

# TECHNICAL BULLETIN – TB006

## THE ARDEX MOISTURE BARRIER SYSTEMS

Date, Monday, 8 May 2017



### INTRODUCTION & SCOPE

Internal concrete substrates come in many different forms – new concrete, old concrete, on grade, below grade, suspended floors. These internal floors then require application of many varied types of floor coverings – parquet, rubber flooring, sheet & tile vinyl flooring, direct stick carpet, cork etc.

The success of installing new floor coverings requires the selection of good quality material, an experienced and capable tradesman and evaluation of the condition of the concrete subfloor to accept the new flooring.

The physical condition of structurally sound concrete subfloors – scratch hardness, smoothness, flatness can be visually inspected, evaluated then specified for a repair/remodelling procedure. Moisture content of the concrete, however, is an unseen condition, which requires testing preferably using hygrometer testing equipment as per AS1884.2012 or AS2455-2007.

The standards put the responsibility back on to the installer to confirm the suitability of a subfloor before laying the flooring materials. Testing for moisture content can produce varying readings, depending on temperature, humidity, air conditioning/heating at time of testing, and in many cases may require professional evaluation to properly analyse the test readings.

At a glance, the concrete subfloor may appear dry and only after being sealed with an impervious floor covering does a moisture problem surface. The rectification costs typically exceed three times the original placement cost. Moisture problems also increase the likelihood of issues with alkaline pH attack which cause degradation of the vinyl adhesive and in some cases can also attack the floor covering itself.

*For more detail on these topics refer ARDEX Technical Bulletins TB040 and TB081.*

### SOLUTIONS

NOTE: The nominal moisture vapour transmission rate of 15gm/m<sup>2</sup>/24 hours is considered to be the maximum permitted for resilient flooring. Both the nominated Moisture Barrier systems have transmission rates below this maximum. In addition the ARDEX WPM300 has a moisture vapour transmission rate well below the requirements of AS2870 for damp-proofing of floors.

- a) The ARDEX WPM300 Hydroepoxy Moisture Barrier System provides protection against capillary and hydrostatic moisture on structural concrete substrates. The epoxy base for ARDEX WPM300 HYDREPOXY is a product that has been available for many years in Australia and has a tried and proven track record. The total system has been designed to be as cost efficient as possible, knowing the parameters we have to work with any many projects have been done this way.
- b) The ARDEX WPM368 moisture barrier is a one part system based on modified VA-SBR co-polymer technology. It has vapour transmission rates slightly higher than WPM300, but well within the nominal transmission rate of 15gm/m<sup>2</sup>/24 hours which is considered to be the maximum permitted for resilient flooring. The one pack nature of this product reduces the complexities of the installation, and also eliminates the need for a primer prior to the installation of the smoothing cement. *The main restriction with this product is that it has a longer drying time for two coats, which is effected by surface dampness in the substrate.*



The cured/dry Moisture Barrier is protected by a minimum 3 – 4mm layer of ARDEX underlayment cement (FLC) which provides a smooth hard flat surface for the conventional installation of *most conventional* floor coverings and *applied coatings*.

### SUBFLOOR PREPARATION

1. Proper preparation of the surface is the most important factor in achieving this bond. The steps and methods required to properly prepare the subfloor depend on the condition of the subfloor and its surface.
2. All weak, loose powdery surfaces of the subfloor must be removed back to a solid, clean open porous matrix of the concrete. Mechanically remove this weak surface either by scarifying, shotblasting or diamond shaving/grinding. Shotblasting is the preferred cleaning procedure.
3. Shotblast (using a dust free system) to remove all adhesive residues and laitance to expose the clean sound porous matrix of the substrate. This will require two or more passes, but it is imperative that a perfectly clean surface is exposed. All edge shot-blasting and grinding should be totally finished before the final pass of the blast procedure takes place
4. Allow all shot-blasted areas to free stand for a minimum of thirty hours with no traffic on it at all. This will help ensure that if there is any residual moisture vapour entrapped in the surface to evaporate before the surface is sealed. If for some reason there has to be foot traffic on the prepared surface during this time, extreme care must be taken to ensure no dirt or soil contamination takes place via shoe or boot migration.
5. Special emphasis must be given to ensure total preparation is done in hard to get at areas and around doorways etc.
6. Expansion and Construction joints to be individually noted and repair procedure to be evaluated and individual cost advised only when exposed after shot-blasting and scabbling.
7. All cracks to be noted by the contractor for future reference, and structural cracks shall be brought to the attention of the engineer before continuing.
8. Remove all dust and debris and vacuum thoroughly to provide an open porous matrix of the concrete.

