

Paint/Coatings

Specifications

Clearcoat Repair Specifications - 3M Products

Paint Condition	Wet Sanding	Compounding	Rotary Polisher	Dual Action Orbital Polisher	Hand Glazing/Polishing
New vehicle prep or fine wheel marks	—	—	—	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit DA 6 inch Backup Pad P/N 05776	Premium Liquid/Paste Waxes P/N 0654/06055
Swirl marks, water spotting, or light oxidation	—	—	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05725/35 - Hookit DA 6 inch Backup Pad P/N 05776	- Perfect-It Hand Glaze P/N 05997 - or - Premium Liquid/Paste Waxes P/N 0654/06055
Overspray or medium oxidation	—	- Perfect-It 11 Rubbing Compound Pad P/N 059723 - Perfect-It 11 Foam Compound Pad P/N 05723/31	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit DA 6 inch Backup Pad P/N 05776	- Perfect-It Hand Glaze P/N 05997 - Premium Liquid/Paste Waxes P/N 0654/06055
Heavy oxidation or minor acid rain pitting	Micro Fine 2000	- Perfect-It 11 Rubbing Compound Pad P/N 059723 - Perfect-It 11 Foam Compound Pad P/N 05723/31	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit DA 6 inch Backup Pad P/N 05776	- Perfect-It Hand Glaze P/N 05997 - Premium Liquid/Paste Waxes P/N 0654/06055

Clearcoat Repair Specifications - 3M Products (cont'd)

Paint Condition	Wet Sanding	Compounding	Rotary Polisher	Dual Action Orbital Polisher	Hand Glazing/Polishing
Dust nibs, minor scratches, or major acid rain pitting	Micro Fine 1500 or 2000	- Perfect-It 11 Rubbing Compound Pad P/N 059723 - Perfect-It 11 Foam Compound Pad P/N 05723/31	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit DA 6 inch Backup Pad P/N 05776	- Perfect-It Hand Glaze P/N 05997 - Premium Liquid/Paste Waxes P/N 0654/06055
Orange peel, paint runs or sags	Micro fine 1200 or 1500	- Perfect-It 11 Rubbing Compound Pad P/N 059723 - Perfect-It 11 Foam Compound Pad P/N 05723/31	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit SBS/Perfect-It Backup Pad P/N 05717/18	- Perfect-It Polishing Pad Glaze P/N 05995/05996 - Perfect-It Foam Polishing Pad P/N 05776 - Hookit DA 6 inch Backup Pad P/N 05776	- Perfect-It Hand Glaze P/N 05997 - or - Premium Liquid/Paste Waxes P/N 0654/06055

Clearcoat Repair Specifications - Meguiar Products

Paint Condition	Wet Sanding	Cleaning	Polishing
New car prep or fine wheel marks	—	—	Swirl Free Polish (M-82) W-6000 Pad for DA polishers
Swirl marks, chemical spotting or light oxidation	—	—	Swirl Free Polish (M-83) W-9000 Finishing Pad
Overspray or medium oxidation	—	Heavy-Cut Cleaner (M-85) W-7000 Cutting Pad	Swirl Remover (M-82) W-9000 Finishing Pad
Heavy oxidation or minor acid rain pitting	—	Compound Power Cleaner (M-84) W-4000 Cutting Pad	Swirl Free Polish (M-82) W-6000 Finishing Pad
Dust nibs	2000 Grade Unigrit Sanding Block	Compound Power Cleaner (M-84) W-7000 Cutting Pad	Swirl Free Polish (M-2) W-9000 Finishing Pad
Minor scratches or acid rain pitting	2000 Grade Unigrit Sanding Paper	Compound Power Cleaner (M-84) W-7000 Cutting Pad	Swirl Free Polish (M-2) W-9000 Finishing Pad
Major runs or sags	1500 Grade Unigrit Sanding Block	Compound Power Cleaner (M-84) W-7000 Cutting Pad	Swirl Free Polish (M-2) W-6000 Pad for DA Polishers
Major orange peel or acid rain pitting	1500 Grade Unigrit Sanding Paper	Compound Power Cleaner (M-84) W-7000 Cutting Pad	Swirl Free Polish (M-2) W-6000 Pad for DA Polishers
Need for protection	—	—	Quick Detailer (M-6601) will provide protection without streaking. Contains the mildest of cleaners which will insure even application of polish.

