

Technical Information

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SUGGESTIONS FOR LINING SWIMMING POOLS WITH GLASS RE-INFORCED POLYESTER RESIN

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NCS Resins' Isophthalic and Isophthalic/NPG Pool Resins and Pool Coats are recommended for the lining of concrete and Marblelite cement swimming pools as well as old fiberglass pool shells. Orthophthalic resins must not be used in direct contact with the Poolcoat. It is recommended that a Barriercoat be used between the Poolcoat and the Ortho resin. Although a "tie-coat" with an Isophthalic resin can be used in place of a barrier coat it is not ideal. The best Osmosis resistance will be obtained when a Vinyl Ester barriercoat (NORPOL VBC) is applied between the Poolcoat and the laminate. These linings offer an attractive finish which is strong, durable, and requires minimal maintenance. The suggestions contained in this application sheet cover cosmetic linings which are intended to replace the worn surfaces of an existing pool, or to provide a smooth waterproof lining for rough or porous surfaces of new shells and linings for pools which have had leaks and surface cracks repaired.

This Application Sheet should be read in conjunction with the technical data sheets for the NCS Resins products being used. The quantities of materials required for the two different linings are as follows:-

COSMETIC LINING

- A bond or seal coat of ATPRIME 2 used at a rate of 200g - 250g/m² for porous substrates and 160g – 200g/m² for non-porous substrates.
- A single layer of 450 g/m² chopped strand mat laminated with NCS Pool Resin 991 PA MV at a resin to glass ratio of 3:1.
- Polylite VBC, vinyl ester barriercoat applied 600 – 800 g/m² or single layer of glass surfacing tissue using NCS Pool Resin 991 PA MV at an application rate of 300 g/m².
- A single application of 600 to 800 g/m² of NCS Poolcoat.

RE-SURFACING A LEAK - REPAIRED POOL

- A bond or seal coat of ATPRIME 2 used at a rate of 200g - 250g/m² for porous substrates and 160g – 200g/m² for non-porous substrates.
- Two layers of 300 g/m² chopped strand mat laminated with NCS Pool Resin 991 PA MV at a resin to glass ratio of 3:1.
- Polylite VBC, vinyl ester barriercoat applied 600 – 800 g/m² or single layer of glass surfacing tissue using NCS Pool Resin 991 PA MV at an application rate of 300 g/m².
- A single application of 500 to 600 g/m² of NCS Poolcoat.

POOL PREPARATION

If the pool has previously been painted, then all paint must first be removed. This can be achieved in a number of ways, e.g. sand blasting, wire brush, sanding or paint remover. If paint remover has been used then care must be taken to ensure that no residues of this remain, to eliminate any possibility of attack on the primer or on the laminate when those are applied on the stripped surface. Similarly, all other contamination, such as algae, oily deposits, sand from sand blasting, general dirt, and dirt introduced in the course of cleaning must also be removed, so that the pool is clean and free from any residue.

INSPECTION AND REPAIRS

After having been cleaned, the pool should be inspected for defects such as cracks, leaks, crumbling plaster, etc. All such defects must be repaired fully before lining work proceeds. Repairs can be done using cement grout or a polyester resin/sand mixture. Once cured and allowed to dry, the repaired area must be sanded flush with the surrounding surface.

Where a pool is extensively cracked, the cause of such cracking may be earth movement. In such cases, a full scale repair must be effected, such that the structural strength of the pool is the same as it was originally. Failure to do such a repair may result in failure of the lining.

Proper repairs are essential to the long-term performance of the liner, and particular attention should be given to this aspect, as the GRP liner described in this Application Sheet is **not** a structural part of the pool.

FILLETING OF CORNERS

All corners (wall-wall, wall-floor, and steps) should be filled with cement mortar and filleted to give a radius of at least 50mm. This makes for easier application of the liner and an improved liner to pool surface bond in these areas.

REMOVAL OF COPING STONES AND MOSAICS

It is strongly recommended that coping stones and mosaics be removed. This enables the liner to be carried under the coping stones and mosaics and results in a more reliable bond between liner and pool surface. Furthermore it prevents water seepage behind the liner. Once coping stones and mosaics have been removed, the area exposed must be cleaned thoroughly.

SPECIAL CONSIDERATIONS IF COPING STONES ARE NOT REMOVED

If coping stones are not going to be removed for some reason, then a horizontal groove must be cut as high as possible above the water level, to receive and secure the top edge of the liner. This groove should preferably be dove-tail shaped and at least 20mm deep.

