TECHNICAL BULLETIN – TB006

ARDEX MOISTURE BARRIERS SYSTEM

18th September 2024

INTRODUCTION & SCOPE

Internal concrete substrates come in many different forms—new concrete, old concrete, on-grade, below-grade, and suspended floors. These internal floors then require the application of many varied types of floor coverings: parquet, rubber flooring, sheet and 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, and flatness—can be visually inspected, evaluated, and then specified for a repair/remodelling procedure. The moisture content of the concrete, however, is an unseen condition that requires testing, preferably using hygrometer testing equipment as per AS1884.2021 or AS2455-2019.

The standards require 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, and air conditioning/heating at the time of testing, and in many cases, a professional evaluation may be required to analyse the test readings properly.

At a glance, the concrete subfloor may appear dry, but 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 causes degradation of the vinyl adhesive and, in some cases, can also attack the floor covering itself.

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

SOLUTIONS

NOTE: The nominal moisture vapour transmission rate of 15gm/m²/24 hours is the maximum permitted for resilient flooring. Both Moisture Barrier systems have transmission rates below this maximum. In addition, ARDEX WPM300 has a moisture vapour transmission rate well below the requirements of AS2870:2011 for damp-proofing of floors.

a) The ARDEX WPM300 Hydrepoxy Moisture Barrier System provides protection against capillary and hydrostatic moisture on structural concrete substrates. The epoxy base for ARDEX WPM300 HYDREPOXY 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.
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/m²/24 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 before the installation of the smoothing cement. *The main restriction of this product is that it has a longer drying time for two coats, which is affected 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 installing most conventional floor coverings and coatings.

SUBFLOOR PREPARATION

1. Proper surface preparation is the most important factor in achieving a solid bond between the substrate and the floor coating. The steps and methods required to properly prepare the subfloor depend on its condition and surface.
2. All weak, loose, powdery surfaces must be removed back to a solid, clean, open porous matrix of the concrete. Mechanically remove this weak surface either by scarifying, shot blasting, or diamond shaving/grinding. Shot blasting is the preferred cleaning procedure.
3. Shotblast (using a dust-free system) to remove all adhesive residues and laitance to expose the substrate's clean, sound, porous matrix. This will require two or more passes, but a perfectly clean surface must be 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, 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 should be individually noted, the repair procedure evaluated, and the individual cost advised only when exposed after shot-blasting and scabbling.
7. The contractor is to note all cracks for future reference, and structural cracks should be brought to the engineer's attention before proceeding.
8. Remove all dust and debris and vacuum thoroughly to provide an open porous concrete matrix.

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

INSTALLATION OF ARDEX MOISTURE BARRIER

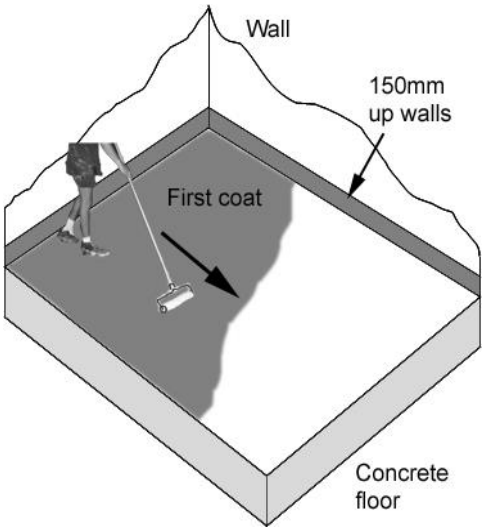
9. ARDEX WPM300—Thoroughly mix the individual Part A & B components of the ARDEX WPM300, then mix the components in equal volumes to achieve a homogeneous mix.
10. ARDEX WPM368 – Thoroughly mix the contents of the bucket before application.
11. Apply two coats of the liquid barrier with a final total coverage of 1.5m² per litre (this is the same as ~3m² /litre at 300μm wet film thickness (WFT) per individual coat) to give a final dry film thickness (DFT) of 0.3mm (300μm).

