Frequently Asked Questions

1. What is the Mix Ratio? The mix ratio of our Low Viscosity or FLAG Resin and MAS Hardener is 2:1 Resin to Hardener. That ratio stays constant even when the hardeners are custom blended. The Mix ratio for Rapid Cure 5 Minute epoxy is 1:1.

2. Can I speed up the cure by adding more hardener? NO!!! Changing the mix ratio will cause your final product to be too flexible or not cure at all and then you'll have to scrape off the uncured epoxy.

3. How much mixing is required? Mixing is the key to a thorough cure, good films, and strong bonds. For Low Viscosity or FLAG Resin and MAS Hardeners 1½ to 2 minutes of aggressive mixing, swiping the sides and bottom is recommended. Use clean plastic or uncoated paper cups or buckets and a clean mix stick. Rapid cure should be mixed well for about 45 seconds.

4. What is BLUSH, and how do I remove it? Blush is noticeable as a slippery film formed over the cured surface. It can be removed with warm water and a sponge (rinse and wipe) or Scotch Brite pad. **All MAS Hardeners are now non-blushing, so you do not have to wash in between coats.**

5. What is the recoat time? Since epoxies from MAS are 100% solid (no solvent), recoat time can be as short as surface tack. If more than 12 hours pass between coats, do a light scuff sand. (Use a cotton ball to test if a light scuff sand is needed. If the epoxy holds the hair of the cotton ball, you can recoat without sanding. If it doesn't, a light scuff sand will help adhesion between coats. Always check for blush on surfaces and remove if present before recoat. Remember the "Rule of Thumb" test and that warmer is faster.

6. Temperature requirements? For clear coating, we like to see temperatures remain over 65 to 70° F. For bonding, anything over 45°

7. How to clean up? Latex gloves and other personal protection should always be used. If you should get any epoxy on your skin, it should be cleaned off with a waterless soap immediately, then thoroughly washed with soap and water. Tools can be washed with white vinegar or Denatured alcohol. Semi-gelled epoxy (on tools ONLY) can be cleaned with acetone or lacquer thinner.

8. What tools are used to apply the epoxy? For coating and fiberglass, a short nap 1/8" nylon bristle roller, plastic squeegee, or disposable brushes. For bonding, a glue brush or a squeegee with notches cut into the edge.

9. How to protect the epoxy? Epoxy surfaces should be protected from sun exposure. Clear coats may be protected by a good quality varnish or urethane with UVA protective additives. Paint is always considered a 100% filter. Indoor pieces do not need varnish over the epoxy.

10. Can a stain be used on the project? To use a stain on an epoxy project, use a waterborne urethane stain under the epoxy clear coat, although oil based stains have been used successfully. Be sure stain is fully dry before coating work with epoxy. Always test first using the "Cross-hatch" test. Take a spare piece of stained wood and coat it with epoxy (make about an 8" box). Once it has cured for a few days, take a utility knife and cut a "tic-tac-toe" board in the epoxy. Take some Duct tape or strong packing tape and place pieces onto the squares making sure they are firmly attached. Pull the pieces of tape off. If the epoxy comes with it, it won't adhere to the stain. If the wood comes off, or just the tape, it has a good adhesion and you can use our epoxy over the stain. (For clear coating only)

11. What fillers can be used with the epoxy?

All dry fillers, regardless of the manufacturer. For more information see page 11 for fillers.

12. What protection is needed when using epoxy? Disposable gloves should always be used and eye protection is important if any splashing were to occur. If the ventilation is poor a respiratory mask (like 3M Easy-Air) should be used. Clean any uncured epoxy off of the skin with a waterless hand cleaner immediately. The epoxy may cause irritation of the skin, especially fair skin.

Avoid all direct skin contact with resin, hardeners and mixed epoxy by wearing disposable gloves and other protective clothing. NEVER use solvents to remove epoxy from the skin. Always wash thoroughly with soap and water immediately after contact.

Protect your eyes by wearing protective eyewear. If contact should occur, flush eyes immediately with running water for 15 minutes. If discomfort continues, seek medical attention.

Avoid breathing vapors. Use epoxy only in areas with good ventilation. In small areas, be especially careful to have a supply of fresh air and to exhaust any fumes. When ventilation is not possible, wear a respirator with an organic vapor cartridge **especially when sanding uncured epoxy.**

Avoid ingestion. Wash thoroughly after each use and especially before eating and smoking.

