

CHOOSING THE RIGHT RESIN FOR THE JOB

Polyester and Epoxy resins have certain things in common, but each also has its own characteristics:

POLYESTER IS IDEAL:

- As a repair for all kinds of surfaces, such as plaster, fiberglass, aluminum and wood (except redwood and close-grained woods like oak or cedar. Do not use with Styrofoam.)
- For structural repairs using fiberglass cloth or mat where high impact resistance is critical
- As a protective, waterproof coating and sealer.
- The hardener for polyester resin can be increased or decreased according to instructions, depending on temperature. Cooler temperatures require more catalyst, warmer temperatures less.
- Polyester is economical and easy to use.
- High shrinkage factor

NOTE: Polyester resins cannot be used to repair thermoplastics; that is, the kind from which Tupperware or molded toys like "Big Wheels" are made. Thermoplastics include polyethylene, polypropylene, acrylic, PVC, and ABS.

EPOXY RESIN IS IDEAL:

- When superior adhesion and strength is necessary. Excellent adhesion to metals, woods, glass, rubber, and fiberglass.
- Provides excellent bond between non-porous surfaces, like metals including aluminum.
- As a tough coating or repair material for most surfaces including Styrofoam, redwood, cedar and oak.
- Where a smooth glossy surface is important. Epoxy is however, more expensive than polyester resin and requires more care when mixing and applying.
- Very low shrinkage. 100% reactive. Low VOC
- Epoxy should be used at room temperature (70-90f); otherwise rate of cure may be affected. The user should not attempt to adjust the ratio of hardener to resin.
- The hardener should be used as directed with the epoxy resin. The two parts should be measured into a mixing container, not simply dumped together, even when the entire quantity of each can will be used.

REPAIRING HOLES AND MOLDED FIBERGLASS

HOW TO REPAIR HOLES:

- Remove all loose material from damaged area and bevel edges with a file or sandpaper to create a rough surface for repair material to stick to.
- Sand or grind through protective coating, exposing bare metal, wood or fiberglass about 2" around hole.
- Cut fiberglass cloth about 3" in diameter larger than the area to be repaired.
- Protect your hands with gloves. If you prefer, wear solvent gloves.
- Mix resin and hardener according to the instructions on the can for amount of resin needed only for that repair. Follow directions precisely for mixing resin with hardener.
- On a piece of cellophane or acetate, saturate the cloth with the resin mixture. Work in to the cloth with spreader, squeegee or paintbrush removing air bubbles.
- Apply the repair material to the hole so that the cellophane is on the outside and the fiberglass covers the hole. Remove the cellophane and let the fiberglass cure.
- After filler has cured, sand it to the contour of the hole. It is now ready for priming and painting.
- Clean all tools and brushes with acetone to prevent resin from hardening on them.

REPAIRING MOLDED/ FIBERGLASS BOATS:

- Sand away dirt, grease and small particles from damaged area.
- For cracks or gouges, use Polyester Putty to fill small areas. Refer to package instructions.
- Repairing holes in molded boats requires grinding away the damaged area and feather edging about 2" out from the hole. Wipe with Acetone
- Protect hands with gloves. Apply a piece of acetate taped to a piece of cardboard to the outside of the boat. Secure with tape to the boat.
- Cut a piece of Clear Glass Cloth/Mat slightly larger than the hole
- Mix resin and hardener according to package directions. Mix only enough resin for that repair job. Work resin mixture into cloth or mat. Apply to the inside of the boat against the acetate.
- After the repair material has hardened, cured, remove the cardboard. The acetate prevents the fiberglass material from sticking to the cardboard.
- Fill any surface imperfections with Polyester Putty. After it has cured, sand and paint.

WORKING WITH CLEAR COTE POLYESTER

PREPARING THE SURFACE is most important to insure a good bond. Completely remove all paint, varnish or other surface coating down to the bare material. Scrape, sand or use a "water-rinse" paint remover. Other removers contain wax and oils, which are absorbed by wood and prevent a good bond. Don't use a blowtorch as this drives paint and oil into the wood. Remove oils with a non-oily solvent, caustic solution, or detergent. Don't use gasoline. Fill small cracks and holes with Polyester Putty.

MIXING THE MATERIAL Add Hardener to Laminating or Marine Resin (Fiberglass Resin) just before using and stir for one minute. Never mix more than one quart at a time as it starts setting up in about 30 minutes and should not be used after it starts to gel.

