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TECHNICAL BULLETIN – TB266

FLOOD TESTING OF ARDEX WATERPROOFING MEMBRANES

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INTRODUCTION & SCOPE

Ardex Australia manufacture and distribute a range of waterproofing membranes to the construction and remedial industries. The integrity of these membranes is often tested insitu (once installed) to determine 'water fastness' prior to commissioning for intended use. The testing is described as 'Flood Testing' and is performed once the membrane has cured sufficiently to allow tanking of the waterproofed area. If a situation is deemed critical, it is often recommended that 'Flood Testing' be performed prior to installation of any materials on top of the waterproofing membrane or material.

Accepted cure times of Ardex membranes are covered in this Bulletin as are the procedures for conducting the 'Flood Testing'.

WHY IS FLOOD TESTING IMPORTANT?

Waterproofing of internal wet areas and external roofs and balconies is one of the critical functions in new and remedial construction. If not done properly there is the potential for costly repairs and possible structural damage.

Ardex manufacture and supply liquid applied and sheet membranes. These are generally tiled over but some sheet membranes and some of the liquid applied 'trafficable' membranes can be left exposed. In waterproofing situations deemed critical, 'Flood Testing' is recommended to verify the integrity of the installation.

MEMBRANE CURE TIMES

The recommended cure times for Ardex membranes or Ardex sheet systems are in the following table. These are minimum times that should be allowed at 23°C and 50% RH before the flood testing procedure can begin.

Note: Cooler temperatures or higher humidity will extend these times.

Ardex Waterproofing Membrane	Recommended Cure Time (hours)	Comments
ARDEX WPM 001 (Single Part Membrane)	72	The material may be slow to cure in junctions and high build areas
ARDEX WPM 155 (Single Part Membrane)	72	The material may be slow to cure in junctions and high build areas
ARDEX WPM 002 (Two Part Membrane)	48	Two part cementitious acrylic membrane (even cure throughout)
ARDEX WPM 812/822 (Two Part Topcoat Membrane)	48	Trafficable system. Cure time is after completed application of the Topcoat
ARDEX WPM 813/823 (Two Part Topcoat Membrane)	48	Trafficable system. Cure time is after completed application of the Topcoat

ARDEX WPM 750/1000 (Under-tile sheet Membrane)	60 mins	Fleecy sheet membrane heat welded prior to application of tiled finishes or screeds. The membrane is adhered to the substrate with a solvent based adhesive (external) and a water-based adhesive (internal)
ARDEX BUTYNOL ARDEX WPM 712 ARDEX WPM 715 ARDEX WPM717 ARDEX WPM720 (Roofing Membranes)	24	Rubber sheet membranes designed to be left exposed. The membrane is adhered to the substrate with a solvent based adhesive.
ARDEX WPM157 (One Part Polyurethane Membrane)	48	Polyurethane single part membrane for retaining wall and planter box applications.
ARDEX WPM179 (One Part Latex Modified Bituminous Membrane)	72	Bituminous emulsion membrane for retaining wall and planter box applications.
ARDEX Bituminous 'Torch On' sheet membranes ARDEX WPM185 ARDEX WPM444 ARDEX WPM150 ARDEX WPM 188	30 mins	Bituminous sheet membranes used for roofing, retaining wall and planter box applications.
ARDEX Bituminous 'Self Adhesive' sheet membranes ARDEX WPM 3000X ARDEX WPM 117	30 mins	Bituminous sheet membranes used for roofing, retaining wall and planter box application Typically used for repair applications
ARDEX WPM310 and ARDEX WPM330 (External Façade Membranes)	48	Single part acrylic façade membranes

Note: ARDEX WPM812/822 and ARDEX WPM 813/823 are trafficable waterproofing systems and are unlikely to be used in a 'tanking' situation where 'Flood Testing' is required.

SHOWER PANS AND HORIZONTAL INTERNAL APPLICATIONS

PREPARATION

Prior to the commencement of flood testing, the waterproofing membrane or other approved material type must be inspected for full cure, voids, pin-holes or imperfections. Repairs must be made where there are any observed problems.

Note: The previously recommended drying times must be again observed until the repaired areas have properly cured.

All drains within the area to be tested must be plugged with suitable plugs. The area around the plug and drain must be filled with water in order to check for leaks around the plug and drain installation before proceeding with the full test.

FLOOD TEST

Constant monitoring should occur for the duration of the test. The conditions beneath the test area should be noted before the test begins and at four hour intervals until completion of the 'Flood Test'.

Flood the area being tested with potable water to a minimum depth of 25 mm to a maximum depth of 100 mm at the low point of the test area. The mean water depth should not exceed 65

mm. Water added to the area to be tested must be at a pressure that will not damage the membrane and will not flow onto any lapped edges. It is possible that leaks may occur so it may be best to have a contingency plan in effect to deal with the water.

If the flood test is being performed in an exterior environment, the testing should not be performed if rain is anticipated during the test period. For accurate measurement of water loss due to environmental conditions (evaporation, wind, etc...) it would be a good idea to place a watertight, flat-bottom, vertical-sided shallow pan to the approximate depth of water in an adjacent area which will be subjected to all of the same environmental conditions as the test area. At pre-determined points, in both the area being tested and the shallow pan, measure the water at the beginning and end of the test. Calculate any changes in water depth in the area being tested and the shallow pan. If the difference in depth in the area being tested is substantially greater than the shallow pan, then membrane leakage is probable.

