

## *Guideline for Gelcoat Repair*

This guideline has been prepared to provide advanced procedure information for problems associated with the spraying and curing of Gelcoat as a repair coating. You will find that the incorporation of these methods and techniques into standard Gelcoat repair, regardless of the supplier or manufacturer of the particular Gelcoat will greatly increase repair performance, such as,

- Faster cure time.
- Eliminate tacky finish.
- Hide the “halo” effect.
- Control color change.

Ideally, it is our goal to see the addition of these methods used in Gelcoat repair, **Results Guaranteed!**, even for the *Seasoned Repair Professional*.

Consider these methods in this order of importance:

1. Use proper Catalyst Ratios, do not exceed 3%.
2. Heat is the key! Not more catalyst.
3. Spray Gelcoat pure – do not over thin! 10-15% maximum.
4. PVA is an essential sealer, so easy to use!
5. Avoid spraying Gelcoat with Preval type sprayers (okay for PVA).

Standard filling, sanding, and buffing procedures are recommended.

### **Gelcoat Manufacturing Formulation**

Gelcoat is manufactured and formulated as a “ready to spray” product creating parts from various manufacturing and fabrication processes. Gelcoat is not intended to be thinned, if thinning is necessary in such applications as repair, then “10% reduction is optimum with styrene, not to exceed 15%”. This statement is standard, regardless of the formulator of Gelcoat; i.e., *Ashland, Cook Composites or Interplastics*. Some repair professionals call Gelcoat “paint”, this is incorrect, although Gelcoat is sprayed onto a surface like paint, the curing characteristics are of an exothermic resin and should be treated as such. This resin chemistry *relies on heat* that is generated when the proper amount of catalyst is incorporated into the application mixture normally @ 75°F. This causes the resin (Gelcoat) to plasticize or cure thoroughly. **PROBLEMS CAN OCCUR WHEN:**

- Not enough or too much heat is generated (see spraying & curing).
- When the Gelcoat is under or over catalyzed (see catalyzing).
- When the Gelcoat is over thinned (see thinning).
- When sealers cause distortions on the spray patch (see spraying & curing).
- When too much toner is added (see color adjustments).

## Catalyzing:

Use WITCO HI POINT 90 MEKP OR EQUIVALANT

1.5% of MEKP at 75°F

Approximately eight drops of MEKP to each 1/2oz. of Gelcoat = 1.5% @ 75°F.

Pot life at 75°F is approximately ten minutes.

(2% of MEKP for colder temperatures.)

Approximately ten drops of MEKP to each 1/2oz. of Gelcoat = 2%

3% is the Maximum ratio.

Check the temperature of the Gelcoat stock and insure that it is not below 70°F. Add the MEKP to the Gelcoat before thinning. Use the recommended catalyst percentage, over catalyzation of the Gelcoat will cause the patch to *not cure* or *cure off color*. Do not use a retail type of catalyst (MEKP packaged in a tube from auto part stores) because it will not be as reactive as HI POINT 90 or equivalent.

**BEWARE: MEKP shelf life is limited.**

Accurate Dispensers for MEKP:

- ½ oz. Dropper bottle that will yield the exact ratios referenced on this chart when mixing small amounts. Multi-Tech Part # PBBR-.5 (½ oz dropper)
- Graduated Mixing cup will give exact measurements for larger volumes in CC and ounce increments. Excellent “one ounce reference” for small Gelcoat mixtures. Multi-Tech Part # MC100 (Mixing cup)

Notice the needle size of the orifice on the dropper tip of our dropper bottle verses the flip top and other large orifice size lids that yield too much Catalyst.

## CATALYST (MEKP) RATIOS FOR GELCOAT & RESINS:

<u>Quantity</u>	<u>Recommended Optimum Ratio's by CC's @ 1.5% 75°F</u>	<u>Maximum Ratio's "May Effect Color" by CC's @ 3%</u>
Gallon	64.5cc	129cc
Quart	15cc	30cc
Pint	7.5cc	15cc
8 oz.	3.5cc	7cc
4 oz.	1.9cc	3.8cc
		<u>By CC's</u>
		<u>2%</u>
1 oz.	16 drops	24 drops
1/2 oz.	8 drops	12 drops

## Thinning:

*Thin 10-15% with acetone or styrene (styrene is optimum)*

**NOTE:** Avoid using any portable self contained spray units (such as Preval and Spray Packs) these units require the Gelcoat to be thinned beyond the recommended limits of 10-15%. Thinning 16-50% is considered extreme because the additional thinners will have an adverse effect on the cure and color match of the Gelcoat. (When this much thinner is added to the Gelcoat, it inhibits the chemical reaction that generates “heat” necessary for a thorough cure.)

## Color Adjustments

When toning or adjusting colors with Gelcoat pigments, be sure “not” to add more than 5% pigment to the Gelcoat. This will slow down the cure time. It is acceptable to mix and match between other Gelcoat colors.

## Spraying Equipment:

*A single action airbrush is recommended for best results.*

- Binks Wren with “C” tip 5-10023
- Paasche H with “3” or “5” tip
- Badger 250 or 350

*Touch-up Spray guns with a large tip.*

*Preval and Spray Packs are not recommended.*

These airbrushes are classified as single action external feed (the jar connects at the front of the airbrush where fluid flows through a short needle and the spray is adjusted by a cone tip.) This type of airbrush is excellent for spraying Gelcoat. The other type of airbrush is called a dual action internal feed airbrush (the airbrush has a needle that runs the length of the body, fluid runs through the body and the spray is controlled by the trigger). **BEWARE:** This type of airbrush will not spray heavy bodied coatings (Gelcoat and Acrylics) with ease unless they are thinned beyond their limits. There are very few exceptions, with the *Badger 175 Cresenda* being one. For larger repairs it is recommended to use a touch up spray gun.