If the temperature is below 70 degrees increase amount of Hardener to speed up drying. If temperature is above 80 cut back on hardener to retard drying. (Because results are unstable in extremely high or low temperatures, the ideal room temperature is 70-80F.)

APPLICATION should only be made on a perfectly dry surface. When applying Polyester Marine Resin over wood, if the first coat soaks in, apply a second coat and wait until it gets sticky before laying Clear-Glass Cloth.

Once the surface is sticky, begin applying the Clear-Glass Cloth. First cut the cloth to fit the surface to be patched. Then roll the cloth on a cardboard tube, dowel, broom handle etc. Starting from on end of the surface to be patched, unroll the cloth, making sure to work out all air bubbles and wrinkles as you go.

TO FINISH: Sand fiber-glassed surface to remove all imperfections and excess cloth before applying Marine Resin. For best results, flow on Marine Resin with a minimum of brushing.

CLEAN UP tools and brushes with Acetone as soon as you are through to prevent resin from hardening on them.

WHEN AND WHERE TO USE CLEAR COTE POLYESTER. Use on: Fiberglass and all woods (except redwood).

<u>PRODUCT</u>	<u>USE FOR</u>
Clear Cote Polyester Filler ...	Cracks, dents, and small holes, gouges. (Can be tinted).
Fiberglass Mat	Build up holes before applying glass cloth bulk reinforcement.
Cloth	As reinforcement before filling dents, holes.
Hand Lay-Up Resin	Base coat(s) under fiberglass.
Marine Resin	Over Fiberglass for reinforcement.
Body Filler	Repairing dents, gouges, scratches

ESTIMATING AMOUNTS OF RESIN AND FIBERGLASS:

Don't waste resin. If a squeegee can remove excess amounts after application, you have used too much.

1 pt. Resin	1 sq. yd. Cloth-Mat
1 qt. Resin	2 sq. yd. Of Mat-Cloth (non-woven fabric)

This guide is for first resin coat only. Additional coats will use half as much resin per square yard of cloth or mat. Additional coat is necessary to hide the fabric pattern. Once you have determined the minimum amount of resin you need, just to be safe, increase it by 10%.

WORKING WITH CLEAR COTE EPOXY

SURFACE PREPARATION is most important to insure a good Bond. Remove all paint, varnish or other surface coating down to the bare material. Scrape, sand or use a "water rinse" paint remover. Other removers contain waxes and oils which are absorbed by wood and prevent a good bond. Don't use a blowtorch as it drives paint and oil into the wood. Remove oils with a non-oily solvent, caustic solution, or detergent. Don't use gasoline. Fill small cracks and holes with Polyester Putty.

MIXING THE MATERIAL Just before using add 1 part Resin to 1 Part Hardener and stir to mix thoroughly. Never mix more than a quart at a time as it starts setting up in about 20 minutes and should not be used after it starts to gel. Use a folding motion to mix to prevent air bubbles from being incorporated.

Use Clear Cote Epoxy Resin at room temperature.

APPLICATION should only be made on a perfectly dry surface. When using Clear Cote Epoxy Resin on wood, first apply a thin coat of resin over the surface. Then, while resin is still in liquid stage, begin applying Clear-Glass Cloth. First cut the cloth to fit the surface to be patched. Then roll the cloth on a cardboard tube, dowel, broom handle etc. Starting from one end of the surface to be patched, unroll the cloth, making sure to work out all air bubbles and wrinkles as you go. Apply only enough resin to completely saturate the Clear-Glass Cloth.

Sand fibreglassed surface to remove all imperfections and excess cloth before applying Clear Cote Epoxy Resin. For best results, flow on Clear Cote Epoxy Resin with a minimum of brushing.

A second coat may be applied for extra protection.

CLEAN UP all tools and brushes with Acetone as soon as you are through to prevent resin from hardening on them.

