

# DRIVE Marine Services

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## OSMOSIS EXPLAINED

Osmosis is Fibreglass cancer. In permanently immersed polyester fibreglass boats, there are some laminates which contain certain defects which attract water into the structure of the fibreglass, and this water creates enough internal pressure to form blisters in the hull. These blisters are sometimes only in the outer layers of the fibreglass, sometimes they have penetrated very deeply into it. The causes, and best methods to deal with it, are still being investigated by both resin and boat manufacturers, and at this time there is no absolutely certain remedy. It is likely that most fibreglass boats manufactured using polyester resin will exhibit osmosis defects at some stage of their lives.

Some things are known. Polyester resin (which almost all fibreglass boats are made of) is not very good at preventing small amounts of water permeating through it. This is how the water gets to the defects. Anything which reduces the amount of water which permeates to the site of a defect will reduce the osmosis problem. This means that coating the outside of the hull with a good moisture barrier will certainly help with the osmosis problem. Keeping the inside of the boat (very) dry, removing salt encrustations and being fanatical about ventilation will help prevent moisture reaching defect sites from inside the boat. These measures will mean that it will take a lot longer before osmotic blisters appear, will reduce their size and reduce the number of them, and usually by a very substantial degree.

If the osmosis is caught soon enough, and it is restricted to the outer layer of the laminate, then repair is much easier and more certain. Epoxy is the best resin to carry out repairs as it has so much greater water resistance than polyester (something like 98% waterproof). The Bote-Cote marine coating epoxy is ideal for this task. Cop-R-Bote is an epoxy-metallic copper antifouling and when applied over Bote Cote Epoxy it adds greatly increased resistance to the penetration by moisture.

The blistered area must be ground away, down to sound laminate, and the hull should then be left to dry out for many weeks. Some operators recommend localised heating of the hull, even to quite high temperatures, to destroy the chemical defects in the laminate. When the hull is dry, repair, recoat and restore with Bote-Cote as described in the following section.

Consideration should also be given to coating the underwater parts of the hull with epoxy to form a moisture barrier. To create an osmosis barrier over the whole hull, we recommend coating the hull with three coats of Bote-Cote. Coating the hull with Cop-R-Bote (which should be applied over either epoxy or the gel coat will also provide a good moisture barrier and it is an effective very long life antifouling.

Osmosis can also occur from inside the hull, as well. Areas which are constantly flooded with water, such as water tanks and deep bilges. Clansman are notorious for osmosis in the freshwater tanks which is located in the forward cabin under the V-berth.

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*For a Comprehensive Range of **Boat Building** requirements including*

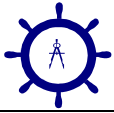
**Bote Cote** Epoxies, Fillers, **Pour-on-Gloss** Decoupage Coating, **COP-R-BOTE** Epoxy Antifouling, **AQUACOTE** Polyurethane Coatings, **PURBOND** Waterproof Single Pack Glue, **TREDGRIP** Rubberised non-slip Paint, Glass & Carbon **Reinforcing Fabrics**, **FERONITE** Rust converter and Primer, Marine, Proof & Aircraft **Plywoods**, **NIDAPLAST** Composites, **S/S & Bronze** Fasteners

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## FIBREGLASS REPAIR

Bote-Cote Epoxy Resin bonds strongly (300% stronger than polyester or vinylester) to clean polyester fibreglass, therefore is ideal for repairing fibreglass boats. To repair impact damage to fibreglass, first grind away all shattered material, preferably to a uniform shape, say a circle, and feather out the edges radially some 6 to 8 times the depth of the hole. Apply a first coat of Bote-Cote thinned with TPRDA, this will wick into any remaining damage and re-bond the fibres. Then rebuild the area by laminating on patches of fibreglass with Bote-Cote, steadily increasing their size to match the increasing diameter of the hole until the patch is level with the surrounding surface. Finish off with a piece of Peel Ply, polythene film, or packaging tape to even out the surface and make it easier to sand flush after it has cured.

If the hole is right through the fibreglass follow the above procedure, but first fit a backing piece of plywood or thick poly plastic to provide a firm base for laminating. If this backer is to be temporary, cover it with polythene film first to prevent it sticking. After removal, if possible laminate some additional glass onto the inside of the patch to lock the repair around the edges of the hole.

Transoms and stringers whose core is rotten are favourite sources of rot in fibreglass boats. Most production boats are built with plywood transom inserts and timber stringers. These were not sealed properly during manufacture, being simply bonded into place using polyester resin, chopped strand mat, and 'bog'. Over not too many years this potent mixture weakens and delaminates from the plywood or timber, water enters and the timber rots away, leaving floppy transoms and bilge panels.

To repair these, first you must remove the fibreglass covering the stringer or inside of the transom, extract all the material inside it, and expose the original inside surface of the hull. Clean and sand this surface, prepare replacement timber or plywood to fit, and thoroughly coat it with Bote-Cote. Apply a thickened Bote-Cote mix to this replacement, and to its corresponding area of the hull, and then fix the timber in place with enough clamping to ensure some of the mix is squeezed out all around. This can be smoothed into a fillet along all the edges, and further filleting mix should be applied to make generously rounded fillets. After this replacement has set, fibreglass the whole area with Bote-Cote, continuing the glass well out onto the adjacent area of the fibreglass hull. For transom repairs, we recommend Biaxial glass for maximum strength both across as well as up and down the transom. For stringers, use Double Bias tape, which will conform more easily to the corners and edges.

**Note.** Polyester (the resin normally used in fibreglass boats and for fibre glassing) is a poor adhesive. Polyester repairs are well known for "delaminating" (that is coming unstuck) after a period. Epoxy is an excellent adhesive and it adheres extremely well to existing sound polyester. Unfortunately, epoxy is attacked by ultra violet light (sunlight) so it in turn must be protected by a paint coating. The best of these are the two pack polyurethane coatings such as our Aquacote; when properly applied will give 5+ years without loss of gloss and usually many more years of protection.

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