

1.0 General

1.1 Scope

This section deals with the installation of SwellSeal® MS (or MS/HP) to below grade vertical and horizontal structural foundation surfaces.

1.2 Please read this section in conjunction with the SwellSeal® specification (previous page) and any other relevant instructions or conditions issued by the Architect/Engineer referring to this project.

1.3 This section should also be read in conjunction with the current BRANZ Appraisal, which refers to related documents in the NZBC.

1.4 Technical Detailing

The designer is responsible for the design of the building and design of the waterproofing system. Geotex NZ Ltd® will create and supply a specification including current technical literature detailing the correct application of SwellSeal® MS (or MS/HP) and supporting products.

1.5 Applicator Qualifications

SwellSeal® (Bentonite Waterproofing Solutions) shall be installed by an approved applicator (contact office@geotexnz.co.nz for a current list of approved applicators).

Generally, 'Approved and Certified Applicator' status can be obtained by attending a Geotex NZ Ltd® operated training course and can be given to both individuals and companies (the later for the issuing of warranties).

For individuals, their registration numbers must be noted on the appropriate Geotex NZ Ltd® Quality Assurance forms.

Approved and Certified Applicator status will be granted by Geotex NZ Ltd® for a maximum period of 2 years and can renewed by attending a Geotex NZ Ltd® prepared training course.

Approved and Certified Applicator status can be removed with formal written notice given by Geotex NZ Ltd®.

1.6 Health and Safety

Individual companies are responsible for the conformance and implementation of their own company policy and should comply with the requirements of the 'Health and Safety in Employment Act 1992'.

1.7 Quality Assurance

Verification of all installation and design details (supplied by both Geotex NZ Ltd® and the building designer) shall take place during a main contractor organised, pre-installation meeting.

The pre-installation meeting should be (where practicable) attended by:

- The Main Contractor (site Foreman or Project manager)
- Approved Waterproofing Applicator
- Engineer or Architect (or both)
- Principal/Owner
- Geotex NZ Ltd® representative or suitably qualified appointee.

QA inspections are to be carried out by Geotex NZ Ltd® or a suitably qualified appointee.

On site installation of SwellSeal® (Bentonite Waterproofing Solutions) shall be carried out by an Approved and Certified Applicator and in accordance with the details and QA documents provided by Geotex NZ Ltd®.

All site visits shall be recorded and digital photographic evidence of on-site installations included with the QA documents supplied by Geotex NZ Ltd® and maintained by the Approved and Certified Applicator.

A copy of all relevant QA documents shall be forwarded to the main contractor and the engineer upon satisfactory completion of the project.

1.8 Materials

Membranes

SwellSeal® MS consists of a low permeability membrane manufactured from 2 high strength geotextile fabrics and a minimum of 5,500gsm of high quality sodium Bentonite (the most of any needle-punched membrane).

SwellSeal® MS/HP consists of a low permeability membrane manufactured from 2 high strength geotextile fabrics and a minimum of 5,500gsm of high quality sodium Bentonite (the most of any needle-punched membrane). SwellSeal® MS/HP also benefits from a HDPE liner bonded to the non-woven geotextile giving it superior chemical resistance and extremely low permeability for water and gas transmission.

Test data Property	Test Method	Value
Peel adhesion to concrete	ASTM D 903	58N
Hydrostatic Pressure	ASTM D 5385	70 meters
Permeability	ASTM D 5084	4.5 x 10 ⁻¹²
Tensile strength	ASTM D 4632	147N
Puncture resistance	ASTM D 4833	475
Low temperature flex	ASTM D 1970	Unaffected @ -29C
Geotextile interlock peel	ASTM D 4632	146N

SwellSeal® MS (and MS/HP) is supplied in rolls 1.65m wide by 20m long (33m²) also 1.65m wide by 3.0m long. The 33m² rolls are supplied on hard cardboard tubes and packed in labelled polythene protection wrappers. The 5m² rolls are supplied rolled up and are available on pallets of 25 or individually.

Bentonite Strips

Bentorub® + is a hydrophilic strip for sealing construction joints in concrete. 25 x 20mm rolls of 5m or 25 x 10mm rolls of 5m.

Bentorub® Salt is a hydrophilic strip for sealing construction joints in concrete in contact with salt or brackish water. 25 x 20mm rolls of 5m.

Bentoject® is the unique combination of a hydrophilic Bentonite strip and a post – injectable injection tube into 1 system for the sealing of construction joints in concrete. 16 diameter x 5m.

Bentoject® Salt is as above but for use in joints in contact with salt or brackish water. 16 diameter x 5m.

Bentoglu® is a caulk applied adhesive for gluing Bentorub® strips in vertical and horizontal applications. 310ml cartridge.

