

TECHNICAL BULLETIN – TB088

Treatment of Swimming Pool Internals

(Ardex WPM002 - 2 Part System)

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INTRODUCTION & SCOPE

This Information Sheet is designed to detail the treatments necessary for the surface preparation and application of a waterproof membrane finish to a newly constructed concrete swimming pool prior to the application of a tiled finish.

Several aspects of the construction and coating schedule are covered in each of the following sections.

Application of a coating to a swimming pool is a critical process – please read all information carefully before proceeding. Any inquiries or doubts should be directed to your nearest Ardex technical representative before carrying out any work.

STRUCTURAL CONSIDERATIONS

This specification incorporates a flexible membrane suitable for pools that are structurally sound and not likely to develop excessive cracks or structural relative movement between the walls and base or other locations over time. The construction of the pool must include continuous reinforcement (for single cast structures) or reinforcing starter bars (for dual cast structures) between the base and the walls in accordance with relevant Australian Standards.

Where the pool is to be over a habitable area, or other critical areas, the waterproof membrane should be fully reinforced and the optional reinforcement layer should be included.

Suspended pools over habitable areas must be accompanied by a structural engineers report confirming the structural integrity of the pool.

CLIMATIC CONDITIONS

Major problems can be experienced as a result of climatic conditions during application of a swimming pool membrane coating.

AMBIENT TEMPERATURE

If the ambient (air) temperature falls below 8°C the drying rate will be severely slowed and chemical curing will cease altogether. As the temperature rises both drying and chemical curing rates will increase although the chemical curing rate will remain very slow until the temperature reaches 15°C.

No membrane coating application should take place while the ambient temperature is below 10°C nor while the temperature is around 10°C and is not expected to rise above 15°C for the subsequent four hours.

No membrane coating application should take place while the ambient temperature is equal to or above 35°C.

SURFACE TEMPERATURE

Surface temperature is the actual temperature of the substrate surface and this can vary substantially from the ambient temperature. High surface temperatures can result in blistering of the membrane coating and lead to improper bonding with subsequent delamination between coats. Water or moisture in the substrate as a result of exposure to rain or high pressure water blast cleaning will commence to vaporise at around 40-45°C. The membrane coating has a very low permeability and therefore will not allow this moisture vapour to escape from the surface. The membrane coating therefore has to be set hard and well bonded prior to being subjected to the pressures of the vaporising moisture or the water vapour will simply blow the coating off the surface in the form of blisters.

Surface temperature can also affect the flow and bond strength of the membrane coating. High surface temperatures result in the water at the interface of the surface and the fresh coating evaporating rapidly reducing the flow of the membrane coating and therefore reducing the penetrating properties and bonding ability of the coating.

No membrane coating application should take place while the surface temperature is below 10°C nor around 10°C and not expected to rise above 15°C over the subsequent four hours.

No sealer/primer or membrane coating should take place while the surface temperature is equal to or above 35°C.

RELATIVE HUMIDITY

Very high ambient relative humidity will result in the very slow evaporation of water from the membrane coating. Since chemical curing is retarded prior to the membrane coating drying, slow drying and therefore chemical curing will result in conditions of high humidity.

No membrane coating application should take place while the relative humidity is above 90% nor around 90% and not expected to fall below 80% over the subsequent four hours unless the surface temperature is above 25°C.

PENDING RAIN OR SHOWERS

While the Ardex membrane coating system is very tolerant to early rain or showers, exposure to early rain or showers will result a deterioration, or worse, of the integrity of the membrane. Exposure to rain or showers prior to curing (within 4-5 hours of application) may result in membrane coating discolouration.

Time Scale between Stages

The minimum time intervals that should be allowed to elapse between the successive stages, as recommended by AS3958.1-2007, and also Ardex technical information. In each case, the more conservative time span has been selected. They are:

1. Between placement of the pool shell and rendering or screeding: **6 weeks to allow for any plastic shrinkage to develop.**
2. Between placement of the pool shell or rendering and application of the waterproof membrane: **16 hours.**
3. Between completion of rendering and fixing of tiles: **21 days (If tiles are directly fixed to the render or concrete).**
4. Between completion waterproofing membrane application and fixing of tiles: **24 hours @ 23°C/50% R.H. (If tiles are directly fixed to waterproof membrane)**
5. Between completion of tile fixing and the commencement of grouting: **7days.**



6. Between completion of the grouting and sealing of expansion joints and the filling of the pool: **3 weeks for cement based grout systems; 7 days for the Abapoxy system.**

Note: The above are minimum time intervals that should be allowed to elapse between the successive stages. Wet weather typically requires longer intervals.