*ARDEX Technical Bulletins TB041 examines preparation issues, and TB037 & TB039 discuss the implications that can result from poor preparation.*

### INSTALLATION OF ARDEX MOISTURE BARRIER

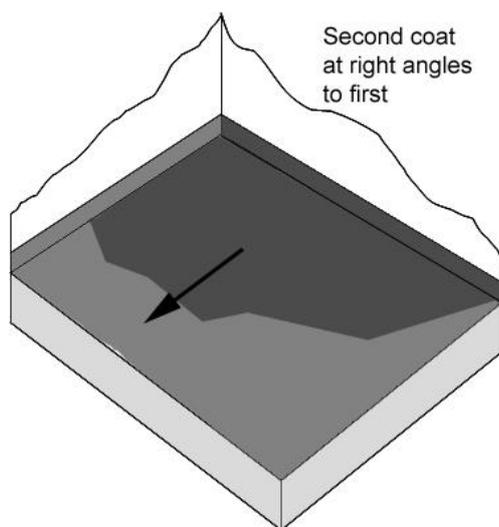
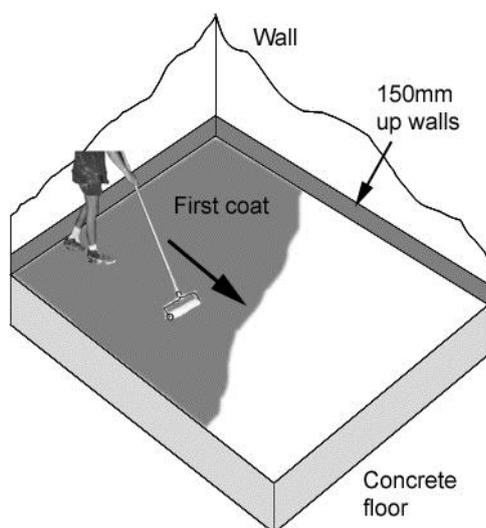
9. ARDEX WPM300 - thoroughly mix the individual Part A & B components of the WPM300 then mix the components in equal volumes to achieve a homogeneous mix.
10. ARDEX WPM368 – thoroughly mix the contents of the bucket before application.
11. Apply the total of two coats of the liquid barrier with a final total coverage of 1.5m<sup>2</sup> per litre (this is the same as ~3m<sup>2</sup>/litre at 300µm wet film thickness (WFT) per individual coat) to give a final dry film thickness (DFT) of 0.3mm (300µm).

It is recommended that the first coat is applied somewhat more liberally than the second to reduce the risk of pin-holing. The average of the two coats still equals the above coverage.

First coat to be applied at 2.5m<sup>2</sup> per litre (0.40 litre/m<sup>2</sup> @400µm WFT)

Second coat at 3.5m<sup>2</sup> per litre (0.29 litre/m<sup>2</sup> @250µm WFT)

*Extreme care must be taken to apply the coats in different directions to ensure that there are no windows left in the second coat and absolutely no pinholes in either coat. Pinholes lead to development of localised areas of high moisture and humidity under the floor covering.*



The coats are applied at 90 degree angles to obtain a complete coverage.

**Note:** It is important to obtain the coverage per coat as specified above, to ensure an adequate coating thickness for optimum performance. Correct coverage can be achieved by marking out the area to correspond to the litres mixed i.e. 1 coat @ 2.5m<sup>2</sup>/litre – 1 x 20 litre unit covers 50m<sup>2</sup> (nominally 20 litres covers 60m<sup>2</sup> at 0.3mm DFT for one coat).

Mark out 50m<sup>2</sup>, then mix up the 20 litre kit of WPM300 (Part A & B) in a separate bucket, and squeegee out the 20 litres to the entire 50m<sup>2</sup> (ensuring an even coat throughout), or direct apply the WPM368 from the container.

Then using a medium length nap roller, roll the ARDEX WPM300 or ARDEX WPM368 into the surface of the concrete. The same procedure although at a different coverage rate is repeated for the second coat.