Clean up spills with a squeegee and paper towels. Scrape up as much material as possible with the squeegee before using the paper towels. Sand, clay or other absorbent materials may be used to contain or soak up large spills. Clean residue with white vinegar, Isopropyl Alcohol or denatured alcohol.

Dispose of resin, hardener and empty containers safely. Do not dispose of resin of hardener in a liquid state. Before disposing of resin and hardener containers, puncture the corners of can and drain residue into clean containers for re-use. Small quantities of resin and hardener can be mixed and cured completely to a non-hazardous solid. Place pots of curing resin and hardeners outside on the ground to avoid the danger of excessive heat and vapors. Dispose of after the reaction is complete and mass has cooled. Then follow your local, state and federal regulations for proper disposal.

13. What is the shelf life of these products? The resin has an infinite shelf life and the hardeners have a shelf life of a *minimum* of 1 year in a closed container.

14. What surface preparation is needed prior to application of epoxy? All surfaces should be cleaned of any contaminates, such as oil, grease and any moisture. Light sanding is recommended. A clean cloth moistened with Denatured alcohol or plain water may be used to clean surfaces.

DO NOT USE ACETONE, A TACK CLOTH, OR RECYCLED SOLVENTS.

15. What are the major pitfalls that most users fall into? Bad mixing practices are the cause of 99% of all problems. The mix ratio Resin to Hardener is 2:1. The pumps are pre-calibrated for ease of dispensing. One full stroke of the resin pump and one full stroke of the hardener pump will give you the proper amount. Once dispensed, mix, mix, mix and mix some more.

Temperature: Maintain close to 70°F or better if possible while curing. Epoxy loves heat. Keep your resin and hardener warm (70°F) - even if you don't heat your shop.

Don't over clamp. You don't want to squeeze out the glue. Use the right filler for the right job. Don't use Micro Balloons to glue wood or fiber glass. See our application guide on page 3, or filler page 11 for proper filler use.

Patience - Be patient. Epoxy takes time to cure. Let it do its job. Follow the cure schedule on page 4.

16. How much coverage will one gallon give? We refer to one gallon of resin and a half gallon of hardener as a "catalyzed gallon." Depending on your application technique, generally on bare wood, you can cover 500 sq. feet 3 mil thick. See chart page 4.

17. How does temperature variation effect epoxy? For every 18 degrees F., the temperature falls below 77°F, the pot life will double for the mix. The thin film set will come close to a 1.3 increase in time. The exact opposite will occur as temperatures increase above 77°F. See curing schedule on page 4. Applications which are allowed to cool below the freezing point must be warmed to achieve a full through cure. In the case of freezing, the solid or film must be checked for hardness to insure full strength has been achieved.

18. Checking for Hardness - Using the Rule of "Thumb" To quickly check for full hardness, press thumb nail into solid or coating firmly (no indentation should occur). This test is also very helpful when determining if a piece is ready for sanding or machining.

19. Customizing Cure Times - the blending of Slow and Fast Hardeners The time it takes for an epoxy mixture to change from liquid to solid is the cure time.

There are three phases - 1. open (working) time or wet lay-up time(liquid); 2. Initial cure or gel; 3. Final cure is when the epoxy is now solid. The speed and the length of these phases and total cure time varies relative to temperature and which hardener was used - slow, medium, or fast or combination of - and if additives have been incorporated into the mixture.

Cure times can be sped up or slowed depending on your need and application by the combining of the different speed hardeners. Cure times for the Fast hardener, combined with either Low Viscosity or Flag Resin can be lengthened by the addition of 35-40% of the Slow hardener. The Slow hardener can be sped up by the addition of Fast or Medium hardener.

REMEMBER - - THE MIX RATIO BETWEEN THE RESIN AND HARDENER STILL CONTINUES TO BE 2:1 RESIN : HARDENER.

NOTE - - The cure times are not directly proportional to the amount of hardener used to customize the blend. For example, if 25% Fast is added to Slow, the cure time is sped by 12-15 %. Conversely, if 50% of Slow is added to Fast, the cure time is slowed down by 25%.

The above ratios should get you in the curing ball park of a perfect shop/labs which warms and cools by increments of 18° F (see above). However, using both temperature variation and blending ratios which favor the "hot" side to manipulate a pot life, will probably get you close to your desired cure speed. Even if the pot life and thin film set of your first hybrid mix does not fall right on the money, the mix will cure as long as the resin to catalyst ratio is 2:1 and temperatures are not severely cold. We have been working with Hybrid blends of Slow and Fast and the following ratios are the most popular for the listed common conditions:

Coating and Encapsulate: If temperatures are slightly cool (50-60°), we recommend our Medium Hardener This can provide a blush free coating (but do check), and is normally sandable in the morning (remember, always mix resin and catalyst in a 2:1 ratio, mix thoroughly and try to keep resin and hardener warm.

