Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Building and Energy

Industry Bulletin 134

Improving compliance of wet areas

The purpose of this bulletin is to provide information and guidance for builders, wet area installers, architects/building designers and building surveyors to achieve compliance of wet areas.

The design and construction of wet areas within buildings is one of the most important parts of a building to get right as it can lead to deterioration of building elements and cause health issues for the occupants.

Background

Building and Energy's Compliance Directorate has through its audit program identified the following areas in the design and construction of wet areas that contribute to non-conformance with the National Construction Code (NCC), Australian Standard and manufacturers recommendations.

1. Approval documentation
2. Construction in accordance with deemed-to-satisfy and manufacturer's technical documents
3. Sealant installation
4. Drainage flanges
5. Substrate preparation
6. Protection of waterproof membrane
7. Falls to waste in shower floors
8. Installation of waterproofing systems
9. Modular construction
10. Performance Solutions

National Construction Code Compliance

The applicable building standards in Western Australia are Volume One and Two of the NCC. Volume One for Class 2-9 buildings and Volume Two incorporating Class 1 and 10 buildings. The NCC contains performance requirements and deemed-to-satisfy (DtS) provisions applicable to design and installation of wet areas.

The performance requirements in NCC 2019 Amendment 1 – FP1.7 and P2.4.1 require that water must be prevented from penetrating behind fittings and linings or into concealed spaces of sanitary compartments, bathrooms, laundries and the like, excluding kitchens, bar areas, kitchenettes or domestic food and beverage preparation areas.

The corresponding DtS provisions (the Acceptable Construction Practice) NCC 2019 Amendment 1 – F1.7 and 3.8.1, specify the particular elements and locations within a wet area to be waterproof or water-resistant and the Australian Standard required to be complied with. AS 3740-2010 Waterproofing of domestic wet areas (Incorporating Amendment No. 1) (AS 3740).

1. Approval documentation

The permit authority-approved plans and specifications must clearly demonstrate that wet areas will, when constructed, satisfy the performance requirements in the NCC. Where they are known, details of the membrane installation and substrate construction, etc, should be provided.

Documentation that is deficient in detail can result in non-compliant wet area construction during the building process.

The building surveyor must be satisfied that there is adequate information to indicate that the building will meet the applicable building standards.

The approved plans and specifications must contain sufficient wet area information to demonstrate compliance and to enable compliant construction.

