

## NOTES ON FISHPONDS AND TANKS

**SHEATHING IN GRP** (Glass fibre Reinforced Plastic) of Concrete Fish Ponds.

The advantages of a GRP Sheathing over coating with G4 Polyurethane Varnish, for which two coats of clear followed by two coats of pigmented, usually Black are used, is that concrete can crack in winter frosts but the GRP will not crack and has a glass smooth surface.

Fish will rub themselves against any surface protrusion such as grains of granite, even though covered with G4 creating a wound will continue to rub the wound on the protrusion.

**TOXICITY.** Under cured GRP will emanate Styrene (40% content in most Resins). With drinking water tanks this would not be toxic to humans despite an unpleasant taint but would be toxic to fish as they breathe the water. Some resins contain Amins in the Accelerator System. Any Amin emanation is toxic to fish & humans. Our standard Resin A Laminating Resin CVP QC 30, is Amin free as also the Final Surface Coating Resin: Polycor 9101-023. This is a 100% Pure Isophthalic Gel Coat to which wax has been added at time of manufacture, so that the user does not have to add the 2% Solution MW, Wax in Styrene which has to be added to all initial Gel Coat Resins (which are wax free) if they are to be used as Top Coat.

**ERECTOR'S OF TENT.** For Fish Ponds in the open it is essential to erect a tent, a Tarpaulin sheet stretched over horizontal poles & pegged to the ground. Both ends of the tent must be left open so that the Styrene Fumes can freely emanate. If emanation were restricted hardening & cure would be inhibited. The tent must be longer than the pond to avoid rain entering the open ends at an angle. The tent should be erected 14 days before commencing work to allow the concrete to thoroughly dry.

**PREPARATION OF THE CONCRETE.** All corners, vertical and horizontal must be rounded with sand and cement, as leaks are apt to occur when dovetailing Glass fibre into internal 90-degree angles. The concrete should be reasonably smooth but not billiard ball smooth as the Initial Barrier Coat of G4 would not penetrate as well as it should. Do not use Unibond as it contains ammonia. There must be no trace of Bitumen, as this attacks Polyester Resin & inhibits hardening. Allow 14 days for sand/cement to dry.

**INITIAL BARRIER COAT OF G4 POLYURETHANE VARNISH.** The purpose of this is to act as a Barrier preventing Alkali in cement attacking the Resin and dampness striking through the concrete inhibiting hardening and cure of the Resin. The G4 is applied in one coat at 210 grs/sq.m (10.76sq.ft). The G4 hardens upon contact with air, so tins should be promptly re-sealed each time G4 is decanted. It goes tacky-hard in one hour & continues to cure for 12 hours, but when G4 is used in this application the Resin A must be applied within a maximum of two hours or sooner after the G4 has gone tacky-hard. Delay will inhibit the degree of adhesion of resin to G4. The G4 must be brush applied, NOT with Spray Gun, as inhalation of fumes must be avoided.

**APPLICATION OF GRP SHEATHING.** The concrete must be strong, especially the bottom where the weight of the water bears. For ponds up to 5' depth two laminations of medium thickness Chopped Strand Mat described as density, 1 ½ oz sq.ft. Or 450 grs/sq.m. So two laminations is 3oz sq.ft. The sheathing must be carried outwards horizontally over the top of the wall & 2" down the other side. If terminated on the horizontal the top edge would be searched by water & start to de-laminate. The resin is applied with a Lambs wool Roller, quicker than brushes on large areas, the CSM is placed over it and rolled with metal roller, to eliminate all air bubbles & ensuring thorough saturation of CSM. Both laminations can be applied without waiting for the underlying lamination to harden, as also the Final Surface Tissue. The preferred roller is the Aluminium Paddle Roller 6" x 1 ½" o.d. which has a plastic handle with a socket into which brooms handle will fit, which eases the work. The lambswool roller has the same handle. Always overlap pieces of CSM by 2". Do not lie edge to edge. The final surface tissue cannot be rolled with metal roller, which would "pick it up". It is applied with lambs wool roller or brush stippling action. The CSM and Tissue is applied with Resin A. As soon as the tissue is hard the Final Coat

of Polycor Gel is applied at spread rate of 2 ½ ounces per sq.ft. This should always be pigmented with polyester Colour Paste added to the gel in ratio not exceeding 10% by weight. Pigmented gels cure more positively than Non-Pigmented as UV Light inhibits Cure of Non-pigmented resins. The usual colour for fishponds is Super Black.

**FINAL CURE.** Allow a minimum of 14 days after work is completed with tent still erected. Introduction of heat will expedite cure. After this flush out with hot water, steam or several changes of water. Under cure is visible if a white sheen appears on the surface of the laminate after water is introduced.