When using ARDEX WPM300 Calculate then accurately measure out the quantity of WPM300 corresponding to the coverage rate required

e.g. 50m<sup>2</sup> @ 3.5m<sup>2</sup> per litre  

$$\frac{50}{3.5} = \sim 14.3 \text{ litres}$$
  
 (i.e. 7.15 litres of PART A and 7.15 litres of PART B)  
 (Say 7.2 litres of each to allow for waste)

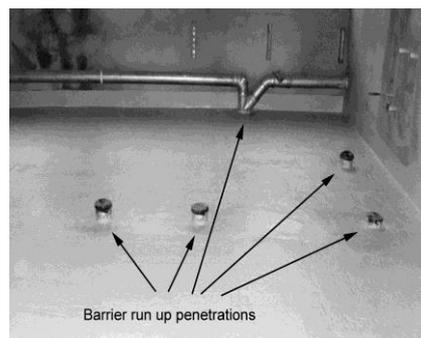
This method of installation ensures exact quantities are budgeted and used on site as no more than 10% batching error is acceptable with epoxy materials.

- The moisture barrier is to be continued up all concrete, rendered and other vertical surfaces to a distance of 150mm above the floor height. (Moisture can move sideways from other areas as well as vertically from the subfloor).

**Note:** All wall-to-wall, wall-floor and floor waste junctions, all penetrations and all other mobile joints shall be reinforced with the 190mm wide x 44gsm woven fabric tape (ARDEX Deckweb).

The moisture barrier is applied to all penetrations as well as up the walls to a height of 150mm. All angles and penetrations are to be reinforced with ARDEX Deckweb.

- A bond-breaker is to be used where hydrostatic pressure *is not an issue* at these mobile joints. This comprises a bead of neutral cure silicone sealant or polyurethane sealant applied in the corner. Ensure



the sealant is fully cured before moisture barrier application.

Note: Both WPM300 and WPM368 are Class I type liquid membranes to AS3740 so are not intended to be used as a primary wet area waterproofing in the same way as a Class III membrane.

14. Where hydrostatic pressure is present as opposed to simple dampness, a fillet cove using ARDEX BR345 (>10mm) or ARDEX BR120FC (1-3mm) will provide a smooth transition and eliminate sharp corners at walls. This can also be done with WPM300-sand/cement mix.
15. Depending on the ambient temperature, it is important *that a minimum of three hours have elapsed between coats*. Although full cure for WPM300 is seven days at 25°C 50% RH, the next procedure can take place once the surface is scratch hard (approximately 12 – 24 hours @ 20°C) as this will not inhibit the curing process. *WPM368 can be covered with the FLC the next day, but the maximum permitted open time must not exceed 5 days.*

Note: that at temperatures below 10°C and at air relative humidity exceeding 85% the cure of the WPM300 epoxy will be retarded, and high surface pH (>11.5-12) can affect the performance of the epoxy.

High moisture levels also retard the drying of WPM368 because it cures by moisture loss rather than by chemical reaction and crosslinking. Alkalinity exceeding pH 11.5 shall be avoided.

#### CRACKS

16. In the case of **non-active** cracks these should be “V” gouged out to allow for sufficient filling of the crack. Prime with mixed ARDEX WPM300 and then fill with a slurry made from ARDEX WPM300 mixed with 25% by volume Portland cement. Keep the repair medium down approximately 2mm below the surface and allow to cure for 24 hours prior to further work.

Smaller hairline cracks can be treated by the application of the moisture barrier with a brush to a width of 100mm either side of the crack, and then whilst still liquid, ARDEX Deckweb tape is worked into the moisture barrier with a metal ribbed roller. A second coat of the moisture barrier is then applied with a brush over the embedded tape.

Note: these cracks are a structural defect and they may eventually mirror through to the subsequent floor coverings. ARDEX suggests all cracks to be noted on a floor plan for reference purposes. All cracks should be referred to a suitably qualified Structural Engineer for assessment, as active cracks will re-open or close, and produce show through, result in moisture problems or even damage resilient flooring. Active cracks require remedial works such as epoxy-metal pinning or as recommended by the engineer.

17. Where cracks are identified as potentially active, repairs can be made under the advice of the engineer, using the ARDEX concrete repair injection system based around ARDEX RA88, 142, 144 or 146 epoxy repair systems.
18. In some cases where walls have been taken out and then the floor areas has been concrete filled, these may have to be scabbled out to a depth of 50mm or more and back filled with a special concrete that contains ARDEX WPM300 mixed into the concrete slurry. The mix design for the water resistant concrete is (by volume):

1 Part mixed ARDEX WPM300 epoxy

1 Part Portland cement

1-1.5 Parts washed dry sand ~0.3mm

1 Part washed dry aggregate 3-8mm or 2-5mm

(The sand and aggregate above can be replaced with 2-2.5 parts of ARDEX A38 mixed aggregate).

