

BASIC ASSUMPTIONS REFINISHING



PPG Industries Automotive Refinish group makes these assumptions based on accepted industry practices, our knowledge, past experience and feedback from our employees and customers. These assumptions are intended to be used by collision repairers for reference and support documentation to promote a better understanding of the refinishing process to their customers.

For complete information, please refer to the appropriate PPG or Nexa Autocolor technical data sheets.

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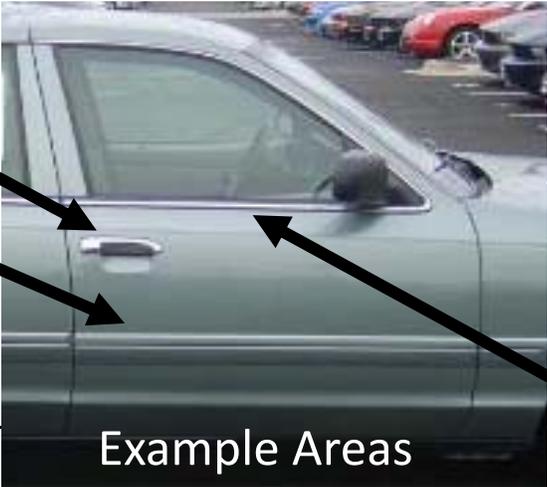
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Parts Removal Guidelines

Overview – When repairing to a factory-like finish, existing paintwork must be thoroughly sanded and cleaned to ensure the adhesion of subsequent coatings. Often times this is not feasible if moldings and parts are not removed.

<p>1</p>	<p>When possible, PPG recommends that all parts be removed prior to refinishing panels and blend areas.</p>
<p>2</p>	<p>If it takes the same time to remove a part as it does to tape the part, remove it prior to refinishing.</p> <p>Dropping bumper cover ends, rocker moldings and other types of trim can create potential risks while moving a vehicle and require additional time to mask and secure compared to removing the part. Partially attached components also can create issues during the paint process. It is PPG’s recommendation to remove parts prior to prepping and refinishing, especially if a partially attached component will impede work.</p>
<p>3</p>	<p>If the interior door panel must be removed as part of the repair operation, remove whatever parts can be removed prior to painting the exterior.</p>
<p>4</p>	<p>If no gap exists between the part and the panel (close-fitting part), remove the part prior to refinishing.</p>
<p>5</p>	<p>CAUTION – Manufacturer warranty recommendations supersede any PPG guidelines shown above.</p>



Plastic Refinishing

Overview – When repairing to a factory-like finish, the substrate being refinished determines the process and products recommended. To reproduce the color, gloss level, and texture of the factory finish on plastic parts requires a different process than painting metal.

1	Successfully preparing plastic parts for painting requires more complete scuffing/sanding and more thorough cleaning than what is needed for metal parts. If water “sheets” off the part, then it is ready for paint. If water “beads up” on the part, recleaning is necessary. There are special cleaners designed specifically for this process.
2	When refinishing bare plastic, use the appropriate preparation products and adhesion promoters to ensure a successful outcome. These products are explained and demonstrated in our technical training materials and courses.
3	Due to the nature of a flexible substrate, it must be able to absorb a slight impact and not crack or chip. Additives are used in undercoats and clearcoats to maintain this flexibility. Years ago, these additives were just a solvent that would evaporate. Today, our flex additives contain resins that actually remain with the paint film after any solvent has left. These resins improve long-term flexibility and durability.
4	Basecoat film does not require flexing. However, to get the most durable finish when painting flexible leading edges, a best practice is to activate the basecoat (especially solvent).
5	PPG does not recommend using flexed materials to paint metal parts. While compatibility and adhesion may be unaffected, there are three reasons to avoid this practice: decreased productivity since the flexed material takes a little longer to dry, the increased material costs of the flex agent, and adding flex agent may result in VOC non-compliance.
6	Metal parts can be baked on or off the car with relative ease. Non-rigid plastic parts, if baked off the car, must be adequately supported to avoid warping and deforming of the part or baked longer at lower temperatures.
!	Note: Bumper failure due to poor preparation is NOT a <u>warranty</u> issue. More attention to detail during preparation will reduce potential customer satisfaction issues in the future.