**WORKING TEMPERATURE.** Throughout the work temperature should not be less than 16c or 60f. If work has to be interrupted it may be found that the finished edge of laminate has curled up & away from concrete due to 6% shrinkage of resins as they harden & cure. Cut this out & overlap 3” onto extant laminate with subsequent laminate.

#### **G4 POLYURETHANE VARNISH**

G4 is the leading brand of this product, a one pack polyurethane clear varnish. It is not UV light resistant & will brown slightly with age. A similar product by same manufacturers: - Bondaseal Clear IS UV light resistant & extremely clear but is more expensive than G4. Unlike oil based paints & varnishes that require a warm dry atmosphere for solvents to evaporate to harden them, polyurethane’s harden when they come in contact with moisture present in air. If surface cakes, drain tin by spiking hole in bottom.

**HEALTH AND SAFETY.** Avoid breathing fumes and a respirator should be worn unless area is very well ventilated because of risk of fume inhalation. Note that it hardens in contact with moisture & inhaled particles would harden in lungs.

**HARDENING & CURE.** Each coat takes approx. one hour to harden to “finger tacky” degree and approx. 9-10 hours to fully cure. If applying several coats, each coat should be applied as soon as underlying coat has gone tacky-hard or at most within two hours.

**SOLVENT.** Brushes & tools are easily cleaned with Acetone.

#### **TYPICAL APPLICATIONS.**

1. **SHEATHING CONCRETE IN GRP (Glass fibre & Resin).** The concrete should be skimmed with sand/cement to a smooth surface, as the G4 will not bridge over gaps or crevices. If a tank or Fishpond all corners, vertical & horizontal should be rounded with sand/cement to avoid having to dovetail glass fibre into internal 90-degree angles, wherein leaks could occur. Allow fifteen days for sand/cement to fully dry. Apply one coat of G4 spread at 210 grammes per sq.m. It will be tacky-hard in one hour. The Resin & Glass fibre should be applied immediately or at most within two hours. The longer the delay the less good a degree of adhesion of Resin to G4. If time factor makes it difficult to apply the GRP Laminate within two hours, a coat of resin only can be applied. The purpose of using G4 as above is to prevent Alkali in cement attacking the Resin which would inhibit the hardening & cure and the G4 acts as a barrier to prevent moisture seeping through concrete which also inhibits hardening & cure.

2. **SHEATHING METAL TANKS.** One coat of G4 should be applied as above, because G4 adheres to metal, timber and other materials more effectively than does Polyester Resin. The corners, vertical & horizontal should be rounded by applying Filler Paste i.e. Catalysed Resin filled with Talc or Fordacal Powder. Always add Catalyst first, before the powder, otherwise there can be adverse chemical reaction.

3. **MAKING GRP MOULDS FROM PLUGS** made of timber, hardboard, plaster, concrete etc.; one coat of G4 should be applied & allowed to fully CURE for approx ten hours. The purpose is to prevent moisture being drawn from above materials, which would attack the Liquid PVA Release Agent (Solvent is water) & adversely affect the Initial Gel Resin.

4. **MAKING VINAMOLD MOULDS FROM PLUGS** made of concrete. A fully cured coat of G4 withstands up to 200C. If the G4 is not used the Liquid Hot Vinamold at 170c will draw moisture from the concrete creating holes in the surface of the Vinamold applied to the concrete.

**5. COATING CONCRETE FISHPONDS IN G4 ONLY.** I.e. without the GRP Laminate. The advantage of sheathing with a GRP laminate is that should the concrete crack in winter frosts the GRP laminate will still remain intact, but using G4 only is cheaper than using GRP laminate. The concrete should be sand/cement rendered to a smooth finish, as described in paragraph No. 1 above & fully dried for minimum of fifteen days.

Apply two coats of Non-Pigmented G4 at 210 grs/sq.m: total 420 grs/sq.m.

Then apply two coats of pigmented G4 at 200 grs/sq.m: total 400 grs/sq.m.

Only G4 pigmented by the manufacturers at time of manufacture should be used to avoid risk of toxicity to fish. Only four colours are supplied: Black, Olive Green, Red Oxide, and Middle Grey, most users prefer Black. Each coat should be applied as soon as underlying coat is tacky-hard or at

most within two hours.

**COATING CONCRETE FLOORS & WALLS IN G4.** The method is exactly the same as paragraph No.5 above but the user can pigment the two topcoats of G4 by adding 10% by weight of Polyester Colour Paste to Non-Pigmented G4, which reduces cost. If the concrete is not very porous & underlying ground is not very damp, one coat of clear in lieu of two will suffice, plus two coats pigmented. The G4 is tough, hardwearing and resistant to Chemical spillage.