGNMENT**

Use the specifications given in Figure 24 after body repair procedures are completed to ensure proper clearance and flushness of all body panels.

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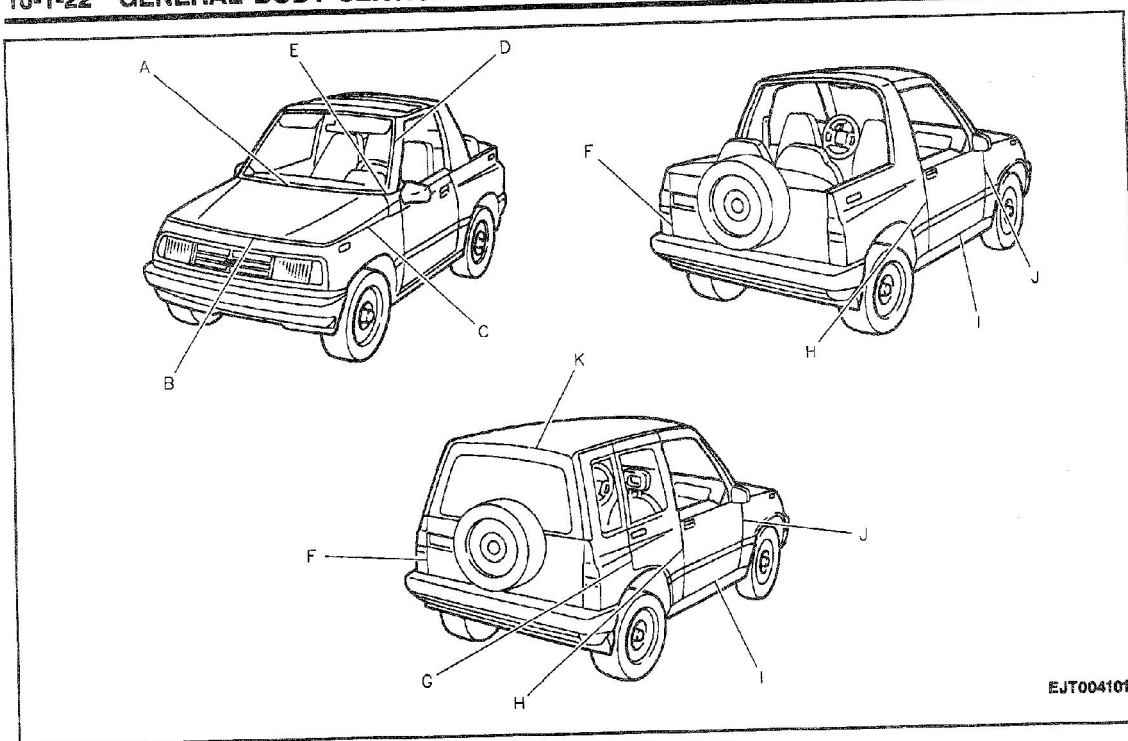


Figure 24—Sheet Metal Tolerances

| SHEET METAL TOLERANCES |   |                             |                         |
|------------------------|---|-----------------------------|-------------------------|
| POINT                  | LOCATION                                | CLEARANCE GAP (MILLIMETERS) | FLUSHNESS (MILLIMETERS) |
| A                      | HOOD-TO-COWL VENT GRILLE                | 3.7 mm (0.14")              | -                       |
| B                      | HOOD-TO-FRONT END PANEL                 | 4.2-7.0 mm (0.16-0.27")     | 0.0-1.5 mm (0.0-0.05")  |
| C                      | HOOD-TO-FENDER                          | 4.5-7.1 mm (0.17-0.28")     | -                       |
| D                      | SIDE WINDOW PILLAR-TO-WINDSHIELD PILLAR | 5.2 mm (0.20")              | 0.0-1.5 mm (0.0-0.05")  |
| E                      | COWL VENT GRILLE-TO-FENDER              | 4.8 mm (0.18")              | -                       |
| F                      | REAR DOOR -TO-QUARTER PANEL             | 5.5-8.2 mm (0.21-0.32")     | 0.0-1.5 mm (0.0-0.05")  |
| G                      | DOOR-TO-QUARTER PANEL                   | 4.0-6.8 mm (0.15-0.26")     | 0.0-1.5 mm (0.0-0.05")  |
| H                      | DOOR-TO- PILLAR                         | 4.0-6.8 mm (0.15-0.26")     | 0.0-1.5 mm (0.0-0.05")  |
| I                      | DOOR-TO-ROCKER PANEL                    | 4.0-7.0 mm (0.15-0.27")     | 0.0-1.5 mm (0.0-0.05")  |
| J                      | DOOR-TO-FENDER PANEL                    | 4.4-7.0 mm (0.17-0.27")     | 0.0-1.5 mm (0.0-0.05")  |
| K                      | REAR DOOR- TO-ROOF                      | 8.8-11.8 mm (0.34-0.46")    | 0.0-1.5 mm (0.0-0.05")  |