Introduction

Basecoat/Clearcoat Paint Systems

Caution: Exposure to isocyanates during paint preparation and application processes can cause severe breathing problems. Read and follow all of the instructions from the manufacturers of painting materials, equipment, and protective gear.

Caution: Approved safety glasses and gloves should be worn when performing this procedure to reduce the chance of personal injury.

All paint finish repairs of rigid exterior surfaces must meet GM standards. The GM Approved Refinish Materials book GM P/N GM4901M-D-99 identifies the paint systems you may use. Always refer to the latest revision of the 4901M-D book. All approved products, including volatile organic compound (VOC) - compliant regulations are listed in the system approach recommended by the individual manufacturer. Refer to the manufacturer's instructions for the detailed procedures for materials used in the paint system in the painting repairs of rigid exterior surfaces. All components of an approved paint system have been engineered in order to ensure proper adhesion between layers.

If necessary, spot repairs or color blending in an open panel can be done. However, do not blend clearcoat in an open panel. Always apply clearcoat to the next break point (body side molding, feature line, or the next panel.)

Do not mix paint systems or substitute a product of 1 manufacturer for another manufacturer's product. If incompatible products are used together the following problems may occur:

- Lifting of primer coats caused by overly aggressive solvents in subsequent layers
- Loss of adhesion between layers due to incompatibility of resin systems
- Solvent popping or pinholing due to inappropriate solvent selection
- Poor through-curing due to incompatible hardener resins or insufficient reactivity
- Gloss reduction due to incompatible resins and/or solvents
- Poor color accuracy due to pigment interactions with incompatible resins and/or solvents
- Film defects (craters, blisters, orange peel loss of gloss) due to the use of inferior quality raw materials in incompatible products

Anti-Corrosion Treatment and Repair

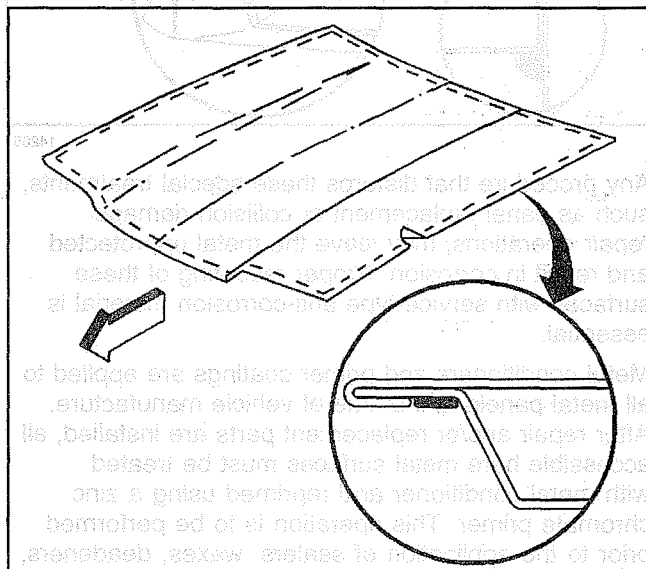
Caution: When applying sound deadeners, or anti-corrosion materials due care and preventative measures must be exercised to prevent any material from being sprayed into door and quarter panel mechanisms such as door locks, window run channels, window regulators and seat belt retractors, as well as any moving or rotating mechanical or suspension parts on the underbody, particularly the parking brake cable. After material application, be sure that 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.