SURFACE PREPARATION

PRIMARY PREPARATION

All concrete protrusions shall be ground to be smooth and level with the primary adjacent surface. Surface irregularities resulting from formwork impressions shall be remedied following surface preparation of the off-form concrete.

1. CAST CONCRETE

This section is likely to refer to the base of the pool.

Light Broom Finish

All surfaces shall be finished as a light broom surface finish. All surfaces shall be high pressure water washed or high pressure detergent washed as required using a nozzle pressure of not less than 7-10 MPa (1,000-1,500 p.s.i.) to remove all dirt, grease, oil or other surface contaminants.

Other Surface Finishes

All surfaces shall be wet or dry abrasive blast cleaning. Care should be taken not to excessively expose to concrete aggregate and a non-metallic aggregate must be used.

If abrasive blast cleaning is not possible surfaces shall be cleaned free from any residual form release agent (according to the manufacturers instructions) or other surface contaminants and all surfaces shall wetted down prior to acid etched by applying liberal quantities of a 15% hydrochloric (muriatic) acid solution in water to the surface. Allow the acid to cease reacting and thoroughly rinse with fresh clean water.

Note: Acid etching should only be used as a last resort and particular emphasis shall be placed on the complete removal of all residual acid.

2. OFF-FORM CONCRETE

This section is likely to refer to the walls of the pool.

Any residual form release agent shall be removed and surfaces shall be wet or dry abrasive blast cleaned to achieve a surface profile of 50-75 micrometers and open the pores of the concrete. Care should be taken not to excessively expose to concrete aggregate and a non-metallic aggregate must be used.

Surfaces may then be rendered or prepared for direct coating membrane application.

SECONDARY PREPARATION

DIRECT COATING APPLICATION

All surface imperfections, such as blow holes, surface damage, areas adjacent to intrusions, etc., should be reinstated to form a smooth even surface finish. Reinstatement shall be carried out using a mortar formulated from a 3:1 sand cement blend blended with a gauging solution consisting of 4 volumes of water mixed with 1 volume of Ardex WPM405 Sheltercrete Additive. Immediately prior to placement of the repair mortar, surfaces should be coated with a slurry coat prepared by blending 4 volumes of Portland cement with a mix of 1 volume of Ardex

WPM405 Sheltercrete Additive and 1 volume of water, as a new to old concrete bonding bridge. The reinstatement mortar should be placed while the bonding bridge remains wet or tacky.

RENDERED FINISH

A 3:1 sand cement render shall be prepared using a blend of 1 volume of Ardex WPM405 Sheltercrete Additive and 3 volumes of water as the gauging solution. Immediately prior to laying the render apply a thin coat of Ardex HydrEpoxy WPM300 thinned 3:1 with fresh clean water as a new to old concrete bonding bridge. Only apply the bonding bridge to an area than can be rendered within the drying time of the bonding bridge. Lay and finish the render over the bonding bridge only while the bonding bridge remains wet or tacky. If the bonding bridge dries before the render can be laid apply a further coat over the existing coating before continuing. Rendered surfaces shall be finished to a light broom finish.

INTERNAL CORNERS

Install a coving of at least 20mm in all corners. Coving shall be carried out using a mortar and slurry coat formulated as detailed for Rendered Finish above. Immediately prior to placement of the cove, surfaces should be coated with the slurry coat as a new to old concrete bonding bridge. The cove should be placed while the slurry coat remains wet or tacky.

PRIME / SEAL COATING

All surfaces shall be coated with one coat of Ardex WPM300 HydrEpoxy thinned 50% with water (ie. equal volumes of Part A, Part B and water). Application may be by brush or roller and the coating should be worked well into the surface.

Allow the seal coat to dry to touch (normally approximately 4 hours) and apply to all surfaces a second prime coat of Ardex WPM300 HydrEpoxy by brush, roller or spray to achieve a coverage rate of 3 square metres per litre.

