

SPECIFICATION

Bentech Bentonite Tanking System & details

of work to be done and materials to be used in carrying
out the works shown on the accompanying drawings

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(project name)

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(project address)

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(owners name)

BENTECH BENTONITE TANKING

1. GENERAL

This section relates to the application of **Bentech Pacific Ltd's Bentech Bentonite** tanking system.

1.1 MANUFACTURER/SUPPLIER DOCUMENTS

Bentech Pacific Ltd documents relating to work in this section are:

Standard detailed drawings
CodeMark™ Certificate Number SAIG-CM20070 Bentech Bentonite Below Ground
Tanking Membrane

For copies of the above documents, and for technical assistance, contact a **Bentech Pacific Ltd** representative:

Postal: PO Box 25 607
St Heliers 1740
Phone: 021 565 696
Web: www.bentechbentonite.co.nz
Email: info@bentechbentonite.co.nz
al@bentechbentonite.co.nz

Requirements

1.2 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **Bentech Pacific Ltd** system, or associated components and products.

1.3 QUALIFICATIONS

Application to be carried out by applicators approved by **Bentech Pacific Ltd**. Approved applicators may be found at:

Web: www.bentechbentonite.co.nz
Telephone: 021 565 696

1.4 PROJECT REGISTRATION

Contact **Bentech Pacific Ltd** to confirm that the project has been registered.

Web: www.bentechbentonite.co.nz
Telephone: 021 565 696

If the project has not been registered, telephone at the earliest possible time to ensure Bentech Pacific Ltd are able to provide appropriate specific design information. Go to www.bentechbentonite.co.nz, or telephone 021 565 696 and provide all required details.

Warranties

1.5 WARRANTY - INSTALLERS

Installer's warranty for the system under normal environmental and use conditions against failure.

5 years: Execution warranty

Provide this warranty on the installer's standard form.

1.6 MANUFACTURERS MATERIAL WARRANTY

Provide a materials warranty in the suppliers standard form under normal conditions of use against failure:

20 years: when applied in accordance with application and preparation procedures as specified in the **Bentech Pacific Ltd** product technical data sheets and specification.

From: Date of completion of the application

Performance

- 1.7 **PRE INSTALLATION MEETING**
Convene a meeting between the applicator, contractor, all associated consultants and **Bentech Pacific Ltd** to ensure all parties know what is required for effective performance of the system.
- 1.8 **SPECIAL DETAILS**
Where a standard detail does not exist, or if a standard detail cannot be applied, an approved alternative must be obtained from **Bentech Pacific Ltd** before proceeding with the installation.
- 1.9 **PRESSURE RATING**
Obtain a written assurance from **Bentech Pacific Ltd** that the waterproofing system, comprising membrane and jointing methods, is capable of sustaining the designated water pressure head. Refer to SELECTIONS for the designated water pressure head.
- 1.10 **QUALITY ASSURANCE**
Maintain quality necessary to assure that work is performed in accordance with this specification and the qualifying requirements of **Bentech Pacific Ltd**.

Installer Qualifications: Installing company should have at least three years experience in application of bentonite tanking, who can comply with manufacturer's warranty requirements, and who is an Approved Applicator as determined by waterproofing manufacturer.

Independent Inspection: Owner shall make all arrangements and payments for an independent inspection service to monitor waterproofing material installation compliance with the project contract documents and manufacturer's published literature and site specific details. Inspection service shall produce reports and digital photographs documenting each inspection. Reports shall be made available to the Contractor, waterproofing installer, waterproofing material manufacturer, and Architect. Inspections should include substrate examination, beginning of waterproofing installation, periodic intervals, and final inspection prior to concrete or backfill placement against the waterproofing.

Water Sample Test: Project site water sample supplied to manufacturer by waterproofing contractor to determine suitability of bentonite system to be utilized on the project. Manufacturer shall conduct test free of charge. Contractor responsible for collection and shipment of 2 liters of actual site water. Water should be shipped in uncontaminated, sealed plastic container to:

Ensure that **Bentech Pacific Ltd's** Quality Control sheets are completed fully and faithfully for each installation area.

2. PRODUCTS

- 2.1 **BENTONITE TANKING MEMBRANE**
Bentech high density GCL bentonite membrane, manufactured from high quality natural sodium bentonite clay all marked with the manufacturer's mark. Membrane to have minimum 5.5 kg/m² natural sodium bentonite.

- 2.1.1 **Bentech** HDPE bentonite membrane is manufactured from high quality natural sodium bentonite clay all marked with the manufacturer's mark, and backing liner HDPE High Density Polyethylene Sheet. Membrane to have minimum 5 kg/m² natural sodium bentonite.

PROPERTY	Unit	Value
Thickness	Mm	≤6.4
Bentonite Mass per Unit Area	kg/m ²	≥5.5
Grab Tensile Strength	N	>530
Bentonite Swell Index	mL/2g	>24
Permeability	cm/sec	<5.0 x10-09
Puncture Resistance	N	>620
Elongation	%	>10
Hydrostatic Pressue Resistance	m	>70
Low Temperature Flexibility		Unaffected at -32°
Peel Strength	N	>65
Peel Adhesion to Concrete	kN/m2	>2.6
Peel Strength, HDPE	N	>40

- 2.2 **WATER STOPS**
Bentech 20/10 Water-stop (Rectangular) manufactured from a high quality sodium bentonite clay all marked with the manufacturer's mark.