Facts on Bumper Colors

Overview – Sometimes the original bumper and accent pieces may not match the factory’s vehicle body color even before the repair. In addition, sometimes even metal and plastic pieces painted right next to each other at the same time and with the same paint, may not match. Here are some possible explanations:

	1	<p>A color can vary depending on the substrate on which it is painted. For example, the evaporation rates of paint and related products may vary over metal or plastic. A longer rate gives a flake pigment additional time to “settle” which often darkens the face of the color.</p>
	2	<p>The body was painted on a production line at the factory, while other parts, such as the bumper and trim pieces, may be painted at another location using a different application method.</p>
	3	<p>Slight adjustments can be made during application creating a lighter or darker color, or causing the metallics or mica elements to lay down differently. A best practice is to paint the bumper in the same position that it will be mounted on the vehicle.</p>
	4	<p>Light reflects differently on curved and flat surfaces causing the appearance of a color shift.</p>



Vehicle Masking Process

Overview – The purpose of masking is to protect the undamaged areas of the vehicle from overspray during the repair process.

Once priming is completed, it is a best practice to remove used masking materials and replace prior to paint application. This will minimize dust in the paint area and in the final finish.

	1	Check repair order and verify proper repairs were made. Verify that all parts to be painted are available and removed.
	2	Visually inspect that: All gloss has been removed from panels and edges. All panels have been thoroughly cleaned using wax and grease remover or waterborne cleaner. All openings blown with air.
	3	<p>Outline tape - Outline repair area to be painted using 1 ½ “ or 2” tape. When possible, backtaping is preferred. Aperture tape (foam tape) may be used when backtaping isn’t possible. Be aware that bake cycles may cause foam tape to leave a residue requiring additional cleanup and may also result in a more noticeable paint edge.</p> <p>Spray Mask - Spray mask may be used in conjunction with plastic car covers. This adds additional protection reducing chance of overspray on panels which are not being painted.</p> <p>Plastic - Use paintable plastic sheeting to cover the rest of the vehicle. Do not remove plastic from box. Use box as dispenser. Place on floor and pull plastic over vehicle. Cut to fit and tape edges.</p> <p>Entryways - Attach 6” paper to all necessary backtaped edges to help ensure a closed gap. This provides a second barrier to backtaping alone and substantially reduces the risk of overspray.</p> <p>Masking paper - Use masking paper on any areas not covered with plastic.</p> <p>Wheels - Mask wheels with paper back taped to wheel well.</p> <p>Re-clean - Re-clean areas to be painted with wax and grease remover or waterborne cleaner.</p>



Spray Primer Surfacer Process

Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.

1	Prepare surface as per process document PD-0100 Light Body Repair Process.
2	Scuff sand all recessed areas and panel edges with red scuff pad for adhesion of primer surfacer.
3	Apply Etching Primer to bare metal areas as per process document PD-0500 Self-Etching Primer Process .
4	Clean area to be primed with Wax and Grease Remover and/or SWX350 Waterborne cleaner and a clean cloth.
5	Mask as necessary to protect vehicle from overspray.
6	Mix Primer Surfacer according to product document.
7	Apply 2-3 coats of Primer Surfacer to the repair area. <ul style="list-style-type: none"> a. Apply surfacer just beyond edges of repair area to minimize size. b. Use reverse priming technique by covering the largest area with the first coat and keep the following coats within that area. c. Allow each coat of primer to flash to a uniformly dull appearance before applying the next coat.
8	Clean spray gun immediately following the application of the final coat of primer.
9	Allow the Primer Surfacer to air or force dry according to the product document.
10	See process document PD-0590 Primer Surfacer Sanding Process for next steps.

Pinchweld Priming Process - Air Dry

Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.

Overview – A two-component epoxy primer must be used on bare metal areas of pinchwelds when installing stationary glass using urethane repair materials.

If corrosion is present or if sheet metal repairs or metal replacement are required, the pinchweld flange must be primed in order to restore the bonding area strength.