Caution: Foam sound deadeners must be removed from areas within 152.4 mm (6 in) of where flame is to be used for body repairs. When reinstalling foam sound deadeners, avoid inhaling fumes as bodily injury may result.

Caution: Approved safety glasses and gloves should be worn when performing this procedure to reduce the chance of personal injury.

Notice: The anti-theft label found on some major body panels MUST be covered before performing any painting, rustproofing or undercoating procedures. The mask must also be removed following those procedures. Failure to follow these precautionary steps may result in liability for violation of the Federal Vehicle Theft Prevention Standard, and subject the vehicle owner to possible suspicion that the part was stolen.

Anti-corrosion materials providing rust resistance are used on the interior and the exterior surfaces of the metal panels. These materials include the following metals:

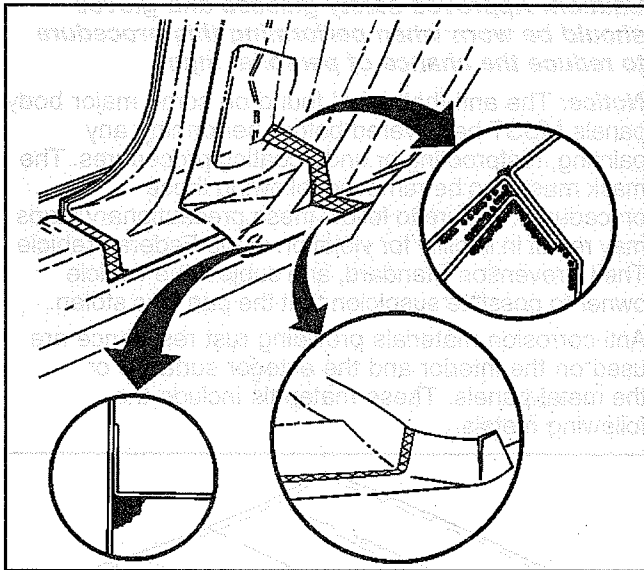


- One-sided galvanized zinc
- Two-sided galvanized zinc
- Zinc-iron alloy steels

These treated metals are used on the following components:

- The fenders
- The doors
- The quarter panels
- The rocker panels
- The lids
- The floor pans
- The wheelhousings
- Other critical parts

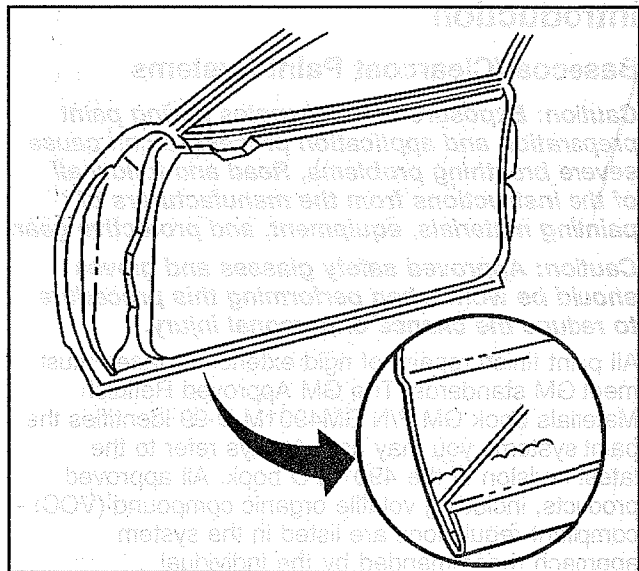
Metal conditioners and primers are used on the interior and the exterior surfaces along with protective waxes on the interior surfaces in the areas where moisture might accumulate. Sealers are applied along the exposed joints and the moisture-repelling asphaltic sound deadeners are applied inside the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



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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. Proper recoating of these surfaces with service-type anti-corrosion material is essential.

