

# SHEATHING OF CONCRETE SWIMMING POOLS IN GRP (GLASSFIBRE AND POLYESTER RESIN)

COSTING SHEET

DATE: \_\_\_\_\_

When ordering please quote above date for ease of reference in our files

PLEASE READ OUR NOTES ON THIS PROJECT: which include use of "G.4."

The concrete must be of adequate strength to bear the weight of water: skimmed smooth with sand/cement at 3:1 mix of sand/cement and all corners: vertical and horizontal must be rounded. The GRP Sheathing must be applied over top of wall and 2" down other side: NOT terminated on the vertical or water would "search" top edge of Sheathing.

LAMINATE THICKNESS. For pools up to 6' depth: two laminations of Chopped Strand Mat of thickness: 1½oz/sq.foot ==450grs/sq.m + final surface tissue is adequate.

AN INITIAL BARRIER COAT OF "G.4." must be applied over the concrete to prevent alkali in cement adversely affecting hardening and CURE of the resin.

## TOTAL SURFACE AREA

### "G.4.": POLYURETHANE VARNISH

Initial Barrier Coat over concrete.

Apply one coat at 210 grs/sq metre (one sq.m.==10.76 sq.foot).

Apply laminating resin and CSM as soon as "G.4." goes tacky hard: (one hours) and preferably within 3 hours.

### GLASSFIBRE CHOPPED STRAND MAT ("CSM")

Two laminations 1½oz CSM. Apply immediately after each other: well rolled with metal roller: and follow with final surface tissue in one operation.

### GLASSFIBRE SURFACE TISSUE

Applied with lambswool roller only.

### RESIN "A" LAMINATING RESIN

Cray Valley Ltd. 6398-211: Terephthalic NPG Chemical Resistant ("NPG==Neo Penty1 Glycol).

Requirement is 2½ times weight of CSM if well rolled.

COST

### RESIN "B" FINAL SURFACE COAT

Cray Valley Ltd. 6531 Terephthalic NPG. Chemical Resistant  
Applied @ 2½ozs/sq. ft==770 grs/sq.m.

COST

### SOLUTION "M/W"

6% Wax in Styrene: must be added at 2%

= 10cc's per lb==22 cc's per kilo to above gel 6531

Otherwise gel would retain surface tackiness when hard.

**CATALYST** same hardening additive for both above resins

At Temp. 16C == 60F ADD 2%==10cc's/lb Resin==22cc's per kilo  
UNDER 16C == 60F ADD 3%==15cc's/lb Resin==33cc's per kilo  
ABSOLUTE MAXIMUM 4%==20cc's/lb Resin==44cc's per kilo  
WEIGHT/VOLUME OF RESINS: One lb==¾pint: One Kilo=1litre.

**DISPENSER** For accurate measurement of Catalyst:  
engraved in CC's.

**ACETONE** cleaning Solvent for brushes and rollers.  
If these solidify with hardened Resins they are scrap.

**METAL ROLLER** For rolling CSM. Aluminium "Paddle"  
type: 6" x 1½" o.d.

**LAMBSWOOL ROLLERS** For applying Resin and  
Rolling of Surface Tissue  
COMPLETE  
REFILLS

**PAINT BRUSHES** For applying Final Gel Top Coat:  
Preferred width 4"

**PVC BUCKETS** For mixing resins and catalyst. Allow  
dregs to harden and they can be broken out as they do not stick to  
PVC: also for washing tools in Acetone. Usual quantity: One gall ==  
5litres: SIX.

**COLOUR PASTE** Added only to the Final Surface Gel  
Coat: in ratio not exceeding 10% by weight of gel and well dispersed  
to avoid areas exceeding 10% which would inhibit hardening and  
cure. For swimming pools recommended colours are blue or white:  
both of which are chemical resistant colour pastes: STATE  
COLOUR REQUIRED.

## **HAND CREAMS**

CLEANSING CREAM that can be rubbed on hands and washed off in  
water.  
BARRIER CREAM.

**GLOVES** Various types are listed in Price List  
Currently the most popular type: SURGICAL:  
Heavy Latex: Powdered inside: £3.50 per Box of 100 gloves.