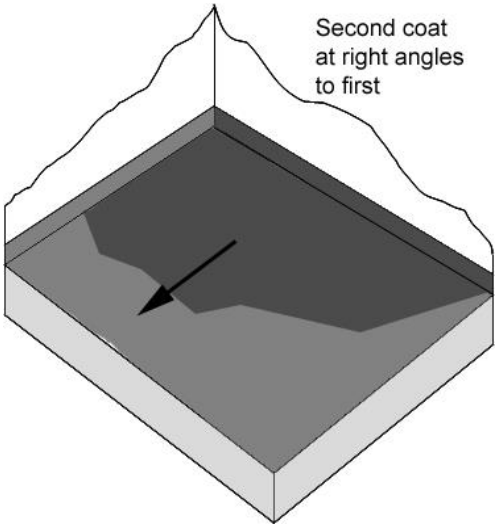
    It is recommended that the first coat be applied somewhat more liberally than the second to reduce the risk of pin-holing. However, the average of the two coats still equals the above coverage.

    First coat to be applied at 2.5m² per litre (0.40 litre/m² @400μm WFT)

    Second coat at 3.5m² per litre (0.29 litre/m² @250μm WFT)

    Applying the coats in different directions requires extreme care to ensure no windows are left in the second coat and no pinholes in either coat. Pinholes lead to the development of localized areas of high moisture and humidity under the floor covering.





The coats are applied at 90-degree angles to obtain 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 @ 2.5m²/litre – 1 x 20 litre unit covers 50m² (nominally 20 litres covers 60m² at 0.3mm DFT for one coat).

Mark out 50m², then mix up the 20 litre kit of ARDEX WPM300 (Part A & B) in a separate bucket, and squeegee out the 20 litres to the entire 50m² (ensuring an even coat throughout), or direct apply the ARDEX WPM368 from the container.

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

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

e.g., 50m² @ 3.5m² per litre

50 =~14.3 litres

3.5

(i.e.' 7.15 litres of PART A and 7.15 litres of PART B)

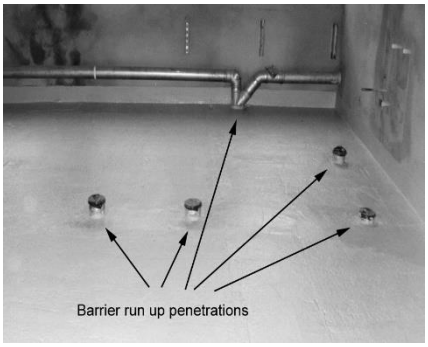
(Say 7.2 litres of each to allow for waste)

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.

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

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

14. 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.


Barrier run up penetrations

15. 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 applied in the corner. Ensure the sealant is fully cured before applying a moisture barrier.

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

16. Where hydrostatic pressure is present instead of simple dampness, a fillet cove using ARDEX A46 will provide a smooth transition and eliminate sharp corners at walls. This can also be done with ARDEX WPM300-sand/cement mix.

17. Depending on the ambient temperature, it is important that a minimum of three hours have elapsed between coats. Although the full cure for ARDEX 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. ARDEX WPM368 can be covered with the FLC the next day, but the maximum permitted open time must not exceed five days.

    Note: At temperatures below 10^0C and at air relative humidity exceeding 85%, the cure of ARDEX 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

18. In the case of **non-active** cracks, these should be “V” gouged out to allow for sufficient crack filling. 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 it to cure for 24 hours before further work.

    Smaller hairline cracks can be treated by applying the moisture barrier with a brush to a width of 100mm on either side of the crack. Then, while still liquid, ARDEX Deckweb tape is worked into the moisture barrier with a metal ribbed roller. A second moisture barrier coat is 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 noting all cracks 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, produce show-through, result in moisture problems, or even damage resilient flooring. Active cracks require remedial work such as epoxy-metal pining or other procedures as the engineer recommends.

19. Where cracks are identified as potentially active, repairs can be made under the engineer's advice using the ARDEX concrete repair injection system based on the ARDEX RA88 Plus multipurpose epoxy repair adhesive.

20. In some cases where walls have been taken out, and then the floor areas have been concrete filled, these may have to be scabbled out to a depth of 50mm or more and backfilled 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 Gravel Mix).

NOTE: ARDEX WPM368 must not be mixed with cement to make this mortar.

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 the ARDEX Moisture Barrier membrane is not damaged.

22. The ARDEXP82 primer must be left on for a minimum of three hours and a maximum of twenty-four hours before the next procedure occurs. However, a slight tack must remain on the surface.

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

Application of Smoothing Cement

Note: Compliance with the Building Code of Australia requires that the ARDEX Moisture Barrier "Must be covered or protected from abrasion by vehicular or pedestrian traffic."

