



Master Builders Solutions Technical Bulletin

Trouble-Free watertight substructure.



Waterproofing is often required for structures built at below ground level. Waterproofing considerations are especially important where ground water is likely to build up in the soil and raise the water table.

Waterproofing can become a major problem for clients, architects and construction companies if it is not completed as it should be.

This guide has been produced to help clients, architects and engineers understand the potential risks and problems faced during the substructure waterproofing installation in order to minimize the risk of water leakage.

The Master Builders Solutions Technical Bulletins are informative documents that present application recommendations and other technical details to better understand the use of construction chemicals products, often from BASF's portfolio.

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Communications and project coordination

The successful choice, design and installation of waterproofing systems rely on the effective communication throughout the project, with continuous information being shared from the client down to all involved parties. The flow of information between the different parties involved in the project is critical from the very start of the project through to completion.

The main contractor has to ensure that the construction plan does not conflict with the waterproofing system design. In order to allow effective communication and coordination between the different parties, regular multi-disciplinary meetings should be held with all the involved parties in the waterproofing work such as MEP, dewatering, steel work and concrete work specialists.

Should there be critical issues on the project, they should be communicated to the manufacturer's technical services team.

In summary, communication and project coordination throughout the design and construction are key for minimizing the risk of a waterproofing system failure.

Selecting the right watertight system

Selecting the right watertight system is the first step to ensure that your structure achieves the watertight condition. Designers are responsible for the proper selection and design of the waterproofing system. The waterproofing system manufacturer should be consulted for technical inputs during the design phase.

Selecting and designing comprehensive watertight systems for structures are two of the most important steps for providing a good service. Following the design of the structure by the designer, a suitable waterproofing system shall be proposed.

With deep knowledge of the project requirements, the design of the watertight system should take into consideration the major required functional properties such as the hydrostatic pressure head to resist, the presence of aggressive chemicals if any, the movement risks that may affect the basements and the service life of the waterproofing system.

All components involved in the waterproofing system should be supplied by a single manufacturer to ensure the compatibility of the full system.

The manufacturer's technical services team should support the designer during the design phase for details and installation guidelines.



Selecting the right applicator

Watertight systems when properly applied will prevent the passage of water into or out of the structures. Using an approved applicator by the waterproofing system manufacturer is one of the most important success factors to achieve watertight structures.

The manufacturer's technical service team should be capable to offer high-quality training courses to the waterproofing applicators. The waterproofing manufacturer should have proper resources and ideally a designated training center to be able to perform the applicator training.

The training sessions offered for the watertight system installers must ensure they understand the products, their application, these correct installation and the required equipment.

The applicator of the watertight systems must be capable of meeting the requirement of the quality control plan of the waterproofing manufacturer.

Each and every single applicator on the project should have an approved applicator certificate from the waterproofing system manufacture prior to being allowed to perform the application of the product on the project.

Project method statement

A project method statement is a guideline of the application which ensures that the necessary precautions have been communicated to all the involved parties.

Before starting the job on site, the applicator shall compose a project method statement for the application of the watertight systems.

The project method statement should include a cover; safety information, shop drawings issued for construction, standard details, application procedures, program of works, organization chart for the project, list of equipment and tools to be used in the project, inspection procedures and non-conformance and corrective action procedures.

A project method statement must be available in the work place at all times. Any changes in the design during the construction should be reflected in the statement. The project method statement has to be reviewed by the manufacturer technical experts and then submitted to the consultant and main contractor for approval before the start of the waterproofing work.

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Shop drawings for the construction and expansion joint locations of the PVC waterstops including a system of waterstops used for compartmentalization shall be prepared by BASF's specialist applicator and shall be submitted to main contractor to obtain approval from Site Consultant.

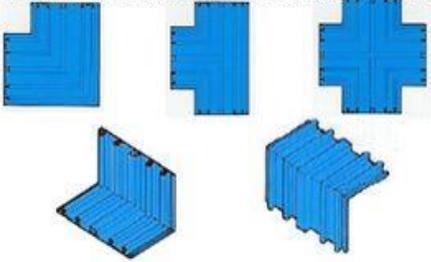
External waterstops will be welded to the membrane using hand hot air gun - hot wedge welding blade and will be welded 50mm from both sides to the MasterBeal 700BS 2mm PVC membrane as per compartmentalization layout to prevent the passage of water into adjacent compartment in case of water leak.