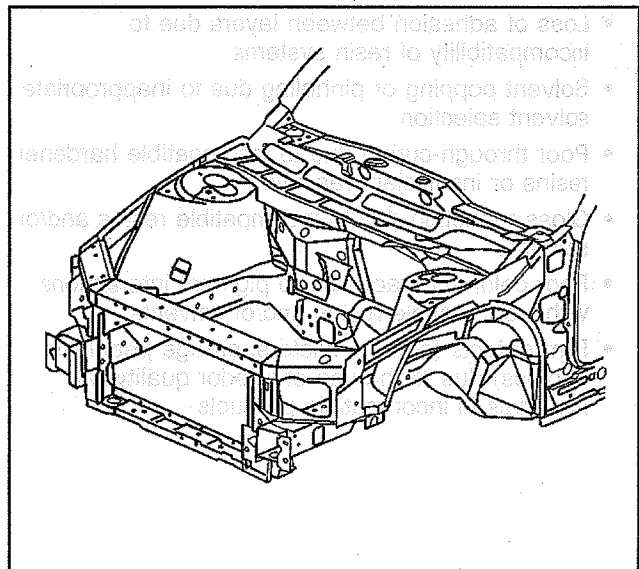
Metal conditioners and primer coatings are applied to all metal panels at the time of vehicle manufacture. After repair and/or replacement parts are installed, all accessible bare metal surfaces must be treated with metal conditioner and reprimed using a zinc chromate primer. This operation is to be performed prior to the application of sealers, waxes, deadeners, and antirust compounds. Refer to *Basecoat/Clearcoat Paint Systems*.



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These sealers are intended to prevent water and dust from entering the vehicle and also are anti-corrosion barriers. Sealers are applied to such areas as rear compartment lid hem flanges, wheelhouse, quarter outer, 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 lids and doors will also require sealing in the hem flange areas.

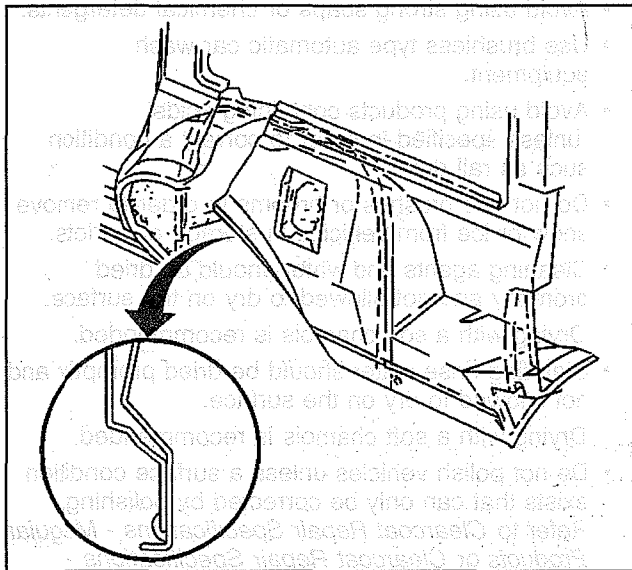
Flanged joints, overlap joints, and seams should be sealed using a quality sealer of medium-bodied consistency. The sealer used must retain its flexible characteristics after curing and be paintable.



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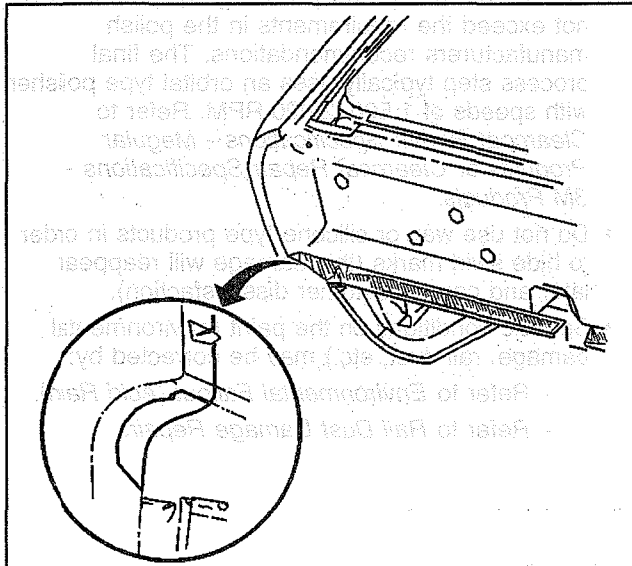
Open joints which require bridging of the sealer in order to close a gap should be sealed using a heavy-bodied caulking material. Follow the label directions for the material selected.