Alternatively the water resistant ARDEX BR120FC or ARDEX BR345 repair mortars can be used (BR120FC – 3mm or BR345 10-80mm thick).



**NOTE: WPM368 must not be mixed with cement to make this kind of mortar.**

#### PRIMING

19. Prime the WPM300 surface with ARDEX P82 ULTRA PRIME at a rate of 6 - 10m<sup>2</sup> per litre depending on the texture of the surface .
20. Thoroughly stir A & B components first before mixing together and apply in a thin even coat using a thin nap roller ensuring no windows are left.
21. The ARDEX P82 primer should have a transparent pink appearance. Excessive application can lead to poor drying and possible cracking of the levelling cement. Soft-soled shoes must be used during this process to ensure that no damage is done to the ARDEX Moisture Barrier membrane.
22. The P82 primer must be left on for *a minimum of three hours and a maximum of twenty-four hours before the next procedure takes place*. However, it is important to note that there must be a slight tack left on the surface.

NOTE: Where the five day period for WPM368 has been exceeded, the surface can be re-coated with WPM368, or alternatively primed with ARDEX P82 (where this has been done, the smoothing cement shall be used with ARDEX E25).

#### APPLICATION OF SMOOTHING CEMENT

Note: Compliance to Building Code of Australia requires that ARDEX Moisture Barrier “Must be covered or protected from abrasion by vehicular or pedestrian traffic”

23. The preferred self-smoothing cement shall be ARDEX K15 Micro installed at 3 – 4mm which provides the necessary protection and a smooth flat cement surface for the conventional installations of floor coverings.

Alternative smoothing cements are ARDEX A55, ARDEX K12 new or ARDEX K220.

Note: Applications of smoothing cement less than 3mm puts the barrier at risk of possible damage during progress sanding or cutting operations during vinyl installation. Insufficient thickness will also not provide a porous surface suitable for certain types of vinyl or parquet adhesive to be applied to.

24. The additive to be mixed with ARDEX K15 (original) over applied over ARDEX WPM300 shall be ARDEX E25 Resilient Emulsion

Mix Design “A” when installing **sheet and tile vinyl flooring and carpet.**

1 litre ARDEX E25 with 4.5 litre of water per 20 kg ARDEX K15

Mix Design “B” when installing **parquet, rubber, over heated subfloors.**

1.6 litres ARDEX E25 with 4.0 litres water per 20 kg ARDEX K15

ARDEX K12 (new) and K220 are mixed with ARDEX E25 according to the product datasheets when used with ARDEX P82 in this application.

25. ARDEX K15 can be walked on after 2 – 3 hours at 20°C
26. Underlayment can accept floor covering material after 24 hours at 20° C
27. Air-conditioning to stay on during the time that the work is being carried out as per AS1884-2012.
28. Resilient flooring adhesive only to be used which is recommended by the vinyl manufacturer. Tack off time to be strictly adhered to any pre-priming done where recommended.

#### SPECIAL CASES

In all the situations mentioned above, the primer used over the WPM300 is ARDEX P82.

In some situations it may be necessary to use a bulk fill product for extra depth of material. Where this is necessary, ARDEX K15+E25 mixed with an equal weight of 2-5mm aggregate can be used, followed by a ARDEX K15 (Micro) smoothing coat.



Another option is to use ARDEX K005 Bulk fill mixed with ARDEX E25 in the ratio of 1l litre E25 to 2 litres of water per 20kg bag of ARDEX K005 bulk fill. This is smoothed off with ARDEX K15+E25.

Where a ramp or patch has to be done over the moisture barrier, ARDEX A45 can be used. ARDEX E25 is used in the gauge water in the ratio of 1.3 parts E25 to 2 parts of water.

The Moisture Barrier System can be used in conjunction with the systems described in ARDEX Technical Bulletins TB012D and TB178 and TB172.

Note: The use of ARDEX A55 in this system should to be referred to ARDEX Technical Services for suitability evaluation.

The alternate sand blinded system for WPM300 is described in Technical Bulletin TB192.

### WARNING

Failure to install the recommended dry film thickness of the moisture barrier can result in reduced performance and increased water vapour transmission.

