

# TECHNICAL BULLETIN – TB119

## WATERPROOFING OF INTERNAL WATER RESISTANT PARTICLEBOARDS AND PLYWOOD

16<sup>th</sup> July 2013

### INTRODUCTION & SCOPE

With the trend towards the use of cheaper and easy to install building materials, more floors in wet areas, and in particular on second storeys of domestic dwellings, have been laid with water resistant particleboard flooring. In other cases there may be an existing tongue and groove timber floor where a renovation is being undertaken.

A commonly received inquiry to Ardex Technical Services involves the application of a waterproof membrane system suitable for tiling in these situations. In this bulletin we will look at some systems that could be used in these cases.

### WHAT THE AUSTRALIAN CODES SAY

The Building Code of Australia when specifying types of waterproofing of wet areas within residential buildings categorises the wet areas as high, medium and low risk.

Note: From the 2010 edition of the BCA, the requirements directly correlate with the waterproofing standard AS3740-2010. The risk categories shown in the BCA are as per the tables in the older version of AS3740-2004. The new 2010 edition of AS3740 does not carry the tables at the time of writing this bulletin.

High risk areas include shower cubicles and floors with a floor waste. Medium risk areas are bathroom floors, and adjacent to baths or spas. Low risk areas are considered to be laundries or toilets, and splash backs.

The high risk areas must be fully waterproofed and drained, whilst timber substrates in medium risk areas must be waterproofed as well. Low risk areas shall be water resistant.

It is important to recognise that there is a difference between the description of a product as water proof as opposed to water resistant (section 1).

The Australian Standard (AS3740-2010) defines water resistant as (1.4.26),

“the property of a system or material that restricts moisture movement and will not degrade under conditions of moisture”.

By comparison, waterproof is defined as (1.4.24),

“ The property of a material that does not allow water to penetrate through when tested in accordance with AS/NZS 4858”.

This refers also to materials deemed to be waterproof (2.4.1) such as stainless steel, copper and membranes which do not allow water to pass through them.

The standard defines floor substrate types (2.4.2), and water resistant timbers include flooring grade particleboard which must comply with AS1860 and structural plywood which must comply with AS/NZS 2269.

*Tongue & Groove strip timber floors are not acceptable wet area substrates under these requirements.*

States may also have their own individual regulations with regards to these installations and it is incumbent on the installer or specifiers to familiarise themselves with the local regulations.

### **WATERPROOF MEMBRANE SYSTEMS**

Whilst timber based products may be classed as water resistant, they still display high moisture movement changes, and can over time degrade where moisture may penetrate. For these reasons Ardex recommends that where possible, normal Compressed Fibre-Cement Sheet, or proprietary products such as James Hardie Scyon™ (TB215) are a preferable substrate in these applications, and provide a better surface for membranes and tile adhesives.

There are a range of basic systems that could be applied to internal floors depending on the risk factor.

LOW TO MEDIUM RISK AREAS (MAIN FLOORS IN BATHROOMS, WC, OR LAUNDRIES WHERE THERE ARE NO FLOOR WASTES)

#### **Option A**

Direct application of the membrane to the timber surface. This is the least preferred method as any damage to the membrane during subsequent procedures will allow water to penetrate. Also moisture vapour will breathe through causing condensation on the timber resulting in movement and possible decomposition, mould, rot and decay.

If the floor has falls built in the tiles are applied to the membrane surface, but if are required the membrane is followed by a screed.

(It is generally preferable to over sheet with fibre-cement sheet and apply the membrane to that instead, followed by a suitable screed if falls are not already in place).

HIGH & MEDIUM RISK AREAS (SHOWER ENCLOSURES AND AREAS WHERE THERE IS A FLOOR WASTE AND FALLS)

#### **Option B**

Uses a Forticon plastic sheet overlay on the timber which can then have a 40mm thick rapid cure screed applied followed by the membrane. The plastic sheet isolates the screed from the timber.

#### **Option C**

Uses a fibre-cement sheet overlay on the timber which can then have a rapid cure screed or bulk filled smoothing cement applied followed by the membrane. The screed is actually bonded to the fibre-cement sheet.

#### **Option D**

Uses a Forticon plastic sheet followed by a traditional self supporting 40mm thick sand/cement screed reinforced with Y5 welded steel mesh followed by a liquid applied membrane.

#### **Option E**

Application of a Hydrepoxy barrier to the timber followed by a traditional self supporting sand/cement screed then a liquid applied membrane.