Color application may be required in order to restore repaired areas such as hood, fenders, doors, quarters, lid, roof, engine compartment, underbody, and inner panels to original appearance. When this is necessary, conventional refinishing preparation, undercoat buildup, and color application techniques should be followed. Refer to *Basecoat/Clearcoat Paint Systems*.



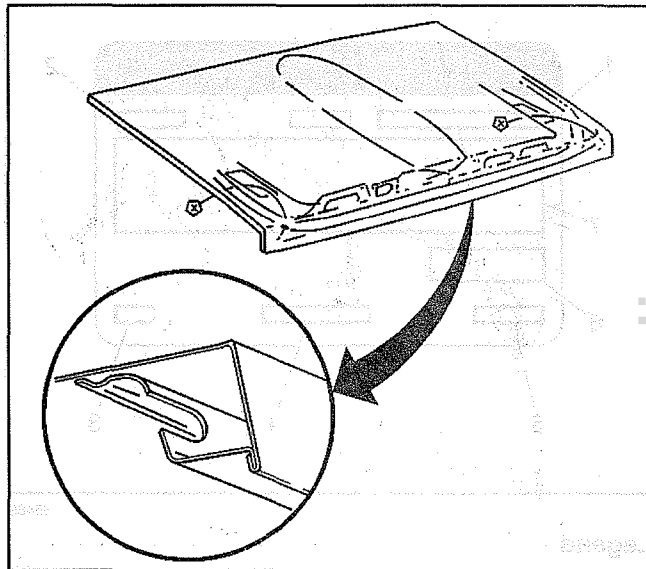
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Deadener materials (spray-on type) are used on various metal panels in order to provide corrosion resistance and joint sealing. They control the general noise level inside the passenger area of the vehicle. When deadeners are disturbed because of damage, are 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 observing the original production installation.



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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, and are inaccessible for painting. Material suited for this type of application is GM P/N 12346225 Anti-Corrosion Compound Clear (Oil Base) or equivalent. Conventional undercoating is recommended in order to coat large areas such as replacement door and quarter outer panels, floor pan sections, lids, hoods, fenders, etc. During undercoating operations, care should be taken to prevent the material from being sprayed into door and quarter panel hardware mechanisms such as door locks, glass run channels, window regulators, and seat belt retractors. On the underbody, the material should not be applied to any moving or rotating part, energy absorbing bumper components, or shock absorbers. After undercoating, ensure that all body drain holes are open. Refer to *Basecoat/Clearcoat Paint Systems* for the sequence of application steps for anti-corrosion materials.



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Cleaning of the interior and underbody panel surfaces is necessary when original galvanized or other anti-corrosion materials have been burned off during welding or heating operations. Removal of the residue 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.

- Sandblasting is an excellent method for cleanup and preparation of open joints, underbody components, and hem flange areas. Sandblasting is most effective and should be used.
- When access is possible, scraping with a putty knife or scraper can be used.
- A jet of compressed air will remove most residue and could be effective in a limited access areas.