1	Perform all necessary metal repairs to pinchweld areas on roof, pillar and other panels where stationary glass will be installed.
2	Final sand all bare metal and body filler areas with 180 grit using a DA sander. Do not apply body filler to pinchweld area.
3	Final sand and featheredge all <u>adjacent</u> painted areas with 320 grit on a DA sander.
4	Clean area to be primed with Wax and Grease Remover and/or SWX350 Waterborne cleaner and dry with clean towels.
5	Mask vehicle appropriately according to process document PD-0300 Vehicle Masking Process .
6	Mix DP50LF/DPL90LF (2:1 with DP402LF) OR DP50LV/DP90LV Epoxy Primer according to the product document.
7	Apply two coats of DPLF OR DPLV Epoxy Primer to the repair area.
8	Allow each coat of DPLF OR DPLV Epoxy Primer to flash to a uniformly dull appearance before applying the next coat.
9	Clean spray gun immediately following the application of the final coat of DPLF OR DPLV Epoxy Primer .
10	Allow the DPLF OR DPLV Epoxy Primer to air dry overnight before applying the urethane adhesive. However, the refinishing process can continue once the epoxy can be masked without tape tracking.
11	IMPORTANT STEP – Mask off primed pinchweld area before color and clearcoat application. Windshield adhesive must only be applied to a clean, epoxy-primed surface.

Pinchweld Priming Process - Force Dry

Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.

Overview – A two-component epoxy primer must be used on bare metal areas of pinchwelds when installing stationary glass using urethane repair materials.

If corrosion is present or if sheet metal repairs or metal replacement are required, the pinchweld flange must be primed in order to restore the bonding area strength.

1	Perform all necessary metal repairs to pinchweld areas on roof, pillar and other panels where stationary glass will be installed.
2	Final sand all bare metal and body filler areas with 180 grit using a DA sander. Do not apply body filler to pinchweld area.
3	Final sand and featheredge all <u>adjacent</u> painted areas with 320 grit on a DA sander.
4	Clean area to be primed with Wax and Grease Remover and/or SWX350 Waterborne cleaner and dry with clean towels.
5	Mask vehicle appropriately according to process document PD-0300 Vehicle Masking Process .
6	Mix DP50LF/DPL90LF (2:1 with DP402LF) OR DP50LV/DP90LV Epoxy Primer according to the product document.
7	Apply two coats of DPLF OR DPLV Epoxy Primer to the repair area.
8	Allow each coat of DPLF OR DPLV Epoxy Primer to flash to a uniformly dull appearance before applying the next coat.
9	Clean spray gun immediately following the application of the final coat of DPLF OR DPLV Epoxy Primer .
10	Force dry the DPLF OR DPLV Epoxy Primer using an IR light at full power for 15 minutes or bake for 30 minutes after metal temperature reaches 140°F. Allow pinchweld flange to cool to room temperature before proceeding.
11	IMPORTANT STEP – Mask off primed pinchweld area before color and clearcoat application. Windshield adhesive must only be applied to a clean, epoxy-primed surface.

Parts Edging & Cut-In Options

Overview—When repairing to a factory-like finish, sometimes a body color or an engine bay color is required to match the OEM gloss level and performance capability. To achieve these characteristics, consider one of the options listed below.

Verify the appropriate color needed by referencing the PPG PAINTMANAGER[®] software, a chromatic variant deck or an engine bay deck.

	1	<p><u>Internal Repair (Engine Bay) System</u>: Designed to provide a simple repair process where there is a specific underhood color or where the internal area is a low gloss version of the exterior color. Dedicated formulas are provided as part of the PPG color retrieval system. They are designed to match the OE finish on internal, unexposed parts.</p>
	2	<p><u>Solvent Basecoat</u>: Catalyze basecoat and apply to underhood and other interior areas. Do not apply clearcoat.</p>
	3	<p><u>Waterborne Basecoat</u>: Exterior colors can be converted into a low gloss internal repair (engine bay) color. For ENVIROBASE[®] High Performance basecoat, see EB-145 and for AQUABASE[®] Plus basecoat, see PDS N5.2.1.</p>
	4	<p><u>Basecoat/Clearcoat</u>: Apply appropriate basecoat color. Match the factory gloss level using a full gloss clearcoat, a matte finish clearcoat or a clearcoat mixed with matting base.</p>



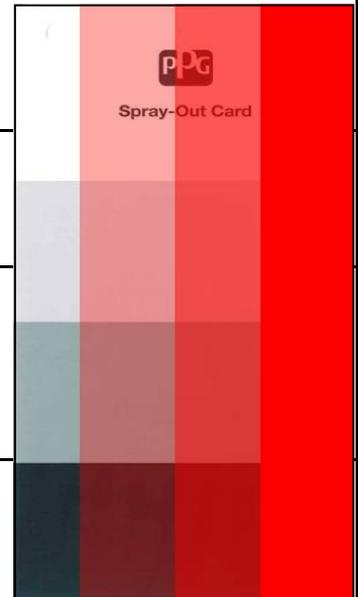
Sprayout Cards

Overview - PPG has sprayout cards available that simulate the various shades of gray sealers (Part #: ARMC464) . They assist the refinish technician to achieve a blendable color match.