23. The preferred self-smoothing cement is ARDEX K15 installed at 3 – 4mm, which provides the necessary protection and a smooth, flat cement surface for conventional floor covering installations.

Alternative smoothing cements are ARDEX K55, ARDEX K12, or ARDEX K10.

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.

24. The additive to be mixed with ARDEX K15 (original) and applied over ARDEX WPM300 is 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, or over heated subfloors**.

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

ARDEX K12 and ARDEX K10 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. The underlayment can accept floor covering material after 24 hours at 20° C
27. Air conditioning will stay on when the work is carried out as per AS1884-2012.
28. Use only resilient flooring adhesives recommended by the vinyl manufacturer. Tack off time to be strictly adhered to any pre-priming done where recommended.

SPECIAL CASES

The primer used over ARDEX WPM300 is ARDEX P82 in all the abovementioned situations.

In some situations, a bulk fill product may be necessary 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 an ARDEX K15 smoothing coat.

Another option is to use ARDEX K900BF (Bulk Fill leveling compound). This product does not require the addition of ARDEX E25.

ARDEX A45 can be used where a ramp or patch has to be made over the moisture barrier. ARDEX E25 is used in the gauge water in a ratio of 1 part ARDEX E25 to 2 parts 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 be referred to ARDEX Technical Services for suitability evaluation.

The alternate sand-blinded system for ARDEX 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.

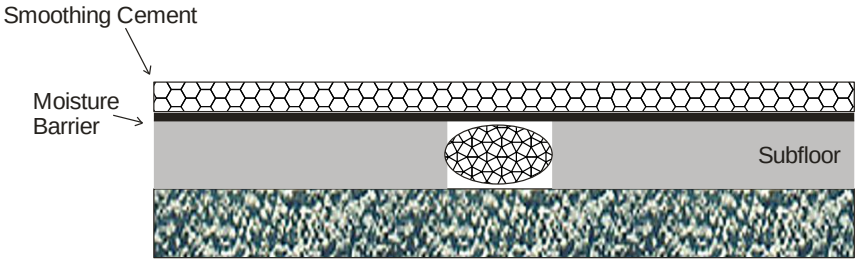
Thin coats applied to ‘cut costs’ are a false economy and must be avoided. The use of a wet film gauge during installation is recommended.

TREATMENT OF FLOOR MOVEMENT JOINTS

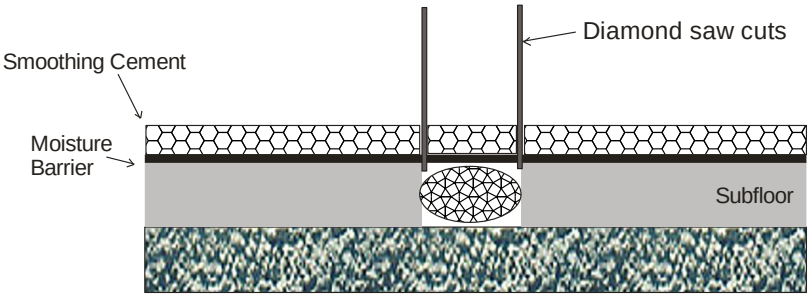
Expansion joints shall be continued through the ARDEX WPM300/WPM368 and ARDEX underlayment cement (FLC).

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 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, structural silicone, or epoxy jointing system.

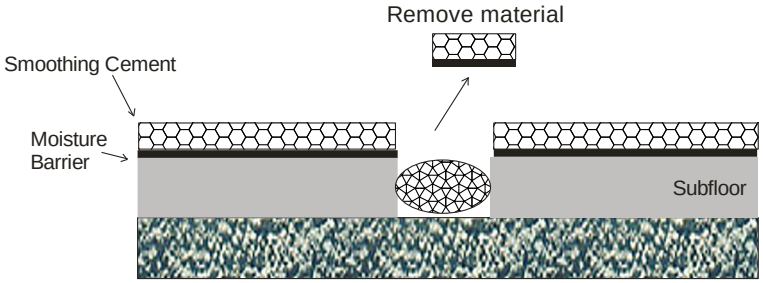
As per steps 29-30, the joint has been cleaned and filled with a backer rod. The Moisture Barrier has been applied, followed by the smoothing cement.



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, the Moisture Barrier is painted down into the joint. A suitable flexible sealant system is then installed (may include mouldings or metal extrusions