Paint Identification

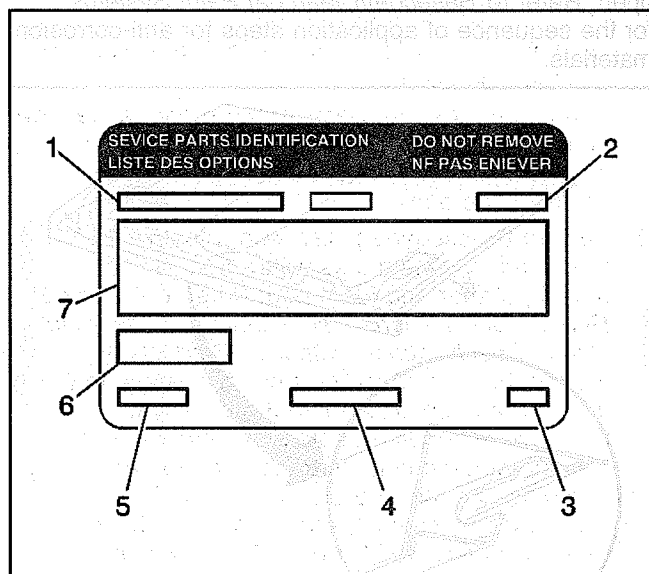
Introduction

Caution: Exposure to isocyanates during paint preparation and application processes can cause severe breathing problems. Read and follow all of the instructions from the manufacturers of painting materials, equipment, and protective gear.

Important: Always refer to the GM Approved Refinish Materials book GM P/N 4901M-D. This book identifies the paint systems you may use.

The basecoat/clearcoat paint is factory applied in the following 4 layers in order to give the finish a high gloss look:

1. A cathodic immersion primer
2. A primer/surfacer
3. A basecoat
4. A clear top coat (clearcoat)



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Legend

- (1) Vehicle Identification Number
- (2) Engineering Model Number (Vehicle Division, Vehicle Line and Body Style)
- (3) Interior Trim and Decor Level
- (4) Exterior (Paint Color) WA Number
- (5) Paint Technology
- (6) Special Order Paint Colors and Numbers
- (7) Vehicle Option Content

Refer to Label - Service Parts ID in General Information in order to identify the type of top coat on the vehicle. This label contains all paint related information for the vehicle. This includes paint technology, paint codes, trim level, and any special order paint colors.

Repair Instructions

Clearcoat Repair w/o Repainting

Service Precautions

- Avoid washing vehicles in direct sunlight.
- Avoid using strong soaps or chemical detergents.
- Use brushless type automatic car wash equipment.
- Avoid using products containing acids (unless specified in order to correct a condition such as rail dust).
- Do not use brushes or brooms in order to remove snow or ice from vehicles in storage or on lots.
- Cleaning agents and water should be dried promptly and not allowed to dry on the surface. Drying with a soft chamois is recommended.
- Standing rinse water should be dried promptly and not allowed to dry on the surface. Drying with a soft chamois is recommended.
- Do not polish vehicles unless a surface condition exists that can only be corrected by polishing. Refer to *Clearcoat Repair Specifications - Meguiar Products* or *Clearcoat Repair Specifications - 3M Products*.
- If a surface condition does exist, the repair approach should be one of less is best (the very least it takes to correct the condition).
- Avoid removing too much clear coat (whenever possible, use paint gauges before, during and after polishing). Refer to *Paint Gauges*.
- Use only the products recommended in this procedure (or their equivalent). Refer to *Clearcoat Repair Specifications - Meguiar Products* or *Clearcoat Repair Specifications - 3M Products*.
- Ensure that any power polishing equipment does not exceed the requirements in the polish manufacturers recommendations. The final process step typically uses an orbital type polisher with speeds of 1,500–2,000 RPM. Refer to *Clearcoat Repair Specifications - Meguiar Products* or *Clearcoat Repair Specifications - 3M Products*.
- Do not use wax or silicone type products in order to hide swirl marks (this damage will reappear later and cause customer dissatisfaction).
- Specific conditions on the paint (environmental damage, rail dust, etc.) may be corrected by:
 - Refer to *Environmental Fallout (Acid Rain)*.
 - Refer to *Rail Dust Damage Repair*.

Repair Procedure

Notice: Refer to *Clearcoat/Ultraviolet Screeners Notice* in Cautions and Notices.