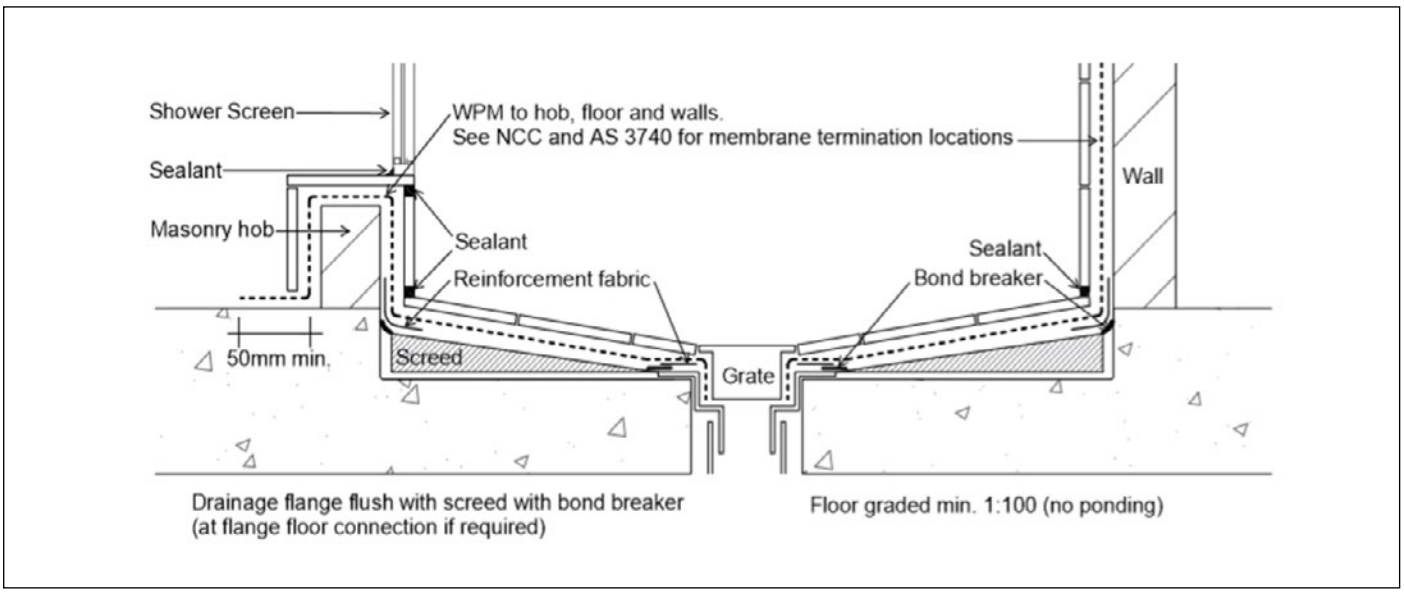

Figure 1: An example of a section through a typical enclosed shower area with hob, on a concrete base.

Note: The NCC and AS 3740 contain additional requirements for wet areas outside of shower areas. For example, in some circumstances these may require the entire floor to be waterproofed with waterstops at doorways.

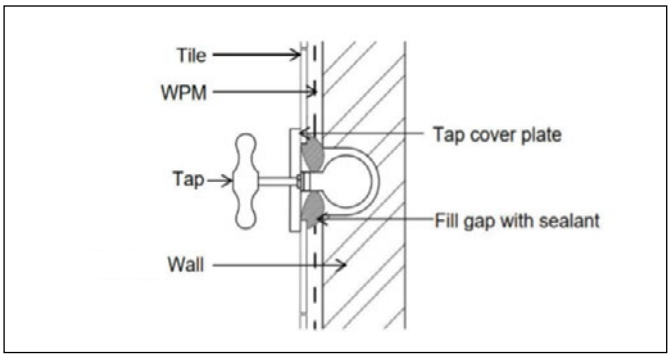

Figure 2: A method of waterproofing a shower penetration. The method and extent of waterproofing of the penetration depends on the substrate. For example, if using plasterboard or cement sheet lining, the manufacturer's may require the use of flanges and the whole shower area to be waterproofed.

2. Construction in accordance with deemed-to-satisfy and manufacturer's technical documents

AS 3740 and the manufacturer's product specifications provide the preparation and installation details for wet areas. If wet area construction is not carried out in accordance with the details in AS 3740 and have no regard to the manufacturer's specifications it may result in water damage to building elements.

It is suggested that quality control processes be adopted, such as maintaining appropriate supervision and carrying out inspections, so the construction of wet areas follows the approval documentation.

Where there is a lack of information in the documentation, such as the extent or the method of the waterproofing, that information should be obtained from an appropriate source such as the building surveyor who issued the CDC and/or manufacturer's guidelines, to ensure compliance with the NCC.

3. Sealant installation

Tiled junctions in wet areas are susceptible to leaks due to cracking caused by differential movement. These leaks are often found in shower areas at the floor wall junctions. Flexible sealants are used in these areas as they are resistant to cracking, preventing a variety of problems such as mould, flooding and water damage.

Sealants used in wet areas are to be waterproof, flexible, mould resistant and compatible with the surfaces they are to be applied to.

The selection and installation of sealant should be based upon the type of wall/floor construction and whether the junction is to be waterproof or water resistant.

Details of the type of junctions can be found in section 4 of AS 3740.

Ensure that the product manufacturer's installation requirements are adhered to.

Suitable gaps should be left in tiled junctions to allow for appropriate application of a flexible sealant.

Note: Certain tile manufacturers may have particular gap size requirements.