COST

Sheathing concrete lined ground excavations in GRP (Glassfibre and Resin)  
TEMPERATURE. It is NOT recommended to work in less than 16C = 60F: as resins can fail  
to harden and CURE satisfactorily in lower temps.

1. TENT. Tarpaulin sheets stretched over a horizontal pole and pegged to the ground must be used to protect work from rain. Leave tent in situ for 14 days or longer whilst GRP laminate fully CURES. Tent must be longer than the pool: as both ends must be left open to allow Styrene fumes to freely emanate so that resins will harden and CURE satisfactorily.
- 2.
3. CONCRETE. The bottom must be strong enough to bear the weight of water. All corners: vertical and horizontal must be rounded to avoid having to dovetail glassfibre mat into internal 90 degree angles and whole surface made smooth with sand/cement at 3:1 mix and allow 14 days to fully dry.
- 4.
3. EXTANT POOLS. That have been painted. All such must be removed: especially any containing bitumen which attacks and prevents hardening of resin and "G.4." If already "G.4." coated: sand to get a key and apply CSM.
4. "G4" POLYURETHANE VARNISH. Should be applied overall as a barrier to prevent both alkali in cement and dampness striking through the concrete inhibiting hardening and Cure of the resin. Provided that surface of the cement is sufficiently smooth for "G.4." to form an unbroken skin: one coat suffices: spread at 210 grs/sq.m =  $\frac{3}{4}$ oz/sq.ft. "G.4" hardens in contact with air: so promptly re-seal tins each time decanted. It goes tacky hard in one hour. If a second coat is needed promptly apply it. The "G.4." must be brush applied: NOT sprayed as it contains Cyanide. The "g.4." hardens upon contact with moisture in the atmosphere: so warm dry air is not needed. The laminating resin and glassfibre mat should be applied within three hours of the "G.4." going tacky hard: delay minimises the degree of adhesion of resin to "G.4." WARNING. Because "G.4." hardens upon contact with moisture: the fumes must not be breathed. The use of a respirator is recommended.
5. THE GLASSFIBRE LAMINATE. For pools of max. depth 6': two laminations (thicknesses) of Glassfibre Chopped Strand Mat of density (thickness) 1½ sq.ft=450 grs/sq.m. suffices. For deeper pools use three such laminations over bottom and 2' up sides and ends from bottom. All the laminations of CSM can be applied one after the other topped with a lamination of surface tissue to give a smooth but matt finish in one operation. If there is interruption of work and underlying lamination of CSM has fully hardened for some time it will be necessary to sand to get a "key" to ensure that next lamination will fully adhere. Sometimes the edge of the CSM of previous day's work may have curled upwards away from the substrate: due to resin shrinkage: which is 6%; this curled up edge must be sanded out. Always overlap pieces of CSM by an inch.

### **CALCULATION OF WEIGHT OF CSM REQUIRED**

If total surface area has been measured in sq. metres: multiply sq. metres by 900 grammes (for two laminations of 450 gr. CSM) add 10% for cutting to waste and overlaps. This gives total KILOS of CSM required.

If total surface area has been calculated in sq. feet: for two laminations: multiply total sq. feet by three ounces: add 10% as aforesaid: divide by 16 for lbs: and divide lbs by 2.20462 to produce KILOS of CSM required.

One square metre ==10.76 sq. feet. ONE KILO == 2.20462lbs

6. CALCULATION OF LAMINATING RESIN REQUIRED provided that the CSM is well rolled with the metal roller: resin required is 2½ times the weight of the CSM.

THE SURFACE TISSUE which only weighs thirty grammes per sq. metre only requires a maximum of one ounce per sq. foot: but if applied promptly over last lamination of CSM usually absorbs most of this from the resin on the CSM. The tissue always floats up in the resin leaving a smooth but matt finish to which the final gel adheres well.

