



c/o Endurance Technologies
275 Bridge Point Way
South St. Paul, MN 55075

Toll: 800-755-8568 | Local: 651-554-4000 | Fax: 651-451-9728

About Blister Repair & Barrier Coating

WHAT IS A BLISTER?

To understand the repairing of blisters, we should first understand the cause. Polyester Resin is used in the production of 90% of the boats now afloat and is not waterproof. It has a very high osmotic absorption rate (how much water the solid absorbs) usually the 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. gelcoat. 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 which 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 15 - 20% of its original 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 will out perform epoxies. Since Vinylester is an epoxy/polyester hybrid it's highly unlikely it will out perform 100% solid epoxy.

MAS Epoxy is comprised of 100% solids and its water absorption is less than .05% - the lowest barrier coating product we're aware of. It's secondary bond strength is 1850 p.s.i. (using MAS Resin and MAS Slow Hardener) assuring the coating will stick to the surface.

REMOVING BLISTERS

To begin, you'll need to remove all paint on the surface. You'll 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.



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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 whether. 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. This moisture content should be .05% or below. If you can't get hold of a moisture meter, please call us for recommended dry schedules. (Typically, an Infra -Red Lamp on blister area for 12 days, with surface temperature of 120 - 140 F.) Now you can begin rebuilding the surface. Our recommendation for filling back divots is a blend of Phenolic Micro Balloons (Purple in color) and milled fibers (1/32" chopped fiberglass) 75/25 respectively. After blending these two fillers, mix it into a peanut butter consistency with the MAS Resin and Slow Hardener. Pre blend the epoxy and let it sit for three minutes before mixing in the fillers. 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. Let the epoxy filler mix harden for 24 - 48 hours at 77 F before attempting to sand or work the surface. If you are working in colder temperatures, we recommend you use F.L.A.G. resin and medium or new No-Blush Fast hardener down to 35 F and, depending on the temperatures, you'll have to check the surface for hardness before working. If you need to recoat, use the "Rule of Thumb" - If you can leave a thumbnail dent in the surface, then you can repeat after roughing up the surface with a Scotch Brite pad. This is usually within the 24 hour window. If it's still soft, throw some heat at it or be patient, it will cure. Our Slow, Medium and New Fast hardeners are blush free. Amine blush is a waxy, slick film forms on the surface, wash it off with water before you sand. If you are using our older blend of Fast hardener it will blush. Be sure to look for the words "Non-Blushing" on the Fast label to make sure you have the new Non-Blushing Fast.

You may recoat with either the filler epoxy blend, or clear coat with straight resin/hardener. After the surface is smooth or "fair", you may begin putting multiple coats of clear epoxy on the bottom as your barrier coat. (5 coats are recommended to build 10-15 ml 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. Get moisture content below .05% before re-building surface.

Coat raw surface with 1 coat of unthickened epoxy MAS Resin/ MAS Slow Hardener. Let it set until you have a tacky surface (5-7 hours at 77 F) Now use either thickened epoxy using the Micro Balloon/ milled fiber 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.



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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 F) you may make a fairing compound by blending Micro Balloons with MAS Resin/Slow Hardener. This should be like wet pudding. Now 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 for your barrier coat. Again, you may use any bottom paint you like. However, you must wait 7 days at 77 F for full cure before painting.

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 150 grit and coat 4-5 coats with unthickened epoxy use MAS Resin Slow 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 the "Rule of Thumb" - if you can leave a thumbnail imprint you can recoat.

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.

If you have further questions or comments regarding barrier coating or blister repair, please contact us at 1-888-627-3769.

F.Y.I.

One catalyzed gallon will cover approximately 500 sq. feet. 3 ml thick. A 40' hull will require a 6-gallon kit to barrier coat. Remember to let it reach full cure (approx. 7 days at 77 F) before paint is applied. Always use organic respirators and gloves when handling epoxies and fillers.