Acid Wash

Once all repairs and filleting have dried completely and have been sanded flush, the acid wash can commence. For old pools it is suggested that a 1% hydrochloric acid solution be used to wash all areas of the pool surface. For pools with new concrete or plaster, a 5% hydrochloric acid solution should be used. The purpose of the acid wash is to neutralise alkalinity in the surface of the concrete, and remove cement rich "crumbly" material. When the pool has dried, it must be washed thoroughly. Because ATPRIME 2 is moisture activated a maximum of 4% moisture will be permitted in the cement substrate. The substrate may not be wet as ATPRIME 2 will not be absorbed in to the substrate or will be prevented from bonding on a wet substrate. 4% moisture content is the maximum allowable. Use a moisture meter.

NOTE When an acid wash is being undertaken, it is recommended that suitable protective clothing be worn to protect the skin, eyes and clothing from contact with the acid.

THE PRIMER LAYER

The primer layer should not be started if there is insufficient time available to commence laminating once the primer has gelled. ATPRIME 2 has a 12 hour pot life and it is recommended that the primer be applied at the end of the day once acid washing and drying of substrate are done. ATPRIME 2 can stand overnight and the following morning NCS Pool resin and glassfibre work can commence. The surface area of the pool must be determined, and sufficient ATPRIME 2 obtained for a surface coverage of rate of 200g - 250g/m² for porous substrates and 160g – 200g/m² for non-porous substrates.

ATPRIME® 2 components must be mixed before using. Blend 1 part (by weight) ATPRIME® 2A with 4 parts (by weight) ATPRIME® 2B. No catalyst is necessary. Allow mixture to stand 30 minutes before applying to the substrate. The pot life of blended ATPRIME® 2 is approximately 12 hours at 80°F and 50% relative humidity. Discard older material in accordance with applicable regulations. The ATPRIME® 2 system may be thixotroped to prevent drainage on vertical surfaces and to improve adhesion to very non-porous substrates. Blend 3% hydrophilic fumed silica into ATPRIME® 2B.

Apply the ATPRIME® 2 mixture using a paintbrush, or a paint roller for larger surfaces. For health and safety reasons, the mixture should never be sprayed. Allow primer to cure for a minimum of 2 hours at ambient temperature. Complete curing is evident when the primer surface cannot be indented by a fingernail. The cure is moisture-initiated, so cure time will vary with temperature and humidity conditions. If primer is left more than 24 hours, re-application will be necessary to obtain full inter-laminar bond strength.

Apply polyester resin over the cured, primed surface, and then complete fiberglass lamination according to accepted industry practice.

Refer to the application guide "ATPRIME 2 Lining Technical Guide" for more details on substrate preparation

In order to keep the applied layer clean, it is best to start with the walls and then carry on with the floor, working from the deep end of the pool to the shallow end so that the layer is not walked on. Once the primer has set, the next stage can begin.

THE LINER

Pigmented resin should not be used in the liner, as this will mask air bubbles that must be removed.

Calculation of material quantities:

[Reference:

Chopped Strand Mat 450 g/m² = 0,45 kg/m²

Chopped Strand Mat 300 g/m² = 0,30 kg/m²

Glass surface Tissue 25 g/m² = 0,025 kg/m²]

1) Mass of glass fibre mat (kg) = (glass mass, kg/m²) x (pool surface area, m²).

2) Resin Mass for glass fibre mat = total glass mass (kg) x 3.

3) Mass of surface tissue = (tissue, kg/m²) x (pool surface area, m²).

4) Mass of resin for surface tissue (kg) = total tissue mass (kg) x 10.

All these amounts should be increased by 15% to allow for overlaps and wastage.

APPLICATION OF THE LINER

The pool surface area must be divided into sections, each of which can be easily covered with laminate well within the expected gel time of an appropriate resin batch. It should be noted that the gel time of the resin is dependant on prevailing temperature (surrounding air and concrete) and the amount of catalyst used. The catalyst content can be varied to alter the gel time at different temperatures but should be kept between 1% and 2%. The glass fibre mat should be cut to fit one of the sections and then weighed (or the mass calculated). The correct amount of resin is then weighed and catalysed. (Resin mass = 3 x glass mass).