Important:

In general, and particularly in warm or hot ambient conditions, the Prime/Seal Coating should be applied when the surface temperature is declining (such as late afternoon) to avoid the risks of vapour blistering.

WATERPROOF MEMBRANE APPLICATION

Allow the Prime/Seal coating to dry thoroughly before proceeding.

Treatment of Cracks and Joints

All joints and cracks shall be filled with a sealant specifically designed and recommended by the manufacturer as being suitable for pool installations. Always use a reputable sealant manufacturer and the sealant must be installed strictly in accordance with the manufacturers' recommendations.

Expansion Joints

All areas to receive Ardex Construction Detail Bandage must remain dry. Install temporary masking tape over the expansion joints so as to define an area of free movement for the bandage of approximately 50mm wide. Mix Ardex Abapoxy (Part A & Part B) in the ratio of 1:2 then add sufficient Portland Cement to the blended Ardex Abapoxy components to form an icing sugar consistency. The Ardex Abapoxy mix must be used within 15 – 20 minutes. Lay a bed of Ardex Abapoxy onto the concrete surface to the sides of the temporary masking tape. Immediately remove the masking tape and position the Ardex Construction Detail Bandage with the polypropylene wings into the Ardex Abapoxy bed. (No Abapoxy to be under the 50mm free area of the band). Embed the wings into the Ardex Abapoxy and remove excess



from the surface of the band. Whilst still wet sprinkle the wet Ardex Abapoxy with 0.5mm dry clean sand and allow to cure for 48Hrs. Protect from adverse weather conditions whilst curing.

Construction Joints & Cold Joints

In applications where the Optional coat incorporating full reinforcement is not employed, all construction and cold joints shall be stripe coated along the joint and to at least 150mm on either side of the joint with a liberal coat of Ardex WPM002 Two Part. While the Ardex WPM002 Two Part remains wet and fluid lay Ardex Deckweb woven polyester mat reinforcement into the coating and knead into the coating so as to wet the Ardex Deckweb through. Ensure the Ardex Deckweb is fully wetted out and all creases or air pockets are removed. Care must be taken that each area coated is limited so that the reinforcement can be laid while the coating remains wet or tacky. Immediately following the treatment of all joints, the first coat of membrane can be applied over the remainder of the surface.

Membrane Application

First Coat

After all joints have been treated apply one coat of Ardex WPM002 Two Part Membrane at a coverage rate of not greater than one (1) square metre per litre (wet film thickness of 1 mm).

Optional coat for pools over habitable or critical areas.

Allow the previous coating to dry thoroughly, at least 16 hours, and apply to all surfaces a further coat of Ardex WPM002 Two Part Membrane to all surfaces at a coverage rate of not greater than 1 square metre per litre (wet film thickness of 1mm). While the Ardex WPM002 Two Part remains wet and fluid lay Ardex Deckweb woven polyester mat reinforcement into the coating and knead into the coating so as to wet the Deckweb through. Ensure the Deckweb is fully wetted out and all creases or air pockets are removed.

Finish Coat

Allow the previous coating(s) to dry thoroughly, particularly over reinforced areas, (at least 16 hours) and apply to all surfaces a further coat of Ardex WPM002 Two Part at a coverage rate of not greater than 1 square metre per litre (wet film thickness of 1.0 mm).

Allow the membrane to fully dry particularly over reinforcement for a period of not less than 24 hours before proceeding with the tiling.

TILING INSTALLATION

Note: Time Scale Between Stages before proceeding.

Tile adhesives must comply the AS4992.1 ratings Types C2S1 or R1.

Materials for Fixing of tiles

Suitable Ardex adhesives for fixing tiles in swimming pools are:-

1. **Ardex STS 8 White** adhesive to be used with **Ardex E90** additive
2. **Ardex OPTIMA** adhesive
3. **Ardex X77** adhesive recommended to be used with **Ardex E90** for improved performance

Materials for grouting

Suitable Ardex tile grouts in swimming pools are:-

1. **Ardex ABAPOXY** Epoxy Grout
2. **Ardex WA** Epoxy Grout
3. **Ardex FG8** grout colour 200 white plus GROUT BOOSTER.