## Air Pressure:

Airbrush: 45-55 lbs of pressure

Touch up spray gun: 35-45 lbs of pressure

Sufficient air pressure is the key to spraying Gelcoat smoothly. It is better to adjust the air pressure higher than to over thin the Gelcoat. **REMEMBER:** Avoid using portable self-contained spray units or low pressure with your sprayer. Again, the additional thinners will have an *adverse effect on the cure and color match* of the Gelcoat. Preval and Spray Pack units will only spray 3-7 lbs of air pressure. Low pressure is okay for the PVA application.

## Air Source:

*Aluminum CO<sub>2</sub> tank with a quality regulator.*

- 5 pound or 10 pound CO<sub>2</sub> tank - Welding Supply
- Victor SR310 regulator- Welding Supply

This type of air source is an excellent choice because it is portable, lightweight, and has no limits on air pressure. One 10 pound tank will do 2-3 weeks of repairs.

*Hot dog type compressor:*

- Makita, DeVilbiss, or Campbell Hausfeld

This type of compressor will have at least a 1-2 gallon *reserve tank* and a ¾ Hp to 1Hp motor/ pump, which will normally deliver 3-4 CFM. A compressor alone *without* a reserve air tank *will not* deliver optimum air pressure for spraying Gelcoat and some acrylics. A minimum of 1-CFM is sufficient.

**BEWARE:** Some motor/ pump type (compressor without a tank) claim they will deliver up to 100 or 120 lbs of air pressure, while this is true for pumping up tires, realistically it can only give about 25-30 lbs of air pressure to an airbrush or spray gun. Without a tank this pump type of air source lacks sufficient CFM rating. They also can condensate and spit water on to the sprayed area, contaminating the sprayed Gelcoat. *Preval and Spray Pack units are not recommended.*

## Heat Additives:

**Heat Gun** - 200-300°F recommended (a paint stripper type is sufficient.) A hair dryer will not deliver enough heat and is not recommended.

**PVA** (Poly Vinyl Alcohol) Patch Sealer - Eliminates the tackiness from the spray patch by creating a seal from the oxygen. (Essential for all types of Gelcoat repairs and so easy to use.) Washes off with water.

**Surfacing Solution** (Wax) **IS NOT RECOMMENDED.** This styrene wax liquid is added to the Gelcoat and rises to the top surface to create a seal. We have found it leaves divots and pinholes in a nice spray job. Residual wax will be present in the Gelcoat affecting the adhesion to reapply more Gelcoat (not always the rule, especially with appropriate sanding methods).

**Patch Aid or Duratech** – also known as *Thinning Resin or Patch Boosters*. These resin mixtures make the Gelcoat chemistry more reactive by adding up to 15% to the Gelcoat in place of thinning. The idea is to get the Gelcoat to react faster for a thorough cure to the surface. These products do work and are recommended for repair with the addition of the PVA application. **BEWARE:** These additives can yellow the color.

## Spraying and Curing:

1. **START BY:** Applying heat to the filled and sanded area that is to be sprayed. Holding the heat gun 3” to 6” from the surface keeping the heat gun moving in a circular motion around the repair. Apply enough heat to warm the surface; the surface should not be too hot to touch. **WARNING:** Excessive

heating can distort the surface and possibly the structure. The key is to generate enough heat from the unit being repaired to help kick off the spray patch. This speeds up the heat reaction, especially in colder temperatures.

2. Immediately spray the Gelcoat mixture to the heated patch. Start the spray at the center of the sanded area and work outward in a circular motion covering all the fill area. Approximately 10 mil wet film thickness will be sufficient. Try to create a nice, smooth, glossy spray area.
3. Immediately apply moderate heat around the sprayed area. **CAUTION:** Excessive heating may cause blistering and poor color matching of the patch. Keep applying heat until the sprayed Gelcoat turns dull. This means the Gelcoat has started to cure and is in its gel stage. It is now ready for the PVA. **Do not spray PVA any sooner!** The PVA will distort the wet spray area. The Gelcoat cannot be distorted with PVA once it reaches its gel stage.
4. Immediately apply the PVA (with an airbrush or Preval sprayer) spray a fine coat of PVA and then apply heat. *Make note: Too much PVA can cool down the Gelcoat heat reaction.* The PVA will also dull out. Repeat with two or three coats of PVA. Continue with moderate heat for a few minutes, the Gelcoat will continue through its cure stage and become hard, in colder temperatures it may be necessary to continue with heat a little longer. Allow the patch to cool down. Your sprayed area should now be cured thoroughly!
5. PVA is water-soluble and will either wash off with water or come off when wet sanding the patch. If the PVA distorts a nice spray job and will not sand out with 400-600 grit sandpaper, then the PVA was applied too soon (See #3).

## Summary:

1. Use proper Catalyst Ratios, do not exceed 3%.
2. Heat is the key! Not more catalyst.
3. Spray Gelcoat pure – do not over thin! Remember 10-15% maximum.
4. PVA is an essential sealer, so easy to use!
5. Avoid spraying Gelcoat with Preval type sprayers (okay for PVA).

## Microban Gelcoat:

Microban is an antibacterial substance that is added to the formulation of standard Gelcoat to create “Gelcoat with Microban.” The addition of the Microban additive does not make antibacterial Gelcoat an inferior repair Gelcoat. It does mean, however, that all *repair procedures* with the Microban Gelcoat need to be *precise* in mixture and application consistent with these guidelines for the product to perform properly, hold its color and cure thoroughly.

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