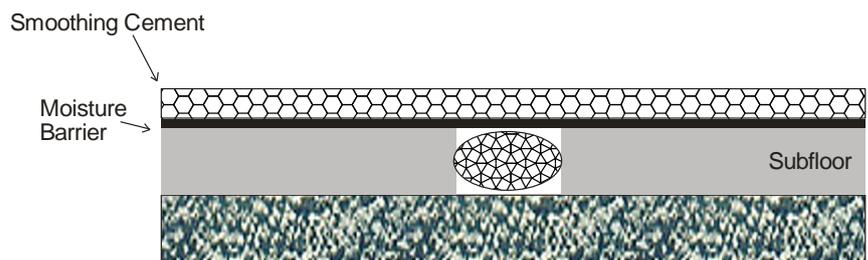
Thin coats applied to 'cut costs' are a false economy and must be avoided. Use of a wet film gauge during installation is highly recommended.

### TREATMENT OF FLOOR MOVEMENT JOINTS

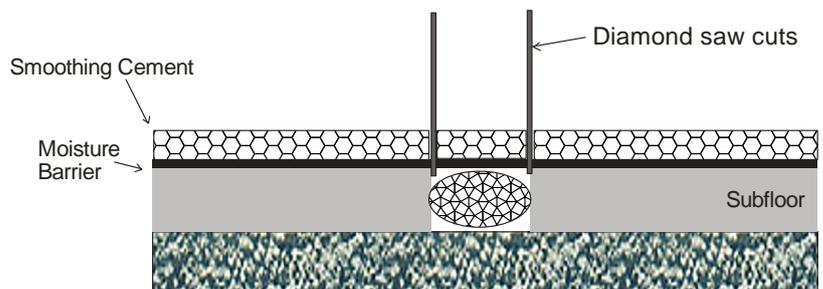
Expansion joints shall be continued through the ARDEX WPM300/WPM368 and ARDEX underlayment cement (FLC).

29. The expansion joints shall be pre-filled with backer rod or similar to prevent leakage of the ARDEX FLC into the joint.
30. Apply the moisture barrier and ARDEX FLC over the joint. Ensure the location of the joint is clearly marked on adjacent fixtures.
31. Once the ARDEX FLC has sufficiently hardened, saw cut through the FLC to expose the joint.
32. Remove all ARDEX FLC from the joints and ensure the vertical saw cuts within the joint are clean, dry and free of dust, dirt etc.
33. Apply ARDEX WPM300 Moisture Barrier to the vertical edges of the joint and after hardening, install a suitable flexible polyurethane (ARDEX RA030 or RA040), structural silicone or epoxy jointing system.

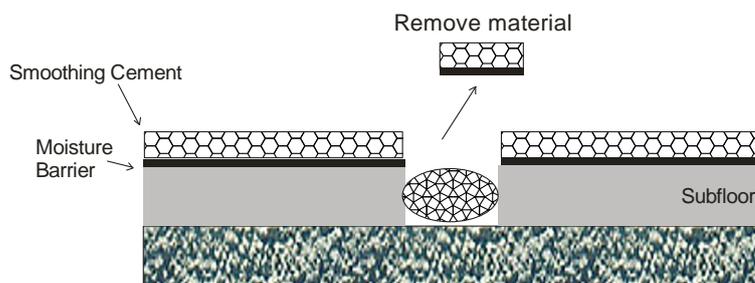
As per steps 29-30 joint has been cleaned and filled with a backer rod. The Moisture Barrier has been applied followed by the smoothing cement.



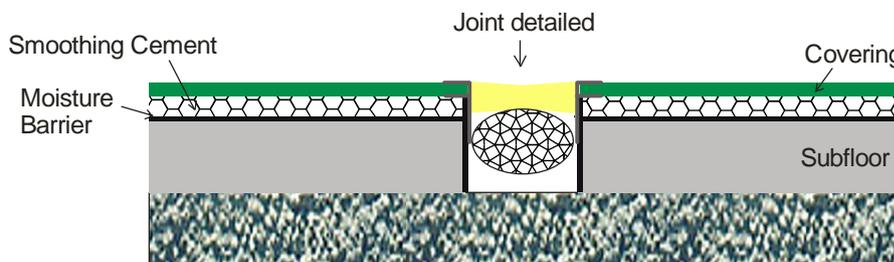
As per step 31, when FLC is fully cured it is saw cut through to the FULL WIDTH of the JOINT.



As per step 32 the material from the saw cut has been removed.



As per step 33 Moisture Barrier is painted thoroughly down into the joint. A suitable flexible sealant system is then installed (may include mouldings or metal extrusions)



**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.

**REASON FOR REVISION**

Replacement of B34/B36 with BR120FC and BR345. Inclusion of K220, RA142, RA144, RA146, RA030 &/ RA040. Removal of references to K009, K10 and K11.

**REVIEW REQUIRED**

36 months from date of issue.

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