TECHNICAL BULLETIN – TB098

WATERPROOFING POTABLE WATER CONTAINMENT TANKS

18th July 2024

INTRODUCTION & SCOPE

This technical bulletin covers the treatment recommended for the internal waterproofing of concrete potable water containment tanks, such as drinking water tanks and reservoirs, and emergency fire water storage tanks. This recommendation is designed for structurally sound concrete tanks and reservoirs only.

> ***The application of a coating to concrete tanks and reservoirs is a critical process. Please read all information carefully before proceeding. Before carrying out any work, you should direct any inquiries or doubts to your nearest ARDEX technical representative.***

STRUCTURAL CONSIDERATIONS

This specification incorporates a semi-rigid membrane (**ARDEX WPM300**). It is only suitable for concrete tanks and reservoirs that are structurally sound and not likely to develop cracks or relative structural movement between the walls and base or other locations over time. The construction of the concrete tanks or reservoirs 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 the relevant Australian Standard.

Suspended concrete tanks or reservoirs over habitable areas must be accompanied by a structural engineer's report confirming their structural integrity.

CLIMATIC CONDITIONS

When a tank or reservoir membrane coating is applied in the open, climatic conditions can cause major problems.

In the case of closed tanks or reservoirs within buildings, the conditions within the tank or reservoir can be relatively low temperatures and humid, and because of the small manhole entry point(s), can have very low airflow or air transfer conditions. Conditions at the surfaces to be coated should be carefully assessed, and corrective measures should be taken before commencing a coating application.

AMBIENT TEMPERATURE

If the ambient air temperature falls below 10°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 occur while the ambient temperature equals or exceeds 35°C.**

When applying coatings to wet or damp surfaces, the temperature must be reducing to avoid vapour blisters.

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. The membrane coating has a very low permeability and therefore will not allow this moisture vapour to escape from the surface. The membrane coating, thus, has to be set hard and well bonded before being subjected to the pressures of the vaporizing moisture, or the water vapor will 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 its penetrating properties and bonding ability.

No membrane coating application should take place while the surface temperature is below 10°C or around 10°C and not expected to rise above 15°C over the subsequent four hours.

No sealer/primer 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 chemical curing will result in conditions of high humidity.

No membrane coating application should occur while the relative humidity is above 90% or around 90% and not expected to fall below 80% over the subsequent four hours unless the surface temperature is above 25°C.

In conditions of higher relative humidity, an increase in air flow over the coating's surface will facilitate faster drying.

PENDING RAIN OR SHOWERS

While the **ARDEX WPM300** membrane coating system is very tolerant to early rain or showers, the colouring pigment will be affected if exposed to these conditions prior to the membrane coating reaching initial set.

SURFACE PREPARATION

SPECIAL REQUIREMENT

Concrete surfaces need to have open pores. Pores may be sealed by overworking during finishing, wet finishing, and high-wear polishing of aged concrete or other installation or service conditions. Off-form concrete and high-strength concrete (>35MPa) normally seal the pores of the concrete.

The pores of the concrete may be opened to produce a porous surface finish by mechanical means of surface preparation such as abrasive blast cleaning, scarifying, scabbling, or grinding. All concrete protrusions shall be ground to be smooth and level with the primary adjacent surface.

1. CAST CONCRETE

This section will likely refer to the base of the tank or reservoir.

LIGHT BROOM FINISH
All new concrete surfaces shall be finished as a light broom surface finish.

All aged concrete surfaces shall be thoroughly cleaned and free from all surface contaminants, including grease, oil, dirt, and fungi. Cleaning shall be carried out by mechanical methods or high pressure water blasting using detergent as required.

In both instances the concrete structure must be open pored and free from all contaminants including, curing membranes, dirt, grease and oil.

2. OFF-FORM CONCRETE
This section is likely to refer to the walls of the tank or reservoir.

Any residual form release agent shall be removed, and surfaces shall be wet or dry abrasive blast cleaned to achieve a suitable surface profile.

