

Barrier Coating and Blister Repair

WHAT IS A BLISTER?

To understand the repairing of blisters, we should first understand the cause.

Polyester Resin is used in the production of most boats now afloat and it's not waterproof. Polyester Resin has a very high osmotic absorption rate (how much water the solid absorbs). Usually, water penetrates the gel coat below the water line; however we've seen instances where blisters appear above the water line as well.

Blisters are caused when the water passes through the outer skin of the laminate, i.e. gel-coat. When migrating water finds an osmotic home and begins to collect, pop, you have a blister. A blister is an area within the glass that expands to hold more water and causes the laminate to swell. Blisters may show as a bulge on the surface. This can look like a pea or a grapefruit under the skin. When this happens, the laminate begins to soften and the boat can gain substantial weight by absorbing water. Blistering can be prevented by barrier coating a hull with carefully chosen osmotic barriers, like epoxies.

CHOOSING THE RIGHT PRODUCT

Barrier coating will prevent blistering when you use the right product. Check with the manufacturer of the barrier coat product you intend to use. The two questions you want answered before using any product are

1. What is the osmotic absorption rate of the product? (How much water it will allow in)

2. What is the bond (secondary) strength? (Will it stick to the surface you're coating?)

Don't be surprised, when you call, if barrier coat manufacturers may not have this information available. Also be cautious of claims which state Vinylester products out-perform epoxies. Since Vinylester is an esterified epoxy hybrid it's unlikely it will out-perform a 100% solid epoxy.

MAS Epoxy is comprised of 100% solids and its water absorption is less than .5% - the lowest osmotic absorption we're aware of, and its secondary bond strength is 1850 p.s.i. - the highest available.

REMOVING BLISTERS

To begin, you'll need to remove all paint on the surface and have a clear view of where the blisters are. Once you've located the bubbles

or blister on the surface, on the larger blisters, you'll need to drill a hole in the lower portion of the blister to allow the trapped water, etc. to escape. After this is completed, you'll need to grind away the complete blister - like an upside down volcano into the laminate. You'll know when all the damage material is ground away when you hit hard, clean material again.

We should mention the water behind the outer skin will smell and the material will be spongy in texture and discolored.

FILLING THE VOID

Feather out the edges of the divot you've created. A feathering ratio of at least 8:1 will allow permanent secondary bonding of the repaired area. When you've completed the removal of all blisters, allow the boat to dry by storing indoors or tenting the hull from the weather. You may also consider applying heat to help dry out the composite before you begin to repair. Get hold of a moisture meter and check the moisture content of the hull. If you can't get hold of a moisture meter, please call us for recommended dry schedules.

Now you can begin rebuilding the surface. Our recommendation for filling back divots making your own filler by blending Phenolic Micro Balloons (Purple in color) and Colloidal Silica 75/25 respectively. (See Fairing recipe on page 21.)

Now, fill back the holes using a putty knife or large squeegee. If substantial structural glass has been removed in the grinding process, new glass can be applied prior to applying filled epoxy or Fairing Compound. Let the epoxy filler mix harden for 12 - 24 hours at 77° before attempting to sand or work the surface. Depending on the temperatures, you'll have to check the surface for hardness before you continue working. To recoat, use the "Rule of Thumb" - If you can leave a thumbnail dent in the surface, and there's no amine blush, then you can repeat without washing or sanding. This is usually within the 12-24 hour window. In cooler temps., 35-65°F, if it's still soft, throw some heat at it or be patient, it will cure. **MAS' new blend of Non-Blushing Fast Hardener will not blush.**

You may recoat with either a filler epoxy blend, or clear coat with straight resin/hardener mix. After the surface is smooth or "fair", you may begin putting multiple coats of mixed epoxy on the bottom as you build a barrier coat. (5 coats are recommended to build at least 20-40 mil of thickness). This insures no further water penetration and a thickness you won't sand through when prepping for bottom paint.

GELCOAT STRIPPING or POWER BLASTING

After peeling, stripping, or power blasting off gelcoat, it's always necessary to build back the surface lost. The procedure we recommend is as follows:

Let the hull dry out and check with a moisture meter until dry.

Coat raw surface with 1 coat of unthickened MAS Low Viscosity and MAS Slow Hardener in a 2:1 mix. Let it set until you have a tacky surface (5-7 hours at 77°) Now use thickened epoxy (using the Micro Balloon/Colloidal Silica mix) or your favorite cloth. If you use mat or cloth, press the material against the tacky surface, then wet out fabric with unthickened epoxy. Do not over saturate the fabric or the epoxy will run out of the glass. After you have a thin film set (4 - 10 hours at 70-77°) make up a Fairing Compound (recipe on page 21) and trowel this onto the surface to fill the rough weave of the fabric or mat. After this has set, and has been faired, you may begin to build 4-5 coats of unthickened epoxy/hardener mix for your barrier coat. Again, you may use any bottom paint you like.

**One of Phillip Green's
Award winning
Woodsong Canoes**

Contact Phillip at 843-835-8137

BARRIER COATING NEW AND UNBLISTERED SURFACES

When barrier coating new surfaces, use "lacquer thinner" to clean the surface wax off the hull, then lightly sand with 80-150 grit and coat 4-5 coats with unthickened epoxy/hardener mix use MAS FLAG Resin and Slow or Medium Hardener. This will insure no amine blush on the surface between coats and will save up to 30% in labor by not having to wash or sand in between coats. Be sure you check the surface first. Remember "Rule of Thumb" if you leave a thumbnail imprint you can recoat without sanding. Preferred method of applying Barrier Coat is Roll and Tip. (Roll it on with a short napped roller and tip off with a brush.)

BOTTOM PAINT

This is a personal choice and is a subject we could write a book about. We have not had a paint failure over our epoxy system ever. Amateurs and professionals have used every system out there. All paints adhere to our system. We recommend you follow the instructions after the barrier coating procedure. We do not recommend gelcoat over the epoxy.