Bentosteel® is a galvanised steel mesh for the secure installation of Bentorub® + and Bentorub® Salt. 25 x 20mm x 1.0m.

Mastics

SwellSeal® Mastic is a caulk applied one-component, hydro-swelling mastic for sealing smooth or rough construction joints and pipe penetrations. 310ml cartridge and 600ml sausage.

SwellSeal® Mastic WA is as above but can also perform in wet or underwater applications. SwellSeal® Mastic WA is also used as adhesive for the fixing of SwellSeal® hydrophilic rubber strips. 310ml cartridge and 600ml sausage.

Granules

SwellSeal® Bentonite Granules are used to detail areas (penetrations etc,) that may require additional SwellSeal® protection. They are chemically treated and supplied in 25kg bags.

Geotex Drainage Cells

Dimpled wall drains are made from a cusped core bonded to a high quality non-woven geotextile. A high compressive strength core resists loads from infill and form work.

Bi-planar drainage geonets consist of 2 layers of heat bonded polypropylene or polyester non-woven geotextile bonded to a high strength HDPE geonet core. They are designed for in-plane flows over a large surface area.

Tri-planar drainage geonets consist of 2 outer layers of inclined ribs separated by strong vertical ribs. The whole structure is bonded to a non-woven geotextile. The high compressive strength delivers a high flow rate under load while preventing soil particles blocking the drainage core.

Protection

Geotex drainage cells can be installed against SwellSeal® MS (or MS/HP) in areas of high hydrostatic pressure. Otherwise, SwellSeal® MS' high puncture resistance (ASTM D 4833 =475N), enables backfilling of vertical applications to be performed without the use of protection boards or sheets.

1.9 Installation

1.9.1 General

1.9.2 Storage

Store SwellSeal® MS and all other accessory products in a dry shelter. If the liner is stored outside, protect it with a weatherproof cover on all sides and on top. Ensure that the bentonite liner avoids contact with ground surface water.

Install SwellSeal® MS in strict accordance with Geotex NZ Ltd® installation guidelines.

Schedule waterproofing installation to permit the prompt placement of concrete or backfill material. To comply with warranty requirements, SwellSeal® waterstops (Bentorub®+ and Bentorub® Salt) are to be used in all construction joints. Please contact Geotex NZ Ltd® for a complete, project specific, SwellSeal® MS specification.

1.9.3 Preparatory Work

The substrate should be smooth and compacted to a minimum of 95% modified proctor. Concrete surfaces should be free of voids and sharp projections. Surface irregularities should be removed before installation. Honeycombing and other surface voids must be filled with mortar or Bentonite paste, and tie-bolt holes must be filled with non-shrink mortar or grout.

1.9.4 Under Concrete floor slabs

SwellSeal® MS is recommended for use under structural reinforced concrete slabs 100mm thick or greater, over a compacted earth/gravel substrate or 50mm lean-mix concrete 'mud-slab'.

Install SwellSeal® MS over the properly prepared substrate with the grey (woven) geotextile side facing the concrete to be waterproofed.

Overlap all roll adjoining edges a minimum of 100mm and stagger ends a minimum of 300mm. Staple or nail edges together as required to prevent any displacement before and during concrete placement. SwellSeal® MS should not extend into foundation bearing planes (i.e. pile caps, ground beams, pads etc.), but should completely envelop them. Where this is not possible, a cementitious waterproofing sealant can be used as a 'continuity membrane' through the bearing plane, to which SwellSeal® MS can be sealed using a 100mm lap, incorporating a 5 x 50mm fillet of Bentonite paste.

SwellSeal® MS is cut to provide a snug fit around all relevant objects (pipes, piles etc.). Place a 40mm fillet of SwellSeal® Bentonite paste (granules and water mix) around the penetration on top of the SwellSeal® MS. Where a concrete under blinding is not used, an additional 50mm border of SwellSeal® Bentonite Granules around the penetration under the SwellSeal® MS.

NB: Where property-line construction, such as secant/contiguous piling, metal sheet piling, skin wall etc, is used as the outside concrete form, continue the underslab SwellSeal® MS installation up the property line a minimum 300mm above the top edge of the finished floor level or kicker level. The extra 300mm is very important since there is no access to the outer edge after the concrete pour, and the top 100mm needs to be kept free of concrete splashes to enable a clean lap later.

1.9.5 Backfilled Concrete Walls

SwellSeal® MS can be applied to backfilled walls in two ways;

- mechanically fixing to the cast concrete wall (post applied)
- laying in the pre-cast panel beds and delivering to site already fixed, as part of the panel (pre applied). This is preferable and takes advantage of the high peel – adhesion properties of SwellSeal® MS.