1. Thoroughly wash the repair area with Liquid Wash and Wax GM P/N 1052870 or the equivalent.
2. Readings of the paint film build should be taken prior to the operation. Refer to *Paint Gauges*.
3. Apply a small amount of the appropriate material to repair area and smear evenly with the pad. Refer to *Clearcoat Repair Specifications - Meguiar Products* or *Clearcoat Repair Specifications - 3M Products*.
4. With the polisher running at approximately 1,500–2,000 RPM, polish the repair area. Keep the pad flat against the panel while applying heavier pressure for 4–6 seconds. Then, polish with lighter pressure for 6–8 seconds. Feature lines and panel edges should be hand-rubbed in order to avoid burn-through.
5. Inspect the repair area frequently. Add more of the appropriate material as needed.
6. Always blend or feather the outer edges of the repaired area.
7. After buffing, inspect the repaired area.
8. If swirls are still visible, repeat the buffing procedure.
9. Clean the repaired area using a clean soft, non-scratching cloth with a 50/50 mixture of Isopropyl Alcohol and water.
10. If sanding is required, refer to *Clearcoat Repair Specifications - Meguiar Products* or *Clearcoat Repair Specifications - 3M Products*.

Environmental Fallout (Acid Rain)

Since the severity of the condition varies from area to area, proper diagnosis of the damage extent is critical to the success of repairs. Perform diagnosis under high intensity fluorescent lighting, on horizontal surfaces (hood, roof panel, rear compartment lid) after the surfaces have been properly cleaned. There are 3 basic types of acid rain damage:

Surface Level Contamination: May be repaired by simply washing the vehicle, cleaning the surface with a silicone, wax and grease remover, neutralizing acidic residue and finesse polishing. Refer to Surface Level Contamination Repair in this procedure.

Clearcoat Etching: Slight etching still noticeable after the above washing and finesse polishing procedure. Refer to Slight Clearcoat Damage — Wet Sanding, Finesse Polishing in this procedure.

Basecoat Etching: Severe etching beyond the clearcoat into the basecoat. Refer to *Basecoat/Clearcoat Paint Systems*.

Slight Clearcoat Damage — Wet Sanding, Finesse Polishing

Notice: Removing more than 0.5 mils of the clearcoat can result in early paint failure. The clearcoat contains ultraviolet screeners. Do not finesse sand more than what is required to remove the defect.

Important: Always refer to manufacture's packaged instructions for the detailed procedures of materials used for compounding or polishing.

1. Select a small test area on the damaged panel.
2. Readings of the paint film build should be taken prior to the operation. Refer to *Paint Gauges*.
3. Wet sand the damaged area using an ultra-fine sandpaper and rubber sponge sanding block. Refer to the manufacturer's instructions for detailed procedures for the materials used in the repairs. During the wet sand process:
 - Use ample amounts of water.
 - Work slowly in order to prevent removing too much clearcoat.
4. Remove the excess water with a rubber squeegee and inspect the area. If wet sanding has repaired the damage, continue the sanding procedure on the entire panel.
5. Apply a finesse-type polish with a foam pad. Remove any swirl marks with a dual action orbital polisher and foam pad. Refer to *Clearcoat Repair Specifications - 3M Products* or *Clearcoat Repair Specifications - Meguiar Products*. If (during the repair) you suspect or observe that etching has penetrated into the basecoat, too much clearcoat has been removed during sanding or base color is transferred to pad during polishing, the affected areas may require clearcoat/basecoat application or refinishing. Refer to *Basecoat/Clearcoat Paint Systems*.
6. Polish the entire vehicle after all damage has been repaired.

Surface Level Contamination Repair

Notice: Removing more than 0.5 mils of the clearcoat can result in early paint failure. The clearcoat contains ultraviolet screeners. Do not finesse sand more than what is required to remove the defect.

Important: Always refer to manufacture's packaged instructions for the detailed procedures of materials used for compounding or polishing.

