6. INSTALLATION

6.1 PLANNING

The applicator should plan the application sequence before commencing works to avoid movement on freshly applied material and to ensure that the pot life of waterproofing material does not expire on site. Various factors influence the application:

1. Size of team
2. Tools
3. Size of mixes
4. Detailing
5. Location of construction joints
6. Curing time of material

6.2 TOOLS

Tools and equipment used for application must be cleaned before and immediately after use. Refer to Fig 6.1 for the common tools used on site.

The appropriate tools must be used for the different materials and areas, as specified by the manufacturer. For example, applying the protective slurry coat with a steel trowel may damage the membrane (see Fig 6.2 and 6.3).

Figure 6.1: Common tools/ equipment used

Figure 6.2: Apply using steel trowel

Figure 6.3: Apply using broom
6.3 MIXING

Any mixing of waterproofing products on site should be done in a controlled environment with the mixing equipment and container cleaned prior to mixing. All liquid applied waterproofing products must be machine mixed. Hand mixing should only be used for products that do not machine mix satisfactorily. The mixing must be administered by a trained personnel, taking into account the specified ratio and usable pot life etc.

For the two component (two-part) system, ensure the materials are accurately measured out using appropriate measuring containers. Measure the correct amount of the liquid component and transfer the measured contents into a clean container. The powder component is then slowly added to the container and mixed for the specified time using a mechanical mixer. Care should be taken to ensure that the mix is homogeneous and lump-free and a workable liquid for application is achieved. Random tests or visual checks on the consistency of sample materials taken during the application can be conducted to ensure that there is no improper dilution.

Materials should be mixed only as fast as it can be laid. Mixed materials are to be discarded after the pot life has been exceeded even though mixture may still be in liquid form. It is also a good practice to manually re-stir the waterproofing material before use.

When using liquid applied waterproofing material from sealed containers, always remove the skin on the surface of the liquid before use.

Figure 6.4: Mixing of 2-component waterproofing products
6.4 APPLICATION

Apply material on prepared surface by brush, roller, serrated trowel, spray or a combination of these methods, as specified by the manufacturer. Please refer to Table 6.1 and Figure 6.5 for more details.

Whatever method of application is chosen, a continual check must be made on the amount of material that has been used and the area covered to ensure that the recommended coverage rate is being achieved. It is also important to ensure that the extent of waterproofing does not deviate from what has been specified.

<table>
<thead>
<tr>
<th>DESCRIPTION OF AREAS</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corners and confined areas</td>
<td>Brush application</td>
</tr>
<tr>
<td>Large vertical and horizontal areas</td>
<td>Roller application</td>
</tr>
<tr>
<td>High vertical walls</td>
<td>Spray application</td>
</tr>
<tr>
<td>Large horizontal surfaces</td>
<td>Self-leveling waterproofing material and evenly spread out with a serrated trowel</td>
</tr>
</tbody>
</table>

Figure 6.5: Tools for applying waterproofing membrane
6.4.1 Wall-Floor Junctions

Application normally begins with the upturns at wall floor junctions, and starts at the corner of the wet area, diagonal to the entrance to avoid stepping on applied area. The use of a roller with the same width as the upturn provides an even and uniform application. The use of a brush at these junctions will help to ensure good coverage. Depending on manufacturer’s requirements for certain membrane systems, the designer may choose to install reinforcement such as fiberglass mat at corners rather than installing a continuous fillet. For such cases, the reinforcement is to be cut into specified width and length with shears or a sharp knife. A coat of material is to be applied at the position to be reinforced and the reinforcement material is then covered with a wet coat of waterproofing membrane.

Figure 6.6: Application of waterproofing membrane around wall-floor junctions
6.4.2 Pipe Penetrations

Pipe penetrations are dressed up and floor outlets dressed down. As double protection, either fillet or reinforcement should be applied around pipe penetrations.

![Figure 6.7: Application of membrane at pipe penetrations](image)

**Figure 6.7**: Application of membrane at pipe penetrations

1. Dress down to 50mm
2. Apply membrane outside pipe
3. Completing application

**Figure 6.8**: Application of membrane at floor outlet

1. Dress down and apply around floor outlet
2. Lay reinforcement into wet coat
3. Completing application

**Figure 6.9**: Application of membrane at floor outlet (with reinforcement)
6.4.4 Walls and Floors

After the first coat of application to corners and pipe protrusions has sufficiently dried, proceed with using a roller to apply a coat of membrane to the walls and entire floor. The applicator should bear in mind that once the application of waterproofing to the floor and walls has commenced, the waterproofing works should be completed without any breaks in between. This is to achieve a seamless and continuous membrane throughout.

![Roller application to wall](image1)
![Completed wall application](image2)
![Roller application to floor](image3)
![Completed floor application](image4)

*Figure 6.10: Application of waterproofing membrane to walls and floors*

6.4.5 Special Considerations for Liquid Applied Membrane

For liquid applied membrane, it is a good practice to apply several thin coats to achieve the required wet film thickness (WFT), rather than applying one thick layer. The applicator should bear in mind that overcoating can only be carried out after the previous coat remains firm under hand pressure with a twisting thumb, or until the membrane no longer feels tacky. Coverage of liquid applied membrane must be monitored to ensure that the membrane is applied sufficiently to achieve desired thickness. A wet film thickness gauge can be used to check and confirm thickness compliance (see Fig 6.11).

The curing period for each coat prior to subsequent coats should be monitored to follow manufacturer’s specifications. Generally, adequate provision of ventilation at wet areas is necessary for the proper curing of all liquid applied waterproofing membranes, especially when they are applied in confined spaces such as bathrooms and toilets. Proper ventilation is also required for the safety of workers while handling chemicals within confined spaces.
At appropriate points during the process, joint inspections should be conducted (see Fig 6.11). Random checks on number of coats, mixing, method of application, spread rate and curing should be conducted. Visually ensure that air is not trapped in the membrane as this may result in the development of pinholes, which could become potential paths of leakage.

Particular attention shall be given to the following:

- minimum number of coats required
- wet film thickness (WFT) and coverage
- curing time between and after coats
- the right viscosity for vertical or horizontal application
- use of primers where necessary
- consistent application
- termination at upturn
- minimum total dry film thickness (DFT) – eg. pull-out tests on completed membrane, especially for upturn areas. This is a destructive test and requires rectification of the area tested.

Any damaged materials or work should be rejected and immediately removed and replaced with new materials. If damage is not confined to a localised area, the membrane should be reapplied for the entire area. If damage is localised, cut out localised area and reapply waterproofing to the localised area with proper lapping of minimum 100mm all round the localised area.

The membrane should be left to cure after application of the final coat with proper protection (Please refer to Chapter 7).