Where coping stones have been removed, application of the liner must start in a groove 20-30mm deep, cut into the coping substrate at least 120mm in from the edge of the pool, and progress down the wall towards the floor. About 80% of the resin should be applied evenly to the pool surface, followed by the glass fibre mat. The glass fibre mat must then be rolled with a metal roller to ensure consolidation of the laminate and removal of voids. Additional resin can be applied to obvious dry spots, and these must be worked to ensure full wet-out of the fibres. The next section is applied in the same manner as the first and overlaps it. The next layer (if required) is applied in the same way before the first layer starts gelling, but so that it centrally straddles the overlap formed in the first layer. This final layer is followed by the 'C' glass surface tissue, which must also be thoroughly wetted out with resin. Once the walls have been completed, the liner is applied to the floor, also in sections. Care must be taken to keep the working area clean. The steps are lined last and an additional layer of glass fibre mat can be applied here. Any joints must be overlapped by at least 50 mm.

SPECIAL CONSIDERATIONS IF COPING STONES HAVE NOT BEEN REMOVED.

The groove cut for securing the laminate must first be covered with appropriately large quantities of catalysed resin. The top edge of the glass fibre mat must then be laid into the groove and worked to ensure complete wet out. The groove must then be sealed with a mixture of catalysed resin and silica powder.

INSPECTION AND REPAIR

The liner should be allowed to gel and then be carefully inspected for irregularities and defects, e.g. dry spots, exposed fibres etc. If the liner is satisfactory, the top coat may be applied. This should be done as soon as possible after the liner has been completed, to ensure a good bond. If repairs are necessary, these areas after repair should be allowed to cure and then be sanded flush with the surrounding laminate. If the liner has been left for an extended period and the resin is fully cured, it will be necessary to sand the total area to ensure good adhesion of the Poolcoat.

APPLICATION OF THE POOLCOAT

It is suggested that white or pale blue colours are chosen as dark coloured Poolcoats can dis-colour in patches when in contact with water (refer to technical information on 'Undercure as a cause of whitening of swimming pools'). The Poolcoat is catalysed so as to afford a reasonable gel time at the prevailing temperature (refer to NCS Resins data sheet for the Poolcoat being used). It must be stirred thoroughly and then applied in a single, even coating at 600 to 800 g/m². The Poolcoat must be allowed to cure for approximately 24 hours before inspection. If repairs are necessary, the area must be sanded to remove the wax layer and then be re-coated using the recommended quantity of Poolcoat and catalyst.

Mosaic Tissue NCS Poolcoat 73 NAT PAE is based on NPG chemistry and as a result it does not cure completely when applied very thin or at temperatures below 15 °C. As the synthetic mosaics are typically 1 mm tissue very little Poolcoat/resin is required to completely wet-out the mosaic, typically 150 – 200 g/m². At this film low thickness, the NCS 73 Nat PAE will whiten because of incomplete cure. We therefore do not recommend that NCS 73 NAT PAE be used to post apply mosaic tissue.

NCS Mosaic Coat 71 NAT PAE is specifically designed for post application of mosaic tissue and is formulated to cure well in thin films and is recommended for this purpose..

FILLING OF COMPLETED POOLS

Before the pool is filled with water, the liner and Poolcoat must be given sufficient time to cure completely. If this is not done, the liner will be more susceptible to moisture attack, de-bonding and cracking. In summer 5 to 6 days should be allowed between completion of the pool and filling it with water, and in winter, the cure period should be further extended depending on ambient temperatures.

REPLACING OF COPING STONES

If coping stones were removed during construction of the liner, they can now be replaced after the Poolcoat has cured completely. Poolcoat should be sanded in the areas where the coping stones are to be located, to remove the wax layer on the surface. The coping stones can then be fixed with an epoxy or urethane adhesive. Once the adhesive has set, the spaces between the stones can be filled with a standard tile cement.

GENERAL POINTS

- Construction of a swimming pool liner should not be started if there is a possibility of rain, since each phase of the process should be continuous until completed. If insufficient time is available to allow completion of a particular phase, that phase should not be started.
- It is recommended that no work takes place if the air temperature is lower than 15°C.
- Suitable safety goggles, protective clothing and a dust mask should always be used when sanding a GRP laminate.
- The finished liner should be smooth, with all edges sealed properly, and there must not be any exposed fibres or sharp edges.
- When the pool is used after lining, the pH value of the water should be maintained at 7 at all times. Pool care additives such as chlorine or acids should always be added in a diluted form.

MATERIAL SAFETY

A Material Safety Data Sheet is available from your NCS Resins representative. Make certain that you obtain a copy of this guide to the safe handling of unsaturated polyester resins and resin systems, and that its contents are understood before work commences.

CATALYST IS A DANGEROUS MATERIAL AND MUST BE KEPT OUT OF THE REACH OF CHILDREN. IN THE EVENT OF AN ACCIDENT, CONSULT YOUR PHYSICIAN IMMEDIATELY.

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