Joining of Waterstop - a correct welding procedure with an electrical blade

- Prepare the two waterstop to be joined, make sure they are well trimmed and cleaned with water.
- Adjustable jig can help to fix better the ends of waterstop during cutting and joining.
- Make sure the heater blade is clean and leave it in a safe position to warm up.
- Fit properly the blade to the waterstop ends for approximately 20 seconds - 1 minute. (Push the ends against the blade and hold in position). The PVC should melt without burning or charring.
- Remove the heater blade with a quick upward movement and joint the melted ends by hand pressing for approximately 20 seconds - 1 minute.
- When cold, test the welding by flexing the waterstop.
- Finally clean the heater blade with a cloth, while it is still hot.



- In case of waterstop joining on the site a new connection will be made by butt jointing the two continuous waterstop strips welded together using heater blade. All ribs of waterstop have to be **alive**.
- **Intersection Pieces**
Intersection pieces will be pre-fabricated and delivered to the site for the ease of the application.



Surface preparation

Proper preparation of the concrete surface is an important factor for ensuring a good waterproofing system performance. The area to be waterproofed should be prepared according to the manufacturer's recommendations prior the start of the installation.

The contractor must ensure that any other works that penetrate the floor and walls are completed before the start of the waterproofing work and the related specialists leave the area. To ensure that all the workers understand the requirements, a mock-up should be completed to demonstrate the substrate requirements and preparation. Completed mock-up should be inspected by the manufacturer's technical services team and approved by the consultant and main contractor.



Protection of the waterproofing system

Damages to the waterproofing system during installation or after completion could be the major reason for failures that lead to structure leakage. A proper temporary and permanent protection applied horizontally and vertically should be recommended by the waterproofing system manufacturer to ensure the membrane won't be damaged by the rest of construction activities in the area. The contractor should make sure that the works are carried out under controlled conditions and that the waterproofing is continuously protected during and after application. The contractor must ensure that immediately after waterproofing work completion, the area is cordoned off until a protective covering recommended by the manufacturer has been laid. Traffic on unprotected waterproofing systems should not be permitted. In summary, all subsequent works should be carried out only after the system protection has been implemented.

Quality control and inspection of the waterproofing system

Establishing a quality control and inspection process and defining who is responsible for the inspections is one of the major factors to minimize the risk of failure of the waterproofing system. A guideline for inspections recommended by the manufacturer should be followed by all involved parties. Continuous visual and physical inspections during application ensure quality of the works. The responsibilities of the quality control representative should be clearly defined to ensure complete understanding of the expectations of the waterproofing system to be installed, the installation methods and the definition of deficiencies with appropriately defined corrective actions.

The representative should provide the contractor in a timely manner with copies of all reports and should inform the contractor's field personnel of the locations of the items required for following corrective actions. The manufacturer's technical service team should randomly inspect the ongoing installation of the waterproofing system to ensure good practices.

Project supervision

Poor workmanship could be one of the major reasons for the waterproofing system leading to leakage. Regardless of the basement construction quality and type of waterproofing system being used, the quality of the workmanship has a major influence on the watertightness of the structure. Poor workmanship leads to incorrect installation including the membrane not being overlapped properly. To reduce the risk of leakage due to poor workmanship, the best option is to appoint a competent contractor recommended by the material manufacturer and that is approved by the consultant and main contractor (as highlighted under selection "Selecting the right applicator").

A further significant step for limiting poor workmanship is to have full time supervision by the main contractors' quality control team as well as the subcontractor. The client should weigh up the cost of supervision against the cost of remedial works required to repair a leaking substructure. The manufacturer's technical services team should carry out random site visits to ensure a proper installation of the waterproofing system.

Master Builders Solutions Technical Services Bulletins

- No. 01.** Grouting on an industrial scale
- No. 02.** Fast Track Screed - Doing it Right
- No. 03.** Ucrete Primer FS – recommended application
- No. 04.** Watertight Construction Systems - Hot air welding
- No. 05.** Trouble-Free watertight substructure

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