1. Thoroughly wash the repaired area with Liquid Wash and Wax GM P/N 1052870.
2. Dry the area thoroughly.
3. Clean the affected area with silicone, wax and grease remover.
4. Neutralize left over acidic residue by cleaning damaged areas with mixture of baking soda and water (1 tablespoon of baking soda per 1 quart of water). Rinse thoroughly and dry the panel completely.
5. Apply finesse-type polish with a foam panel. If damage has been repaired, remove any swirl marks with dual action orbital polisher and foam pad. Refer to *Clearcoat Repair Specifications - 3M Products* or *Clearcoat Repair Specifications - Meguiar Products*.
6. If some damage remains, refer to Slight Clearcoat Damage—Wet Sanding, Finesse Polishing in this procedure.

Paint Gauges

Use a paint gauge before, during and after the sanding process in order to accurately measure how much clearcoat has been removed. Paint gauges measure the total thickness of the finish and when used, determine how much clearcoat has been removed during the repair process. Paint gauges range from magnetic pull type to sophisticated electronic types and are available from a variety of sources. The older magnetic type gauges, at best have a 5 percent accuracy range and are not sensitive enough to detect removal of 0.020 mm 0.5 mil; (0.0005 in) clearcoat. The newer type magnetic gauges have improved accuracy ranges. Most gauges are confined to checking either ferrous metal (steel) or non ferrous metal (aluminum) panel. At this time, there are no viable gauges for reading film thickness on composite (SCM Doors, RIM Fenders) panels. The more sophisticated (ETG) electronic paint thickness gauges digital type gauges are able to read film thickness on both ferrous and non-ferrous metal panel. Digital (ETG) gauges may have an accuracy range of 1 percent and include thickness standards for recalibration. The following paint thickness gauges are available. Call 1-800-GM-TOOLS for information.

Paint Thickness Gauges

- 147-5437-ETG Standard Model
- 147-5437-ETG-P Standard model with print option.
- 147-5437-N-ETG-N Non-ferrous model for aluminum panels
- 147-5437-NP-ETG-NP Non ferrous model with print option
- 147-54437-SD-ETG Steel and aluminum gauge

Clearcoat Thickness

The clearcoat on the vehicle is typically 0.059– 0.078 mm (1.5– 2 mils; 0.0015–0.0020 in) thick. The clearcoat contains ultraviolet screeners. Removing more than 0.5 mils (0.019 in) of the clearcoat may result in early paint failure.

Rail Dust Damage Repair

Caution: *Approved safety glasses and gloves should be worn when performing this procedure to reduce the chance of personal injury.*

Important: If rail dust has penetrated into the basecoat, the panel requires refinishing. Ensure all the rail dust has been removed prior to refinishing or the rust spots will return.

Rail dust damage comes from the tiny iron particles produced from the friction between the train wheels and the track. It can also be deposited on vehicles if stored near any operation producing iron dust (i.e., steel ore yards). This dust can either lay on top of, or embed into the paint surface. It is usually diagnosed as bumps in the paint surface or rust colored spots in the paint.

1. Move the vehicle to a cool shaded area and ensure the vehicle surfaces are cool during the removal process.
2. Thoroughly wash the repair area with Liquid Wash and Wax GM P/N 1052870 or the equivalent.
3. Wipe the area dry.
4. Clean the affected area with silicone, wax and grease remover.
5. Perform the removal process according to the manufacturer's directions of the type of repair material used (Gel Type Oxalic Acid or Clay Type Non-Acid Based). If, upon inspection, some particles are still present, the process may be repeated. If the damage has been repaired, complete the repair to the entire panel.
6. Polish the entire panel after the removal process. Refer to *Clearcoat Repair Specifications - 3M Products* or *Clearcoat Repair Specifications - Meguiar Products*. If small pits remain in the clearcoat after all of the damage has been repaired, refer to *Clearcoat Repair w/o Repainting*.