The 'Flood Testing' of a membrane is considered to have started when the water has reached its maximum test depth.

FLOOD TEST PERIOD

'Flood Testing' should be performed for a minimum time interval of 24 hours. The test should be begun once the water has obtained the recommended test depth. Continuous 'Flood Testing' of a membrane should be performed for no longer than 72 hours.

FLOOD TEST FAILURE

If leakage is detected during the test period, immediately drain water from the test area and determine the location of the leakage. The test area should then be repaired. If the problem area cannot be located then the installation area will need to be entirely re-waterproofed.

The 'Flood Test' procedure should be re-done once repairs had been conducted and the membrane cured for the appropriate time.

FLOOD TEST SUCCESSFUL

If it is determined that no leakage has occurred the test area can be drained and dried. The membrane should be left for at least 24 hours before further finishes such as tiles or floating timber decks are installed.

SWIMMING POOLS AND LARGE SCALE WATER FEATURES

Flood testing of swimming pools, fountains and other water features is handled in a similar manner to showers, but there are some major differences which are outlined below.

The basic scale of the flood test is much greater than a shower pan or horizontal application. Where a typical 900 mm x 1200 mm shower pan holds approximately 60 – 90 Litres of water, a 6 m x 12 m swimming pool which averages 1.8 m deep holds 130 m^3 of water which weighs over 130,000 kg.

There are generally more penetrations through the walls of a swimming pool or water feature structure. Each penetration requires specialized treatment to maintain the waterproofing integrity of the entire system. The materials used to waterproof these penetrations must be compatible with the primary waterproofing material.

The flood testing procedure for swimming pools generally takes 24 – 72 hours but it can take a long time to properly flood test a swimming pool or large water feature.

PREPARATION

ARDEX WPM 002 is the only waterproofing membrane Ardex recommends for use in swimming pools, spas and steam rooms. It should be allowed to cure for at least 48 hours prior to commencement of 'Flood Test' procedures. This may need to be extended in conditions of low temperature and humidity.

Prior to beginning the flood test procedure, conduct a visual inspection of the waterproofing surface and look for pinholes, voids, uneven membrane coat thickness, creases, or other defects which may cause a leaking problem. Areas around penetrations require careful attention. Repairs should be made on all areas where defects are noted.

Note: The previously recommended drying times must be again observed until the repaired areas have properly cured.

FLOOD TEST

Constant monitoring should occur during the first day of the test. Daily checks would then suffice after the first day. The conditions beneath the test area should be noted before the test begins and at four hour intervals until completion of the 'Flood Test'. This may not be possible with an in-ground concrete pool.

The pool, fountain or vessel is filled with water at the rate of 25 mm per hour to a depth of 50 mm to 100 mm. Allow the water to remain at this depth for 24 – 72 hours to determine if any drains, returns or other penetrations are leaking. If possible it is best to phase or stage the flood test in order to isolate specific elements (e.g. drains, pipes, or other penetrations) at various water depth levels. This approach makes it easier to identify leaks and to make appropriate repairs.

For accurate measurement of water loss due to environmental conditions (evaporation, wind, etc...) it would be a good idea to place a watertight, flat-bottom, vertical-sided vessel (test vessel) with the approximate depth of water in an adjacent area which will be subjected to all of the same environmental conditions as the test area. At pre-determined points in both the areas being tested and the test vessel, measure the water at the beginning and end of the test. Calculate any changes in water depth in the area being tested and the test vessel. If the difference in depth in the area being tested is substantially greater than the test vessel, then membrane or penetration leakage is probable.

If areas of leakage are observed then drain the pool, allow the membrane installation to dry completely then conduct appropriate repairs.

Pay special attention to sealants around any penetrations or in movement joints in the pool. Improperly installed or improperly used sealants may not be able to handle any loads or pressures exerted by the water. The water pressure exerted by 1,000 mm of depth is 9.8kPa. These pressures, especially at greater water depths may be too much for a poorly installed sealant to handle and may cause a leak.

If there appears to be no leaks during the first phase, then slowly fill the pool to slightly above the next level of penetrations (e.g. water jets, inlets, etc...) and repeat the procedure as stated above. If there are any leaks then drain the pool to a point below the area that requires repair, allow the membrane to dry completely before conducting the required repairs. If there are no leaks then continue filling the pool or vessel to slightly above the next level of penetrations (e.g. skimmers, lights, lane marker hooks, etc...) and repeat the process.

FLOOD TEST PERIOD

'Flood Testing' should be performed for a minimum time interval of 24 hours. The test should be begun once the water has obtained the recommended test depth. Continuous 'Flood Testing' of a membrane should be performed for no longer than 72 hours.

Should rain occur during the test period, discontinue testing to avoid flooding over the edge of the test area.

FLOOD TEST FAILURE

If it is determined that leakage has occurred at any stage, then the test area must be drained and repaired. The 'Flood Test' should be re-done once repairs had been conducted and the membrane cured for the appropriate time.

FLOOD TEST SUCCESSFUL

If it is determined that no leakage has occurred at any stage then the process can commence to the next stage. Once it has been determined that there are no leaks in the entire waterproofing installation, further finishes such as tiles can then be installed 24 hours after completion of the test.

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 or Ardex New Zealand 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.

REASON FOR CREATION – ISSUER
The creation of a new Technical Bulletin following a request from the Ardex Sales Department.

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