Multiple sprayout cards might be used during this process.

Tinting is a dynamic operation and the time required to achieve a blendable match may vary from color to color.

1	<p>Mask off 3 or 4 sections along the length (leaving one section exposed). Spray your first coat of base. Remove the next layer of masking and apply a second coat. Repeat the process until you have 3 or 4 coats of color on the card.</p>
!	<p>Waterborne metallic and pearl colors will also require the “Control Coat” application to achieve the proper color alignment.</p>
2	<p>Clear the entire card using the same clear and reduction that you will use to make the repair.</p>
3	<p>When you compare the card to the vehicle, you will be able to determine the proper undertone and number of coats of color that will need to be applied.</p>
!	<p>PPG recently released new G-Shade specific sprayout cards. They are available through your local distributor. Part numbers are:</p> <ul style="list-style-type: none"> ARMC464G1 ARMC464G3 ARMC464G5 ARMC464G6 ARMC464G7



Tri-Coat Color Letdown Panel

Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.

1	Obtain OEM Color Code from vehicle and look up the code in PPG's PAINTMANAGER [®] software.
2	Note any variant colors available, check variant colors using PPG variant deck chips against area to be painted on the vehicle, choose prime or variant color with best match.
3	The groundcoat - main layer color in this process must be a good match to the OEM color to continue.
4	<p>Prepare the tri-coat letdown panel as shown below. Apply the recommended shade of gray sealer for the groundcoat - main layer color to the letdown panel first.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p style="color: red; font-size: small;">3. Clearcoat only ½ of panel to highlight differences in midcoat.</p> <p style="color: red; font-size: small;">2. Mask off 5 horizontal sections of the panel. Apply 5 coats of midcoat to <u>entire</u> panel, removing 1 section of masking after each coat.</p> <p style="color: red; font-size: small;">1. Apply “blendable” groundcoat - main layer to entire letdown panel.</p>
5	Use the panel to determine the number of coats of mid-coat color for the best match.
6	Follow the tri-coat blending process document PD-0710 Tri-Coat Color Blending Procedure .

Primer Sealer Application Process

Use of a wet-on-wet sealer (WOW) can be beneficial to improve adhesion to the substrate and increase chip resistance. When applying low opacity colors over primer sealer, the appropriate shade of spectral gray may result in better color alignment. Although optional in many repair scenarios, a WOW sealer is required over e-coated parts.

Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.

1	Review work order to verify all work has been properly completed to this point.
2	Verify that all parts to be sealed are available.
3	Clean area to be sealed with Wax and Grease Remover and/or SWX350 waterborne cleaner and dry with clean towels.
4	Mask vehicle appropriately according to process document PD-0300 Vehicle Masking Process .
5	Apply a medium wet coat of Primer Sealer to the repair area. (Refer to the Product Document for the sealer application instructions). <ul style="list-style-type: none"> a. Keep the sealer application area as small as possible on spot repairs. b. Use the recommended G1 - G7 spectral gray sealer for the color that will be applied.
6	Allow each coat of sealer to flash to a uniformly dull appearance before applying the next coat.
7	Where repair areas are too tight to allow proper softening of the sealer edge by the technician's application technique, the entire panel should have sealer applied.
8	Clean spray gun immediately following the application of the final coat of sealer.
9	Allow the primer sealer to air dry according to the product document before applying basecoat.

Single Stage

Overview - Some manufacturers use a single stage product for the vehicle body. This describes a product that has color and clear properties in one package. Since the product is handled similarly to clearcoat and to repair to a factory-like finish, collision centers must match the OE finish which may raise the following concerns.

	1	<u>FULL PANEL</u> : Some car companies have specific procedures for warranty repairs when refinishing an OEM single stage where no definite break line exists for stopping the paint. To meet this OEM warranty guideline and for PPG Lifetime Limited Paint Performance Guarantee purposes, the single stage application must extend to the nearest panel edge or break point.
	2	<u>BLENDING</u> : PPG does document a single stage blending procedure. However, this procedure was designed for specific, economical repairs. Due to its nature, the single stage blend edge is not durable enough to withstand weathering, repeated exposure to the elements and becomes visible after a period of time. As a result, for OEM warranty and PPG guarantee purposes, blending a single stage edge is not recommended.
	!	<u>GUARANTEE</u> : Are Single Stage blends guaranteed under PPG's lifetime guarantee? By the definitions above, only full panel application is covered. Single stage blends are not covered under the PPG Lifetime Limited Paint Performance Guarantee .