#### ALL RESINS USED FOR SWIMMING POOLS MUST BE CHEMICALLY RESISTANT

Ordinary general purpose laminating resins are described as "ORTHOPHTHALIC" and have no resistance to chemical attack. "ISOPHTHALICS" are chemically resistant but TEREPHTHALIC NPG (Neo Pentyl Glycol) resins have a much higher degree of chemical resistance. These are the resins that should be used in sheathing swimming pools. Because of the increased amounts of chemicals now being put into swimming pools: particularly Alumina Anhydrate used to clarify the water: a very strong alkali all the UK resin manufacturers have ceased to make any recommendations for swimming pools. Subject to this reservation we can only offer the above Terephthalic NPG resins. Epoxy resins are totally unsuitable. The only alternatives are ceramic tiles or PVC liners: which are easily punctured. Both are more expensive than the resin used for laminating the Glassfibre Chopped Strand Mat ("CSM") and the Surface Tissue is Cray Valley Ltd.'s Terephthalic NPG No. 6398-210.

For final GP1 – Top Coat: applied after the above laminate has fully hardened: the gel is Cray Valley Ltd.'s Terephthalic NPG: No. 6531.

SPREAD RATE 2½ ounces per square foot ==763 grammes per sq. metre.

This resin is made for use as INITIAL gel against a mould surface and is therefore WAX-FREE. In that application it remains surface-tacky when hard so that the glassfibre applied with laminating resin adheres well to it.

When used as Final Gel==Top Coat as in swimming pool Sheathings WAX must be added.

Add WAX IN STYRENE SOLUTION which contains 6% Wax. This Solution is added at 2% (two per cent) by weight to the Terephthalic NPG Gel which then hardens tack-free.

These recommendations of resins to be used subject to reservations on Page One have proved satisfactory on a lot of swimming pool Sheathings. The only complaint in one case was the appearance: after a time of small black spots on the gel surface: thought to be chemical attack on the ACCELERATOR content of the final gel. All the resins contain approx. half of one per cent Cobalt Accelerator: added at time of manufacture. The user adds the CATALYST at time of use and it is the reaction of the Catalyst with the Accelerator that hardens the resins.

7. PIGMENTATION OF FINAL GEL: CV-6531 This should always be done: not only for aesthetic effect but final gel CURES more positively when pigmented. The colour paste is added to the gel in ratio: 10% (ten per cent) by weight and well dispersed to avoid areas containing more than 10% which would inhibit hardening and CURE.

We recommend using Llewellyn Rylands White: No. 4777 or Lagoon Blue: 8895 as both of these are chemically resistant.

8. DRAINS We advise having these because if they become blocked the bottom of the pool will have to be broken into, involving repair of concrete and the GRP Sheathing.

9. COMMONEST ERRORS

1. Inadequate use of the metal roller. Unless the CSM is thoroughly saturated to the point that no white strands of glassfibre are visible and all air bubbles are eliminated, the laminate will be defective. It is for this reason that we strongly advise in our general literature: NOT to pigment the laminating resin used to saturate the glassfibre, as under-saturated areas of CSM and air bubbles would not be visually detectable.
2. Failing to measure the Catalyst carefully. Even experienced professionals sometimes fail to do this.

10. MEASURING THE CATALYST

The Catalyst Dispensers are described in our Price List and are in TWO sizes. They both consist of a PVC bottle with screw top lid; to which is welded an upwards protruding PVC tube engraved in millilitres (one millilitre = one cc). Having filled the bottle and screwed top back on, the user squeezes the bottle gently and the Catalyst shoots up through a thin inner tube to the level required. The smaller bottle is engraved 1 to 15 millilitres, the larger 10 to 80 millilitres.

CORRECT PERCENTAGE OF CATALYST TO USE. These are the same for all resins and gels.

In temps of 16C or better: Add 2% == 10cc's per lb Resin == 22cc's per kilo

Lower temps Add 3% == 15cc's per lb Resin == 33cc's per kilo

Do not exceed Maximum Add 4% == 20cc's per lb Resin == 44cc's per kilo

In very hot weather: say 30C Catalyst can be reduced to a minimum of 1%.

APPROXIMATES. One lb Resin == 3/4 Pint: 5lbs == 2 1/2 kilos == half gallon. Never mix more than can be used in 15 minutes as resin hardens in the bucket: due to gelation has build up in the mass: very much faster than when spread on laminate.

If discarding a bucket of resin where this has solidified put it in an open place so that if it catches fire no damage will result. There is at least one case on record where an operative returning from lunch break threw a bucket of resin to which this had happened in a boat yard out of a boat hull. It fell into the wood shavings: started a fire and the entire boat yard burned down.