4. Drainage flanges

Leaking around the floor waste (specifically in high-use areas such as the shower) into the floor substrate can be due to incorrect installation, damage to, or failure of the waterproof membrane (WPM) where it connects to the drainage pipe riser. This may be prevented by the correct installation of a drainage flange and the WPM.

AS 3740 – membrane to drainage connection – requires that all floor wastes installed in an area requiring a WPM are required to have a drainage flange, and the WPM is required to be terminated at or in the drainage flange to provide a waterproof connection.

Note: More information on drainage flanges can be found in Industry Bulletin 61, Residential Wet Area Floor Wastes.

5. Substrate preparation

Substrate preparation is important to enable the WPM to perform effectively. Substrates must be constructed and prepared for acceptance of the particular WPM and finishing system proposed, such as tiling.

Clause 3.13.1 of AS 3740 specifies that the area shall be cleaned and dust free. Indentations and imperfections shall be kept to a minimum and repaired where necessary.

Porous surfaces should be primed to improve adhesion of the membrane, particularly when using liquid waterproofing systems.

The substrate preparation must satisfy the requirements of AS 3740, and the manufacturer's installation instructions.

Consideration should be given to:

- the weight-per-square-metre of the finished lining has been determined prior to the preparation of the wet area; and
- the manufacturer's installation instructions for the weight-per-square metre is followed, in particular:

1. the type and spacing of supporting framework;
2. the sheet-lining type and thickness;
3. the fixings are of the type specified by the lining manufacturer with the correct gauge, length and corrosion protection level; and
4. the fixing centres are followed for the edge and field of sheet, and the use of flushing materials and systems are appropriate for the lining and location.

Note: Manufacturer's requirements for sheet-lining fixing vary depending on the weight of the tile proposed.

6. Protection of waterproof membrane

An unprotected WPM may be damaged by subsequent work being carried out, such as by tiling or other tradespeople working in the wet area.

It is important to ensure that the WPM is allowed to cure properly and that the wet area is adequately sealed off from other trades.

There are a number of tests that can be undertaken prior to the finished surface being laid to check that the membrane has not been damaged or leaks have occurred.

The WPM must be protected from physical and/or chemical damage until covered by the finished surfaces. If damaged, ensure that it is appropriately repaired prior to covering.

7. Falls to floor waste in shower

The primary consideration for falls in floor finishes is to ensure water does not remain on the finished floor, which may affect the health and amenity of the occupants and may cause deterioration of building elements.

It is important to note that the substrate should also fall to the floor wastes to ensure the moisture that goes through to the WPM can drain to the waste.

The finished floor surface must have a sufficient grade to prevent surface water from ponding on the shower floor (except residual water remaining due to surface tension)

8. Installation of waterproofing systems

What is a waterproofing system?

A waterproofing system is a combination of elements that when put together will achieve a waterproof barrier designed to meet the NCC wet area performance requirements. These elements include the substrate, WPM, bond breakers, water stops, sealants, adhesives and finishes.

Each of these components has a specific function and if one of these components is not installed in accordance with the requirements of AS 3740 the system may fail.

For example: if the WPM does not achieve the required dry film thickness (DFT) specified by the manufacturer, it could easily be damaged prior to, and during, the application of the finished surface and have a reduced ability to accommodate building movement.

Note: The application of two coats of a WPM does not guarantee that the manufacturer's specified minimum membrane DFT will be achieved.

Using components that are incompatible with each other may result in a non-performing wet area, e.g. applying a sealant to a liquid WPM that is not compatible may cause the membrane to break down, creating an area for water to pass through.