Installing Tiles by Thin Set Method

Substrate must be solid, compact, and free from loose particles, grease, wax, oil, form release agents and other bond breakers.

1. Ardex Optima

Mix in strict accordance with the Product Data Sheet.

2. Ardex STS 8 White/Ardex E90

Mix in strict accordance with the Product Data Sheet.

For 20kg of Ardex **STS8 White**, mix 3.6kg of Ardex E90 with up to 5L of clean water then mix with a mechanical stirrer to a smooth paste.

3. Ardex X77

Mix in strict accordance with the Product Data Sheet. Where increased performance to S2 classification, or resistance to salt water pools is required, Ardex E90 is added to the gauge water.

For 15kg of Ardex **X77** powder, mix 2.5kg of Ardex E90 with up to 5.5L of clean water then mix with a mechanical stirrer to a smooth paste.

Apply the selected adhesive with a notched trowel to achieve 100% bed coverage and a dry bed thickness of not less than 2-3 mm. Back buttering of tiles may be required when the tile is deeply keyed or for placement on curved surfaces to gain the required back coverage.

Careful checks must be made to ensure that a skin does not form on the adhesive surface. Should a skin form on the adhesive do not wet spread the adhesive and do not add water to the mix.

Allow the adhesive to air cure for a minimum of 7 days before proceeding with Grouting.

Note: Refer to Ardex Technical Paper TP002 for information about mesh backed mosaics in swimming pools. "Stackstone" tiles are not recommended for swimming pool installation.

Grouting

1. ABAPOXY AND WA EPOXY GROUT

Grout all tiles working the grout well into the voids between the tiles over an area of approximately one (1) square metre. Before proceeding remove all excess grout from the area treated. Ensure all tile surfaces are cleaned free from all residual grout within 1-2 hours of mixing or it will be very difficult to remove.

Allow the grout to air cure for a minimum **7 days** for Ardex Abapoxy & Ardex WA prior to commencement of filling the Pool.

Technical Bulletin TB088.006 310513

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2. FG8 GROUT WITH GROUT BOOSTER

Mix 4 volumes of Ardex Grout Booster with 1 volume of fresh clean water and blend with the Ardex FG8 grout to achieve a firm, smooth medium slump paste.

Dampen joints, especially in hot weather or with porous tiles and fill joints using a rubber squeegee. Wipe off excess material taking care not to remove excessive material from the joints. Allow to touch dry and polish with a clean lint free cloth to remove residual scum.

Allow **14 days** prior to filling the pool with water.

Movement Joints

Existing expansion or construction joints in substrate must be carried through the tile work to the face and shall conform to architectural details and Australian Standard 3958.1-2007.

Expansion joints shall be installed where tile work abuts restraining structures such as perimeter walls, curbs, corners and where there are “changes of plane”

Installation shall have movement joints in a grid pattern spaced at a maximum of 5.0 x 6.0m, the 5.0m lining up with every second lane marker is an ideal set out. Movement joints shall be raked or cut through the setting bed to the supporting slab structure.

Expansion joints and movement joints shall be sealed with a sealant specifically designed and recommended by the manufacturer as being suitable for pool installations. Always use a reputable sealant manufacturer and the sealant must be installed strictly in accordance with the manufacturers’ recommendations.

The responsibility for calculating the actual spacing and size of the expansion joints shall be the responsibility of the tiling contractor or structural engineer employed by the same company, or the contractor shall be responsible for the site measurement and placement within the design tolerance described in the plans and specifications

Always use a reputable sealant manufacturer and a sealant specifically designed and recommended by the manufacturer as being suitable for pool installations. The sealant must be installed strictly in accordance with the manufacturers’ recommendations.

Protection

The Tiling Contractor shall take all precautions to protect the finished tile work from damage by other trades.

Do not allow traffic on fresh tile work and fresh grout joints for at least 8 hours.

Tile work must not be washed or exposed to rain and must be protected from direct sun, drying wind for at least 24 hours after lying.

The tile work shall be allowed to air dry for the nominated period after grouting and prior to filling the pool.

IMPORTANT

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia Office.

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REASON FOR REVISION

Addition of Ardex X77 adhesive.

Changes to wait time periods in line with AS3958.1-2007.

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