#### **Option F**

Application of a Hydrepoxy barrier to the timber followed by a 40mm thick rapid cure screed then a liquid applied membrane.

#### **Option G**

Application of a Hydrepoxy barrier to the timber followed by a self supporting rapid cure screed, followed by a sheet rubber membrane and tiles.



Note: Where the rapid cure screed systems based on K005 are applied over fibre-cement sheeting, the preferred area for this application is shower recesses. Where larger areas are done with multiple sheet joints, some show through cracking may occur along the line of the joints if the sheets are not properly secured to the subfloor.

The attached flow charts give the steps involved in the system applications.

Suggested Ardex flexible membranes to be applied as the final waterproofing are;

ARDEX WPM001

ARDEX WPM002

ARDEX WPM750 "Undertile Butynol".

### **TILING**

The final step is the application of tiles and for this a cement based adhesive suitable for use with the membrane is required.

The floor must comply with the normal requirements for tiling on timber and be stable and not subject to movements exceeding 1/360 of span of the floor joists. Large format tiles may require tighter tolerances such as 1/500 to prevent problems such lipping and cracking.

Where a screed has been placed, suitable adhesives include:

ARDEX ABAFLEX,

ARDEX STS8+/-E90

ARDEX X77+/-E90

ARDEX X78

ARDEX X56

ARDEX MPP

ARDEX X52 or

ARDEX SUPERTILESET.

Where no screed is in place, the recommended adhesive is,

ARDEX X56

Grouts should be flexible and the recommended grouts;

