



BASF AUTOMOTIVE REFINISH COATINGS

# Fundamental Automobile Refinishing Concepts

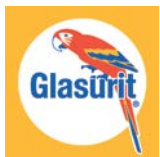
## Definitions for common automobile refinishing tasks

These topics represent the experience of the BASF Corporation Automotive Refinish Coatings group. They are intended to be used as a reference by collision repairers, vehicle owners, insurers and other interested parties to support a better understanding of the refinishing process.

It is important to always follow OEM Repair Procedures and use [OEM-Approved Refinish](#) materials, such as [Glasurit](#) & [R-M](#), when repairing a vehicle to achieve complete, safe, quality repairs. Additional information may be found on [OEM1STOP](#), [I-CAR](#), [BASF refinsh](#) and the OEMs' websites.

For detailed processing instructions, please refer to the appropriate [Glasurit](#) or [R-M](#) technical manual.





## BASF AUTOMOTIVE REFINISH COATINGS

# PREPARATION & UNDERCOATS

### Flexible / non-metal parts

In addition to matching the color, gloss and texture of the original finish, flexible parts must also be able to deform when “bumped” and resist chipping and cracking. This requires special adhesion promoters on bare substrates and flexible additives combined with the undercoats and clearcoats.

BASF recommends using distinct and separate products and processes when refinishing flexible, or non-metal, parts. Beginning at the preparation stage, the process is considerably different between metal parts and flexible parts. Flexible parts require a more thorough cleaning with products specially designed for this purpose, and sanding requirements are different for non-metal substrates. Because many flexible substrates can deform at relatively low temperatures, force dry temperatures can be different than metal parts too. It is usually better to paint flexible parts separately from metal parts.

While it is technically possible to use primers and clearcoats mixed with flexible additives on a metal part, BASF does not recommend this procedure. Doing this would unnecessarily increase the cost of paint materials used. Also, since “flexed” products typically require longer flash-times, total paint processing time will increase, resulting in reduced paint shop productivity.

These products and processes are detailed in our technical application manuals. These processes must be followed to achieve the same level of performance as the original equipment finish.

### Refinishing Previously Painted Vehicles

BASF recommends applying refinish products over Original Equipment finishes or previously refinished vehicles only when that finish is sound. Considerations to determine if a substrate is sound include the appearance, hardness, solvent sensitivity, sandability, blistering and corrosion. Each refinish job should be carefully inspected to determine the correct paint preparation process. If there are any doubts about the soundness of the existing finish, it should be removed.

To achieve the best performance, the total film build after refinish should not exceed 12 mils (300 microns). Existing finishes should be completely removed or sanded down to an acceptable thickness if the total film build thickness after refinishing would exceed 12 mils (300 microns).



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### Refinishing New OEM or Aftermarket E-coated Parts

A primer sealer or surfacer is required on properly prepared, e-coated OEM or aftermarket parts prior to basecoat to meet OEM specifications and Glasurit or R-M warranty requirements.

### Molding / Trim Removal

Removing moldings will improve the appearance of a repair and ensure it is undetectable. To obtain proper adhesion, existing paintwork must be thoroughly cleaned and sanded before applying repair paint. This can be difficult or even impossible if the moldings are not removed. Also, painting right up to a molding can leave a paint edge that is visible after the repair is completed. Moldings should be removed whenever possible to ensure the repair looks and performs the same as the original finish.

### Masking

To prevent overspray settling on undamaged parts of the vehicle, the entire vehicle should be covered during priming and painting operations. To minimize dirt in the final finish, all masking materials used in the priming operation should be removed and replaced with clean masking material prior to basecoat and clearcoat application.

### Underhood Repair Process

BASF recommends applying catalyzed solventborne basecoat without clearcoat to the underhood and other interior areas that originally were not finished in the exterior BC/CC system. This system produces the same color tone, gloss and physical performance characteristics as the OEM finish.

When using waterborne basecoats, the color is mixed with a tintable, transparent, two-component sealer to achieve the desired finish characteristics.



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### Glass Adhesion to Repaired Areas

To ensure the proper adhesion of glass to repaired areas, BASF recommends masking off the area where the glass-bonding material will be applied so that no repair paint is applied over that surface. If a repair is required in this bond area, it should be properly repaired and any bare metal should be primed with a two-component epoxy primer only. No other coatings should be applied over the epoxy primer.

### Use of Ground Coats

The use of a colored ground coat under the primary color is becoming increasingly necessary for proper automotive refinish repair due to the increased use of transparent coatings by automotive manufacturers. More transparent coatings provide the high chroma and depth wanted by color designers and the modern consumer.

There are two main areas where ground coats are a vital part of the refinish repair process. The first is with three-stage color formulations, also referred to as “tri-coats.” These are colors that are styled with an opaque ground coat, followed by a transparent mid-coat, usually mostly containing mica, then completed with a high-gloss clearcoat. The ground coat is an integral part of the color styling and has a direct effect on the color as the mid-coat is very translucent. In these cases, the use of a step panel is recommended to determine the proper amount of mid-coat, to be applied for proper color-match.

The second use of ground coats is when the color coat is very translucent, often with high levels of mica and/or transparent pigments. In the factory, these are applied over color-coded primers so that the proper film build is achieved in the plant. The color is not applied to hiding in most cases. Therefore, to achieve a proper color-match during the repair & refinish process, use of a ground coat that simulates the color-coded primer used in production is required to ensure the proper film build of the color coat. The use of the required ground coat color is required to achieve color-match of translucent colors, and cannot be achieved with additional coats of basecoat only.