Filleting and Bonding: Normally since users are looking for maximum strength and minimum clamp time, we recommend 100% Fast. However, if the weather gets hot (over 70°), this mix can be controlled by adding approximately 25% Slow, or switching to Medium hardener. (Remember always mix resin and catalyst in a 2:1 ratio, mix thoroughly). For large fillets Medium hardener is recommended to prevent slumping and give you a longer work time.

20. Controlling Cure Time through mixed Quantity, Container Shape and Temperature

A. Mixed Quantity - A larger quality of mixed epoxy will create more heat and have a shorter open (working) time and overall cure time. Smaller batches of epoxy create less heat than larger batches and also have longer working and cure times. In other words, a thicker layer of epoxy will cure sooner than a thin layer.

B. Container Shape - The mixture's heat can be distributed by pouring the mixture into a larger, flatter container (like a roller pan, for example.) This also extends the open time.

C. Temperature - Heat can be applied or removed from the epoxy to shorten or extend open and cure times. After the epoxy is applied, a fan can be used to draw heat from the lay-up or application and extend the epoxy's open time. Moderate heat (an industrial hot air gun, hair dryer or heat lamp) applied to the lay-up or to the resin and hardener before mixing, will shorten the epoxy's pot life and cure time.

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21. Post Cure: Our system may be post cured. See the Cure schedule on page 4. Temperatures between 90 and 140 will create post curing conditions. For temperatures above 140, call us for proper times and temperatures.

22. Coloring Epoxy: MAS Epoxy can be colored by using an epoxy pigment, usually available in your local Marine Chandlery. MAS Epoxy can also be colored using Acrylic Artist Paints you buy at an Art Supply Store. These come in a tube and are a high viscosity (similar to tooth paste). Mix the resin and hardener thoroughly first, then add the colorant. Just like when using stains, we recommend you test, first, on a non-critical part or spare piece to check for adhesion and color opaqueness.

23. Bonding/ Coating Aluminum - You need to pre clean and treat the Aluminum to be bonded with acid etching cleaner.. Once that is done you need to convert it using a neutralizer. These products can be purchased through a Marine or Auto body Supply store.

24. Gel coat over epoxy - If you are making a repair on a gel coat of a boat, you need to sand down the gel coat and feather out the edges of the area to be repaired so that you will get a permanent secondary bond. An 8:1 feathering ratio will work fine. Make the repair out of epoxy (see #23 above) and then let it fully cure. Coat the cured epoxy with a thin coat of (BPO) cream hardener style polyester fairing compound. Make it fair (smooth) Then use the Gelcoat to cover. The Fairing compound acts as a tie coat for the adhesion of the gelcoat to the epoxy repair.

25. Thinning Epoxy - When saturating or precoating wood, you may add up to 10% denatured alcohol, Lacquer Thinner or Xylene to thin the mixed resin and hardener.

WE DO NOT RECOMMEND THINNING THE SYSTEM WHEN BEING USED IN STRUCTURAL APPLICATIONS

26. How do you glue or coat Teak?
Coating for high build:

Sand teak to required finish (solvent wipe with lacquer thinner)

Using a mix of MAS Medium speed hardener and Flag Resin coat the teak and keep after the drips for about 30 min the formula is self leveling so don't worry about the brush marks (we sometimes thin this mix with 2-5% lacquer thinner)

Once this coating tacks up (try using a cotton ball on a piece of scrap and when the coating can pull fuzz from the cotton ball it has tacked) put on the next coating. Again, thin with just a touch of lacquer thinner.

Repeat wet on tack (or what we call set) one more time.

Allow this to cure in a warm place for 24-36 hours, sand flat and put on your clear topcoat.

Gluing Teak:

Sand facing surfaces to a 36-40 grit finish

Wipe with Lacquer thinner

With a mix off Flag Resin and Medium Hardener pre coat the faying surfaces

With the remaining mix add a combination of colloidal silica and wood flour to the mix to make a bonding putty

Place bonding putty on wet faying surface and clamp for 12 hours

Allow to cure undisturbed and the part can be handled in the 12 hours. Full strength will be achieved in 48-60 hours. The piece can be sanded etc after clamps are removed (just handle the piece with some respect).