Basecoat Color

Overview - Vehicle manufacturers select colors years before the actual vehicles are painted at the factory. Once these model year colors are selected, they are provided to paint manufacturers. PPG creates formulas to match these standards. There are many steps to the manufacturing process and variations can occur throughout. They may be due to one step being out of tolerance or a culmination of many steps being close to unacceptable. Examples of these potential variations include different paint manufacturers supplying the OE plant, different application equipment used at the factory, shearing of metallics as they tumble through the supply line, parts painted separate from the vehicle body, to name a few. The end result is that the actual car color does not match the OE standard.

	1	<p><u>TINTING</u>: When the actual vehicle color does not match the OE standard and is not close enough to blend, the paint formula needs to be adjusted to get the color closer. This process, commonly referred to as tinting, is one of the most difficult tasks a paint technician performs during the repair. When tinting colors, there are five areas that the painter must balance: hue/color, value/lightness, chroma/richness, metallic size, and flop/angle perspective. It is a time-consuming process and rarely results in an exact match due to the variables described above. Therefore, PPG recommends tinting only to get the color to a blendable match.</p>
	2	<p><u>SPOT REPAIR</u>: When performing a spot repair, the idea is to minimize the repair area. The repair area receives full coverage and the surrounding area receives partial coverage creating an undetectable color transition. The entire repaired panel is clearcoated. If there is not enough room between the repair area and the adjacent panel(s), the color must be blended onto the adjacent panel. All panels that are painted should be clearcoated in their entirety.</p>
	3	<p><u>FULL PANEL</u>: When replacing a panel, blending color onto the adjacent panel(s) is a necessary operation that results in an undetectable color transition. If a spot repair occurs close to a panel edge, the color should be blended onto the adjacent panel(s) as well. All panels that are painted should be clearcoated in their entirety.</p>



Clearcoat

1	<u>FULL PANEL</u> : Some car companies have specific procedures for warranty repairs when refinishing an OEM clearcoat where no definite break line exists for stopping the clear. To meet this OEM warranty guideline and for PPG Lifetime Limited Paint Performance Guarantee purposes, the clearcoat application must extend to the nearest panel edge or break point.
2	<u>FILM BUILD</u> : For PPG Lifetime Limited Paint Performance Guarantee purposes, the clearcoat must cover the basecoat by a minimum of 2.0 dry mils after sanding, buffing, and polishing.
3	<u>BLENDING</u> : PPG does document a clearcoat blending procedure. However, this procedure was designed for specific, economical repairs. Due to its nature, the clearcoat blend edge is not durable enough to withstand weathering, repeated exposure to the elements and becomes visible after a period of time. As a result, for OEM warranty and PPG guarantee purposes, blending a clearcoat edge is not recommended.
4	See the specific clearcoat product data sheet and/or PD-0730 for further information.

Paint Defect Removal

Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.

1	Assess the damaged area to look for dust nibs, runs, sags or other refinish defects.
2	Clean area with an <i>All Purpose Cleaner and Degreaser</i>
3	<p>Dust Nibs:</p> <ul style="list-style-type: none"> a. Sand nib with P1500 grit using a finishing DA sander and interface backup pad taking care that 2.0 minimum dry film thickness of clearcoat is maintained. Visual and hand check area to make sure nib is removed. b. Refine entire sanded area with P2000-P3000 damp on a DA sander with a backup pad. c. Proceed to the compounding procedure below.
4	<p>Runs/sags:</p> <ul style="list-style-type: none"> a. Use P1200 grit Wet-or-Dry sandpaper with hand block to remove the defect. b. Refine entire sanded area with P1500 using a DA sander with an interface pad. c. Refine entire sanded area with P2000-P3000 damp on a DA sander with a backup pad. d. Proceed to the compounding procedure below.
5	Cosmetic scratches in OE finishes (not freshly repaired paint finishes) can be compounded using the procedure below.
6	Compound the entire repair area with extra cut compound using a foam pad or a wool compounding pad.
7	Polish the entire repair area with a swirl mark remover and a polishing pad.