WHEN AND WHERE TO USE CLEAR COTE EPOXY

Use on: All woods including redwood, hardwoods, Styrofoam, Brick, glass, concrete, some plastics, and metal

PRODUCT	USE FOR
Clear Glass Mat	Build up reinforcement for repair of holes/Use with Resin for Molding
Clear Glass Cloth	Apply with Resin for reinforcement and finishing
Epoxy Resin CC 1:1	As adhesive, cloth laminate, and as a protective coating over other surfaces
Epoxy Resin System	Boat building – wood or fiberglass. Repairs on plastic, wood, metal.
100% Solid	This is a 4 to 1 mix epoxy of superior strength. Blister Repair
Epoxy Putty Glue	Repairs needing exceptional strength; won't shrink while curing. Never brittle

IMPORTANT DO'S AND DON'TS

DO'S

- Do work in a well-ventilated area. Try outdoors in the shade or in an area with airflow.
- Do protect your hands and eyes from contact with abrasive chemicals. If you get the resin mixture on your skin, refer to package instructions for removing it.
- Do read the instructions **ENTIRELY** before beginning the job. Have all supplies at hand. And observe all safety regulations and disposal requirements.

DON'TS

- Don't work in direct sunlight. The ultra-violet rays compound the hardener's action and will cut down on working time before resin hardens.
- Don't apply fiberglass or epoxy over wet or dirty surfaces; it won't adhere.
- Don't apply fiberglass or epoxy over painted or finished surfaces; it won't adhere.
- Don't stretch Clear-Glass Cloth over large areas without sufficient backing support. The fiberglass will sag.
- Don't apply Marine Resin over Styrofoam, redwood, or cedar. Instead use Clear Cote's Epoxy Resin.

EPOXY COVERAGE

Mix only the amount of Clear Cote Epoxy that you need at one time. Unused resin and hardener should be left in original containers. After pouring you have about 20 minutes working time before Clear Cote Epoxy begins to harden. Coverage for approximately 1/16 in. thickness (pour coat):

1 Oz. Clear Cote will cover 35 square inches
½ pint kit will cover approximately 1.5-2 square feet
Pint kit will cover approximately 3-4 square feet
Quart kit will cover approximately 6-8 square feet
Gallon kit will cover approximately 30-35 square feet

TROUBLE SHOOTING

Temperature - Epoxies and polyesters are thermoset resins. This means that they require development of heat through an internal chemical reaction in order to cure. This heat development is known as an “exothermic” reaction. Each system requires a certain temperature (peak exotherm) at a certain time at that temperature (dwell time) in order to reach a proper state of cure.

When thermoset materials like epoxies and polyesters are cast in thin layers or when the ambient temperature is low (below 70 degrees F) the ability of the internal reaction to develop and/or maintain exotherm is inhibited. This results in substantially slower cure rates than normal, sometimes extending the cure of a resin system to day's even weeks.

Mix ratio – Most plural component materials are best used when mixed properly. Although many manufactures will give a mix ratio by volume best results will come by weighing out the components on a scale in separate containers then mix the two components together.

Mixing-Mixing epoxies is very different than other materials. Because most applications with epoxy tend to be either clear or need to be bubble free, mixing should be done slowly while scrapping the sides and bottom of the mixing container. Before pouring you should let the mix sit for about 10 minutes so the bubbles work their way to the surface.

Accelerating cure -Polyesters can be accelerated with the addition of MEKP catalyst. Caution: do not use more than 1.5% catalyst. Also be aware adding additional MEKP can have a detrimental effect on molds and your finished product It can cause higher shrinkage, charring, burning, and brittleness in you finished product to name a few.

Epoxy can be accelerated with the addition of heat. You can put the part and mold in an oven and cure at 150 degree F, place under heat lamps, or place in a nylon bag with a hair dryer. Caution: before heating let the bubbles come to the surface and pop

Popping bubbles – bubbles are generated in the mixing process. The more aggressive the mix the more bubbles you can expect to see in your mixed product. In order to minimize bubbles in cast parts let the mixed product sit for 5-15 minutes before pouring. After you pour the resin more bubbles will come to the surface. As they rise wait about 5 minutes and spray lightly with Eat-A-Bubble or mist with a heat source like a hair dryer. Caution: do not leave a heat source in one spot as this can prematurely cause an immediate cure and not allow the bubbles to dissipate.

SAFETY AND HANDLING

As with all chemical products safety precautions are warranted. Always work in well-ventilated areas. Wear gloves, goggles, and respirators are recommended. Many chemical products can be ingested through the skin and or cause allergic reactions. Sometime these reactions will occur upon immediate exposure and sometimes they will take time to build up. Regardless of your use of these materials, always practice good safety habits. If a problem should occur please refer to the Material Safety Data Sheet for the product you are concerned about. Although we make every effort to supply the MSDS sheets are required by law, we are always happy to send you a new one for your files upon request.