Any remaining protrusions and/or intrusions remaining from formwork placement shall be ground smooth.

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

3. CONCRETE BLOCKWORK – CORE FILLED & REINFORCED
Concrete block walls should be rendered to achieve a uniform level to plane surface.

SECONDARY PREPARATION NOTES

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 1 volume of ARDEX WPM300 and 1 volume Portland cement. Up to 2 volumes of river washed sand may be used to body the mortar to fill surface imperfections. Immediately prior to placement of the repair mortar, surfaces should be coated with one coat of ARDEX WPM 300 thinned 2:1 with fresh clean water as a new to old concrete bonding bridge. The reinstatement mortar should be placed while the ARDEX WPM 300 bonding bridge remains wet or tacky.

RENDERED FINISH
A 3:1 sand cement render can be used incorporating 1 litre of ARDEX WPM405 Additive per 4 litres of water as the gauging water. Immediately prior to laying the render apply a coat of ARDEX WPM405 slurry mix formulated from one volume of ARDEX WPM405 additive and 1 volume of water mixed with 4 volumes of Portland cement as a new to old concrete bonding bridge. Only apply the bonding bridge to a small area at a time that allows the render to be laid and finished 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 with a light broom finish.

INTERNAL CORNERS
Install a coving of at least 50 mm in all corners. Coving shall be carried out using a mortar and slurry coat formulated as detailed in 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.

PRIMING

All surfaces shall be coated with one coat of ARDEX WPM300 (thinned 50% with water). This can also be considered as 1 part WPM300 Part A, 1 part WPM300 Part B and 1 part water. Application may be by brush or roller and the coating should be worked well into the surface. Allow the diluted WPM300 to penetrate for not less than 15 minutes and in any event recoat with an undiluted coat of ARDEX WPM300, while the surface remains wet or tacky, at a coverage rate of 3.0 square metres per litre (wet film thickness of 0.3 mm). Allow drying to a scratch-hard film (normally overnight) before proceeding.

TREATMENT OF CRACKS AND JOINTS

1. EXPANSION JOINTS

If the tank is constructed with expansion or construction joints contact the nearest ARDEX Office for recommended treatment procedures.

2. CRACKS

An engineer must address structural cracks to stabilise the structure and structurally reinstate the crack.

Cracks resulting from plastic shrinkage of the concrete can be filled with a mix of ARDEX WPM300 and Portland cement in equal volumes, allowed to set and then stripe coated along the crack and to at least 150mm on either side of the crack with a liberal coat of ARDEX WPM300. While the ARDEX WPM300 remains wet and fluid, lay ARDEX Deckweb equidistantly across the crack and knead the exposed reinforcement cloth into the coating, ensuring it is fully wetted out. All creases or air pockets should be removed. Care must be taken that each area coated is limited so that the ARDEX Deckweb can be laid while the coating remains wet or tacky. Immediately following the treatment of all cracks, the first coat of membrane can be applied over the remainder of the surface.

MEMBRANE APPLICATION

1. REINFORCING COAT

After priming as above, apply a second liberal coat of ARDEX WPM300 at a coverage rate of 3 square metres per litre (wet film thickness of 300 micrometers). While the coating remains wet and fluid place ARDEX Deckweb reinforcement mat into the coating and thoroughly wet out the mat using a metal fluted roller. All creases and air pockets must be removed.

2.FINISH COAT

Allow the previous coating (which contains ARDEX Deckweb) to set hard and apply to all surfaces a further coat of ARDEX WPM300 to all surfaces at a coverage rate of 3 square metres per litre (wet film thickness of 300 micrometers).

Allow the membrane to cure for at least five (5) days before filling with water and at least seven (7) days before adding any water treatment chemicals and/or placing a pool back into service.

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.

DISCLAIMER
The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

Australia: 1300 788 780
New Zealand: 643 384 3029

Web: www.ardexaustralia.com
email: technical.services@ardexaustralia.com
Address: 2 Buda Way, Kemps Creek NSW 2178