ARDEX FG8 GROUT

ARDEX FSDD or

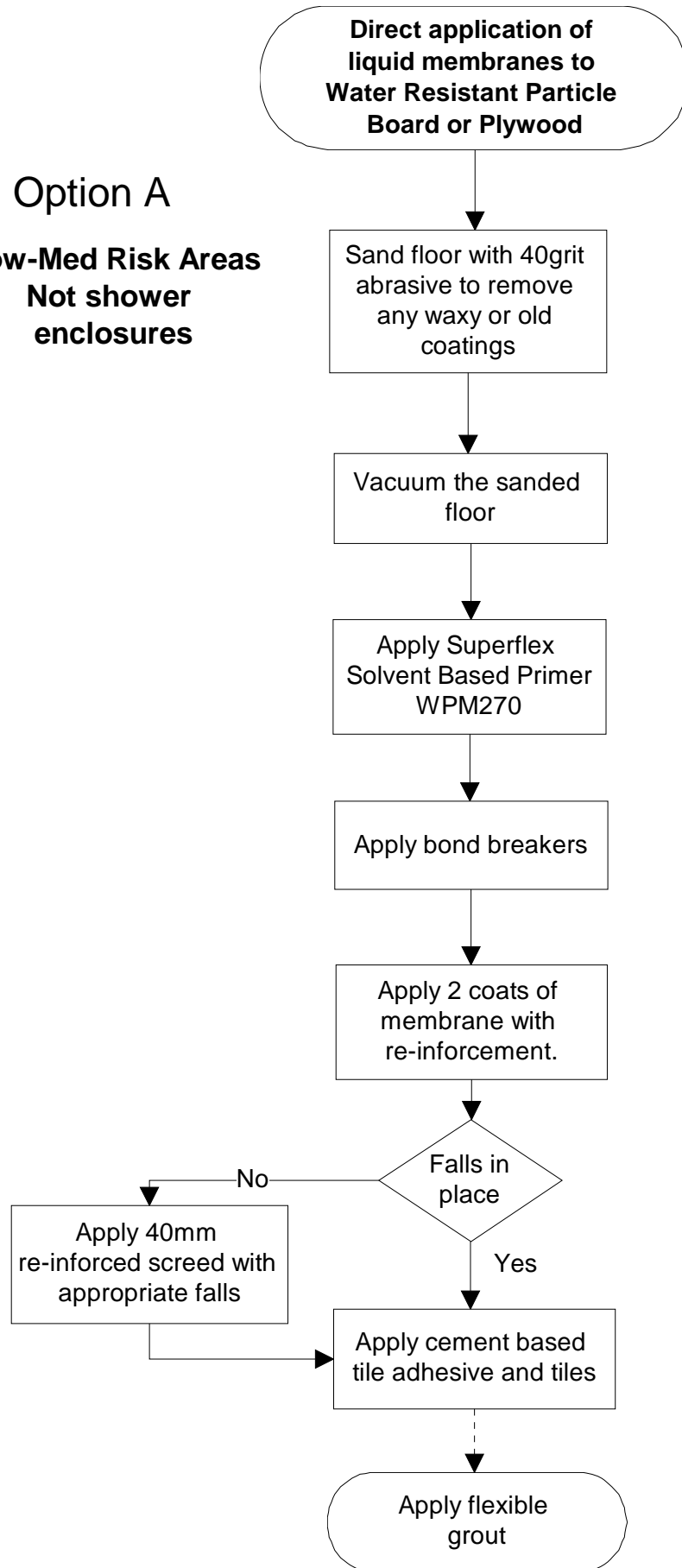
ARDEX WJ50

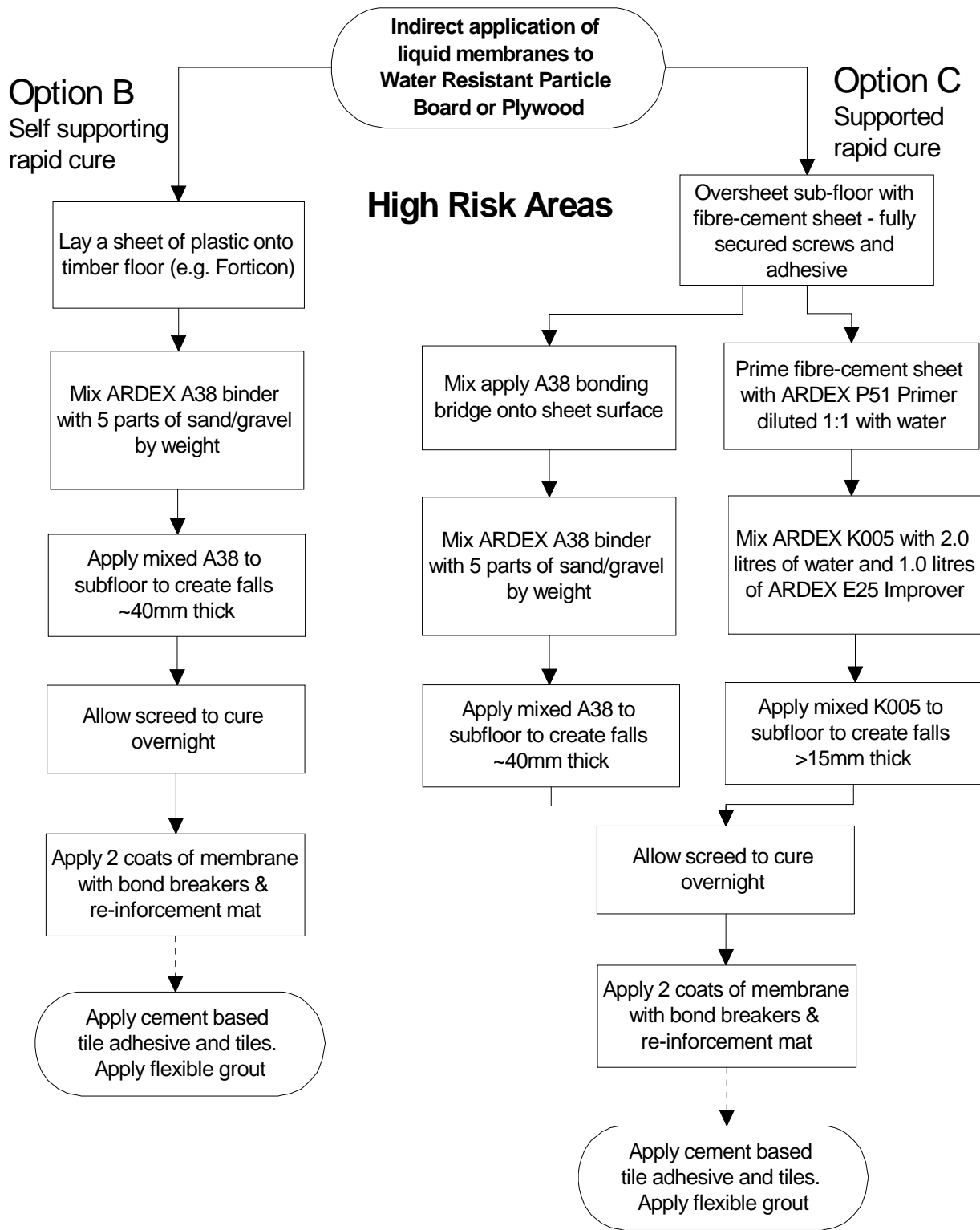
These grouts shall all be mixed with ARDEX GROUT BOOSTER to improve flexibility.