The needle-punched geotextile fibres, (which have been forced from the non-woven side, through the Bentonite and the grey woven side) will be trapped within the wet concrete after the form work has been removed (insitu pour).

Concrete tie holes etc, must be filled from the outside, using a non-shrink grout or similar, covered in a 'mushroom' of Bentonite Paste or Bentonite Mastic, either prior to SwellSeal® MS (post-fix) application, or prior to backfilling (pre-fix/peel adhered application), where additional SwellSeal® MS patching will be required.

Detail all pipe penetrations with SwellSeal® Bentorub®+ (or Salt) Waterstops as a 'puddle-flange' within the concrete (or use SwellSeal® Mastic). Ensure a minimum of 70mm concrete cover to all sides. Where penetrations pass through SwellSeal® MS, ensure that SwellSeal® MS is cut to provide a snug fit and detail with a 40 x 40mm fillet of Bentonite Paste or Bentonite Mastic, prior to backfilling.

1.9.6 Below Grade Masonry Block Walls

When installing SwellSeal® MS/HP to masonry block walls, please ensure the outside face of the blocks are flush with each other and that the mortar between the blocks is also flush with the block face (i.e. not pointed).

The block surface should be free of any debris and in 'constant hydrostatic' conditions, skim coated with a suitable exterior grade plaster (please contact office@geotexnz.co.nz for details).

The membrane should then be installed as per standard SwellSeal® MS/HP details.

The SwellSeal® MS/HP membrane does not require protection from the backfill if the backfill is less than 20mm (please contact office@geotexnz.co.nz for a list of suitable aggregates).

In 'constant hydrostatic' conditions, a Geotex Dimpled Wall Drain may be installed against the HDPE liner on the outside of the membrane prior to the placing of the back fill.

Backfilling should be completed by the contractor to include visual inspection by the Geotex NZ Ltd 'Approved and Certified Applicator' and compaction of the backfill should be completed in 300mm 'lifts' to 95% modified proctor.

1.9.7 Backfill Material

Backfill material shall be compactable soils and free of construction debris. Backfill shall be clean, well grounded, and compacted in 300mm 'lifts' to a minimum of 95% modified proctor (as per ASTM 1557) and meet these general specifications;

- Backfill maximum size of 20mm poorly graded (with fines)
- 90% minimum soil particles smaller than 5mm
- 10% maximum soil particles finer than 74 micron (200 mesh)

1.9.8 Termination

Terminate SwellSeal® MS 100mm below ground level with a SwellSeal® termination bar or similar. Apply a liquid membrane (single pack or polyurethane) to overlap the termination bar and continue to above grade. The SwellSeal® MS lap should be enhanced by the inclusion of a 5 x 50mm fillet of SwellSeal® Mastic, centrally located.

1.9.9 Property Line Construction

SwellSeal® MS is used to waterproof various types of property line construction, including metal sheet piling, skin wall, shotcrete and stabilized-earth retention walls. Shotcrete can be applied directly against SwellSeal® MS. Concrete surfaces shall be free of voids or projections. Voids, pits and cracks shall be levelled flush using cement grout, Bentostic levelling/detailing sealer or Bentonite paste.

Generally, gradual undulating surfaces are acceptable, sudden changes in level, i.e., ridges and hollows are not. When working against the property line, always start with the vertical installation, prior to installing SwellSeal® MS underslab. Apply the bottom run of SwellSeal® MS lengthways/horizontally against the property line, approximately 1.500m above the substrate level, allowing 150mm of SwellSeal® MS to extend under the slab.

On profiled property line (metal sheet piling, secant and contiguous piling etc,) the 150mm base 'flap' will need to be cut and splayed as necessary, to allow the materials to lay flat. A 40 x 40mm fillet of SwellSeal® Bentonite Granules should then be poured along the entire base before the underslab SwellSeal® MS is cut to suit and then laid against the metal piling. Contact office@geotexnz.co.nz for details.

Limitations

SwellSeal® MS is not designed to waterproof expansion joints.

SwellSeal® MS is not designed for unconfined above ground waterproofing applications.

SwellSeal® MS is engineered for use under reinforced structural concrete slabs of 100mm thick or greater. Do not install SwellSeal® MS in horizontal split-slab, plaza deck or roof applications that will receive a poured concrete topping or other solid surface.

Warranty

The SwellSeal® Tanking System has a full 5 to 20 year INSTALLED WARRANTY (depending on what part of the structure has been tanked) which covers the performance of the system when installed by an APPROVED and CERTIFIED APPLICATOR. The INSTALLED WARRANTY is held by Geotex NZ Ltd® and is between Geotex NZ Ltd® and the owner of the building/structure. Please contact office@geotexnz.co.nz for further details.