The proper use of ground coat improves color-match and reduces film build to maximize performance and durability of refinish materials. Ground coat colors required for color-match are included in BASF's color information when referencing the color formula.



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# TOPCOATS

### Blending and or Tinting for Color Match

BASF recommends blending into an adjacent undamaged panel(s) whenever the panel being repaired / replaced has color applied to the entire surface, or color is applied to the part of the panel that borders an undamaged panel. This is the most cost-effective and durable method to produce an undetectable color-blend when repairing vehicles.

There is a limit to the amount of color variance that can be overcome by blending. When the variance is too great to successfully blend, adjusting the color by adding or subtracting mixing bases or “tinting” is recommended. The process of tinting a color ends when a blendable color-match is achieved. At this point, the tinted color is applied to the repaired panel(s) and blended into adjacent undamaged panels as necessary.

Tinting a color to an exact “panel match” is possible, but it is almost always more time consuming than blending. Additionally, the amount of time required can be unpredictable and in the end, most likely will not produce the same undetectable repair that can be achieved by blending.

### Single Stage Finishes

BASF offers single-stage finishes that are matched to some solid color BC/CC OEM finishes. These finishes can be used as an economical alternative for the repair of older vehicles. They will not, however, offer the same level of durability as a BC/CC finish.



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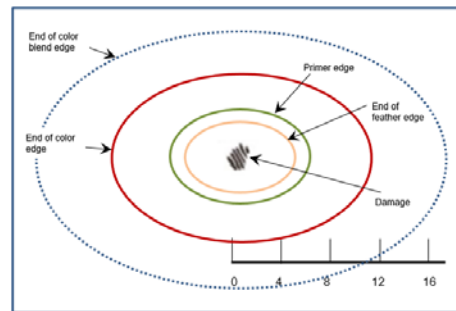
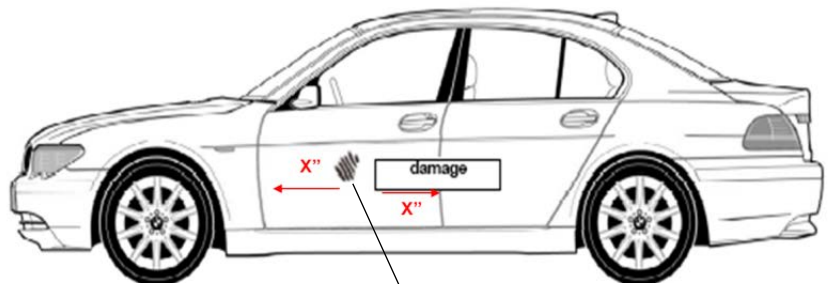
### Spot Repair

Spot repair on a basecoat/clearcoat finish is defined as applying color only to the damaged area and using bodylines and natural breaks to “blend” the repair paint into the original so that no transition can be detected. The clearcoat is then applied to the entire panel.

The goal is to achieve an undetectable color blend while minimizing the actual repair area.

#### Notes:

- In all cases, the entire panel must be clearcoated
- This should be used as a guideline only;
- Many factors can affect how large a repair may become:
  - Some colors are more difficult to apply and will require larger blend areas
  - Panel characteristics, i.e. sight plane, style lines, creases, geometry/angle, etc.
  - Panel Location: hood vs. lower quarter panel
  - Multi-layer / three-stage colors
  - Type and extent of damage could require additional sanding and filling
  - Translucent colors may require use of a ground coat, or additional basecoat application
  - High-metallic colors may require the use of a “wet bed” to achieve an undetectable color blend



typical “spot” repair components



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### Clearcoat Blending

BASF recommends applying the specified amount of clear to the entire panel when doing basecoat/clearcoat repairs. This will make the repair eligible for the Glasurit or R-M lifetime warranties.

Blending the clearcoat requires that the thickness of clear be reduced in the blend area. This can result in the clearcoat blend-edge becoming visible after a period of exposure to sunlight and weather. The blend edge can also become visible if it is polished too aggressively.

For these reasons, BASF will not warrant the blended edges of clearcoats. Although, BASF has developed processes and products for blending clearcoats, these are intended as a cost-saving measure in those instances where an economical, non-warranty repair is required.

Detailed guidelines for applying clearcoats can be found in the Glasurit or R-M technical data sheets and technical reference manuals. These documents can also be found online at [BASFrefinsh.com](http://BASFrefinsh.com).

### Hybrid and Electric Vehicle Bake Temperatures

BASF does not make any recommendations regarding bake temperatures on hybrid or electric vehicles. BASF refinish paint will cure at ambient temperature if necessary.

All restrictions and/or limitations on bake temperatures are based on OEM requirements, which may vary from manufacturer to manufacturer. The OEM Repair Procedures will include all relevant repair requirements to safely repair the specific model in question.





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# FINISHING

### Polishing and Color-Sanding

BASF recommends polishing, sanding and/or de-nibbing to remove dirt inclusions from refinished automotive panels. Sanding finishes to match the texture of existing paintwork is also recommended if the minimum amount of clearcoat thickness (2 mils) is maintained.

While refinishing automotive panels with zero dirt inclusions is possible in theory, it rarely happens in practice. Following best-practices for cleanliness in paint-processing areas and equipment maintenance can minimize this problem and should be adhered to, but in the overwhelming majority of repairs, some dirt is inevitable.

Matte finishes require special care and cannot be polished or de-nibbed in the same manner as gloss finishes.

Detailed guidelines for polishing clearcoats and topcoats can be found in the [Glasurit](#) or [R-M](#) technical data sheets and technical reference manuals. These documents can also be found online at [BASFrefinsh.com](http://BASFrefinsh.com).