Ensure that:

- waterproofing systems and their installation details are compatible as required under AS 3740 Section 2 Materials, Design;
- the WPM is appropriate for the substrate and in-service conditions;
- adhesives and sealants are compatible with the WPM;
- the extent of the WPM and treatment of penetrations is carried out considering the substrate. For example, plasterboard and cement sheet lining manufacturers may have additional requirements when compared to other substrates (always check the manufacturer's product technical statement);
- the system is installed in accordance with the manufacturer's specifications and requirements in AS 3740 including the application of primers, bond breakers, reinforcing to corners, curing times and finished membrane dry film thickness (DFT);
- bond breakers are installed according to the class of membrane being used as required under AS 3740 Section 3 Installation, Section 3.13.7 and Table 3.2. For example, a class III membrane requires a bond breaker minimum width of 12mm whereas for a class I membrane the bond breaker width is 75 mm with backing rod;
- the applicator and supervisor/inspector are equipped with, and use, a tool such as a wet film thickness gauge to assist with ensuring the WPM is being applied at the rate to achieve the specified thickness at completion;
- the builder/supervisor determines what is an appropriate risk-based quality management system (QMS) for the project. The QMS may, for example consist of testing via water-ponding of the wet area membrane prior to being covered, independent inspections, manufacturer/supplier inspections, application audits and ensuring staff have the necessary skills to enable appropriate supervision; and
- those constructing wet areas understand that moisture may migrate through the finished surfaces and that moisture must be contained within the wet area, and ideally the substrate with the WPM should be directed to an appropriate point of discharge, such as a drainage flange.

9. Modular construction

Modular construction is a form of construction where sections of a building are prefabricated in a yard or factory in a location other than its final destination. The sections are then transported to site for construction, erection, assembly or placement as a building or part of a building.

In modular construction, the wet areas may be prefabricated in a yard or factory as a pre-assembled building product. Compliance with the NCC and AS 3740 is still required to be met.

Where the wet area has been completed in the yard or factory as part of a pre-assembled building product, there should be sufficient evidence of suitability on its compliance for a building surveyor to be satisfied before signing a certificate of design compliance.

This may include information with details on how the wet area had been assembled to comply with building standards and quality control measures to ensure the materials and methods used are compliant.

The evidence of suitability handbook published by the Australian Building Codes Board provides some guidance on the various forms of documentary evidence that can be used to support a claim that a material, product, form of construction or design, meets a Performance Requirement or a DTS Provision of the NCC.

10. Performance Solutions

A performance solution is achieved by demonstrating:

a) compliance with all relevant performance requirements; or

b) the solution is at least equivalent to the deemed-to-satisfy provisions.

A performance solution must be shown to comply with the relevant performance requirements through one or a combination of the assessment methods specified in the NCC.

The ABCB has published a Performance Solution Process guidance document to assist in the development of performance solutions. The Department of Mines, Industry Regulation and Safety has also published information on developing performance solutions IB102 Performance solutions for housing projects.

Who is responsible?

Building surveyor	Builder	Applicators of waterproofing systems
Required to ensure the wet area documentation referenced by their certificate of design compliance is sufficiently detailed and demonstrates compliance with the NCC. For Class 2-9 buildings, should be satisfied that the wet areas have been constructed in accordance with the approved plans and specifications referred to on the Certificate of Design Compliance (CDC) prior to issuing a certificate of construction compliance.	Required to ensure that the wet areas are constructed in accordance with the NCC and AS 3740 requirements.	Should refer to the approved documentation for details of areas required to be waterproofed and water resistant, the manufacturer's instructions for the product being used, and the NCC wet area requirements to ensure the correct areas are provided with compliant waterproofing systems.

Parties involved in the design, installation and inspection of wet area construction can ensure that the installation of wet areas is being met by being aware of the requirements for waterproofing in wet areas. In general, these requirements will vary from project to project due to varying materials used. The requirements for each individual project should be considered, demonstrated and approved then made available to the relevant trades and building supervisors/ inspectors.

Further information

Building & Energy Industry Bulletin 102, Performance Solutions for housing projects

Building & Energy Industry Bulletin 61, Residential Wet Area Floor Wastes

ABCB online publication: To grade, or not to grade

Disclaimer – The information contained in this bulletin is provided as general information only and should not be relied upon as legal advice or as an accurate statement of the relevant legislation provisions. If you are uncertain as to your legal obligations, you should obtain independent legal advice.

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