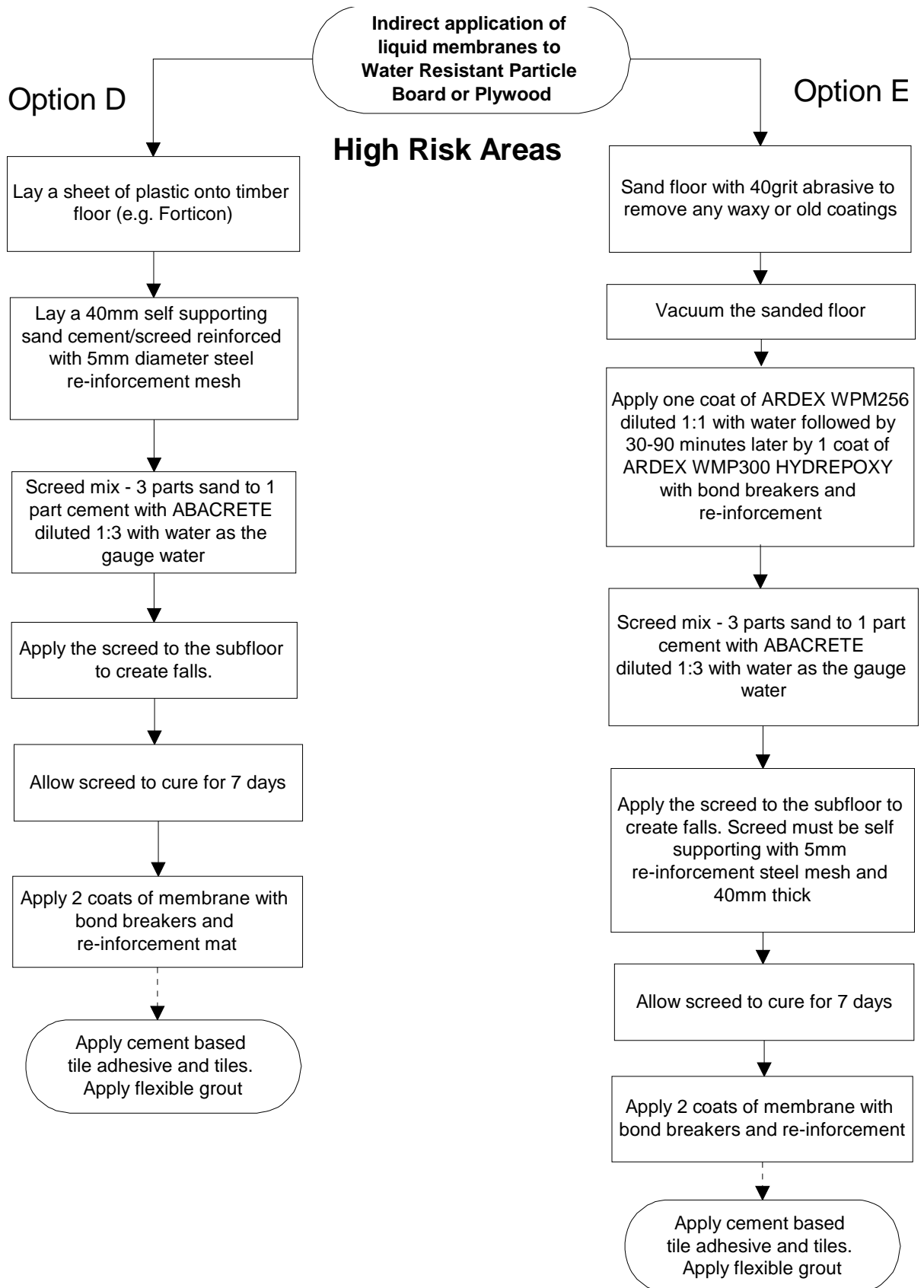


## Option A

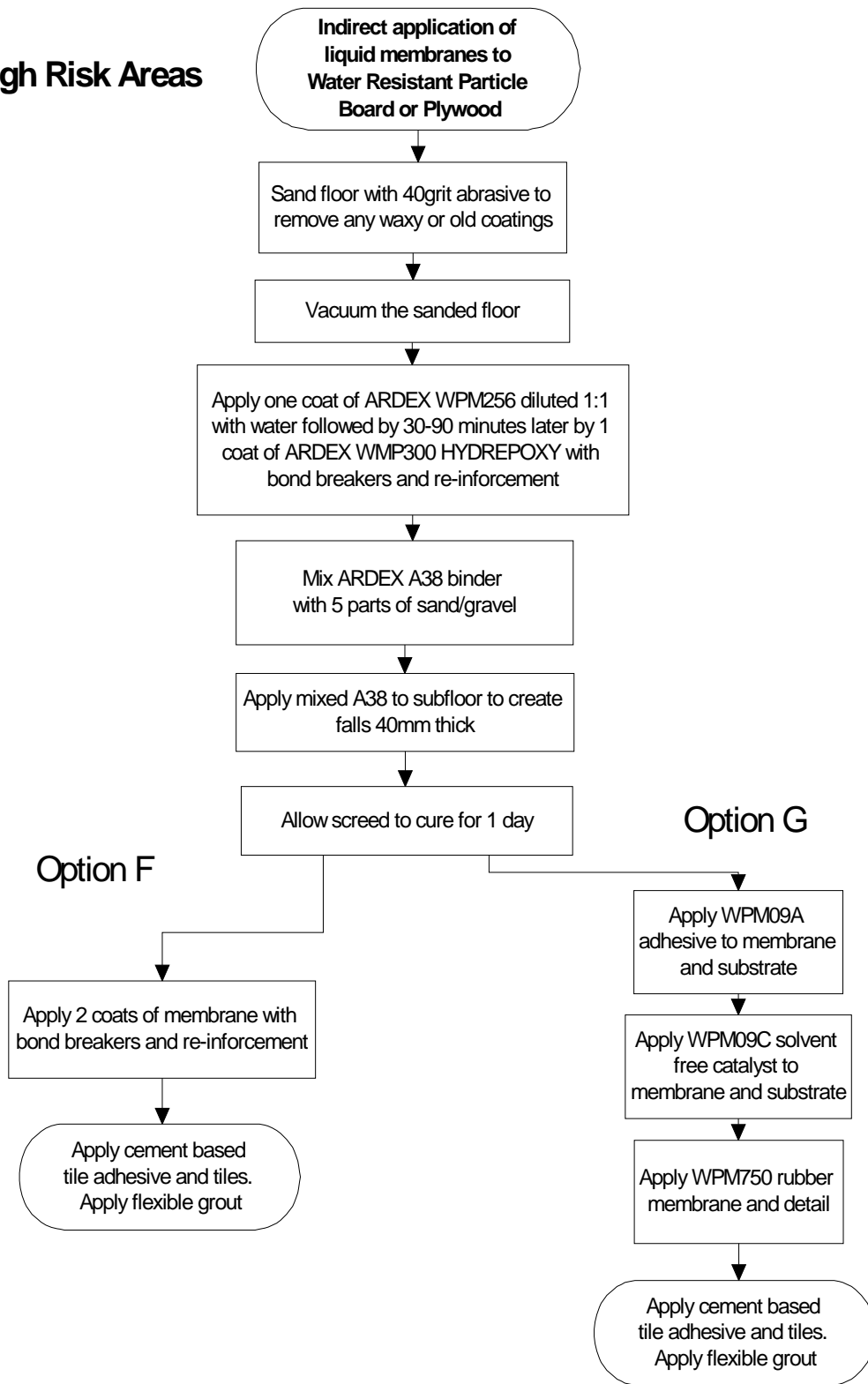
**Low-Med Risk Areas  
Not shower  
enclosures**







# High Risk Areas



## CASE HISTORY



The photograph on the left shows the effects on an area subjected to wetting, which was floored with ordinary particleboard and insufficiently protected with a poorly applied membrane.

As can be seen the water has penetrated the membrane and migrated through the particleboard. This has resulted in the leaching of solubles from the particleboard and the growth of mould. This floor was damaged sufficiently that replacement of the boards was considered a possibility.

This illustrates the necessity to fully protect timber floors in wet areas and pay careful attention to detailing.

## CONCLUSIONS

The application of waterproof membranes can be done over internal timber substrates prior to tiling. However it is necessary to pay careful attention to detail as the long term stability of timber based substrates is less than masonry or fibre-cement sheets.

The systems described in this bulletin are intended for internal applications and are not intended for external timber surfaces such as decks. Special procedures using Ardex sheet membranes such as BUTYNOL are required in these cases.

Non-resistant plywoods or particleboards should not be used in these situations, as any defect in the application of the membranes can quickly lead to water penetration and rapid degradation of the substrate, with resultant collateral damage and costs.

### **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**

Complete revision. Inclusion of systems based on A38 and WPM750. Removal of K005 as 'self' supporting system.

### **REVIEW PERIOD**

24 months from date of issue.

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