Property	Unit	Value
Hydrostatic Resistance	MPa	≥2.5
Wet Swelling Capacity	72h. %	≥200
Max. Swelling Capacity	120h.%	≥300
Density	g/cm ³	1.4±0.1
Heat Resistance	80°C, 2h	No liquid
Low Temperature	-20°C rotation around	
Flexibility	20mm rods for 2 hours	No crack

- 2.3 **BENTECH GRANUALS / MIXED PASTE**
Bentech Granules/Paste used to seal laps and around complex detailing and protrusions.

3. EXECUTION

Conditions

- 3.1 **LAYOUT**
 If not detailed on the drawings, confirm the layout to suit site conditions and **Bentech Pacific Ltd** specifications. Pre-plan the work to keep the number of membrane laps to a minimum.
- 3.2 **DE-WATERING**
 Ensure dewatering system is maintained consistently 24 hours a day, 7 days a week, below the level of work area during the progress of tanking project and until all protective corflute is installed and fully compacted with Gap 40 or similar metal.
- 3.3 **DRAINAGE**
 Install certified drainage system to remove water from foundations. Ensure drain is protected with a geotextile cloth to prevent clogging from fines, and that it is correctly located with falls. Ensure drain is kept 150 mm away from bentonite membrane.
- 3.4 **CHECK SUBSTRATE**
 Check the substrate will allow work of the required standard. Complete any remedial work identified before commencing works. Substrate to comply with performance requirements of the NZBC.

Preparation

3.5 PRE INSTALLATION MEETING

Convene a meeting between the applicator, contractor, concrete supplier, all associated consultants and **Bentech Pacific Ltd** to ensure all parties know what is required for effective performance of the system.

- Co-ordinate work to minimise the time membrane is left exposed.
- Agree detail drawings.
- Discuss the importance of concrete placement.
- Discuss the importance of **confining pressure** with no voids.
- Discuss with contracted back-fill contractor back-fill compaction process, particularly for penetrations and correct metal and confining pressure.
- ***Discuss the importance for 24/7 dewatering.***

3.6 STORAGE

Store **Bentech Bentonite** membrane and **Bentech 20/10 Water-Stops** in their protective wrapping, and away from heat and direct sunlight until use. Return part rolls and part boxes to their wrapping until used again.

3.7 SUBSTRATE CONDITION

Ensure that the substrate is in a suitable condition to allow work of the required standard. Ensure compacted base is smooth, without voids or debris and compacted to 85% Modified Proctor density. Blinding concrete substrates to be 50 mm+ smooth finish and free from contaminants or foreign matter that may impair the performance of the waterproofing system. Substrates do not have to be dry. Check for live cracks in the concrete substrate and report for special detail.

3.8 SUBSTRATE PREPARATION

Carry out any remedial work required to substrate.

3.9 PILE PENETRATIONS

Where piles penetrate the over-site blinding or compacted sub-base. Place **Bentech Granules/Paste** around perimeter of pile. Neatly cut the **Bentech** membrane around the pile and turn up the face of the pile covering the paste. Place a second layer of **Bentech** membrane around pile, ensuring membrane is secured with plastic cable ties and further paste and membrane to perimeter floor approx 300mm secure with ground pins or mechanical fixing. Refer to **Bentech Pacific Ltd** details – Det 18.

3.10 INSTALL BENTECH WATER-STOP REBATES

Bentech 20/10 Water-stops must be located within a pre-formed rebate and held securely in place prior to concrete pour. Rebate to be a minimum 50mm from the rebar.

3.11 INSTALL BENTECH WATER-STOPS

Install **Bentech 20/10 Water-stop** to all internal construction joints.

Install **Bentech 20/10 Water-stop** to applicable vertical & horizontal concrete construction cold pour joints and around penetrations and structural members and or any rebar protrusions. Join lengths of water-stop by butting tightly and thumbing together to ensure a continuous water-stop is formed.

Installation

3.12 WEATHER CONDITIONS

Bentech Bentonite can be installed on to damp substrates and during inclement weather including rain. **Ensure the membrane is not left exposed or in standing water.**

3.13 INSTALL BENTECH BENTONITE

GCL rolls are applied with green/white side to concrete surface to be waterproofed. 100mm laps, 200mm end laps (wall application).

GCL / HDPE rolls, geotextile surface side to concrete surface to be waterproofed, ensuring HDPE is peeled back 150mm, bringing the second layer in continuous contact with the first layer. Ensure **Bentonite Granules/Paste** is applied to all side and end laps. Stagger rolls to prevent build up, ensuring laps remain intact while placing confining concrete over the top (prepared sub-base surface).

Install wall membrane sheets horizontally around structure (or vertical fixing depending on applicable height and safety). Fix with mechanical guns, Hilti or Ramset nails and flat 48mm washers at 400mm centres. Nail 150mm below top of the sheet. Ensure all side and end laps receive paste. Ensure subsequent rows overlap by 100mm fixing through second layered membrane at 200mm centres ensuring a good closing joint. Continue fixing around the structure.

When installing on to precast panels and there is **insufficient** access behind the panel to manually form the floor to wall junction, contact **Bentech Pacific Ltd** for specific design. Ensure when the tilt slab panels that are seated on packers, the bottom of the tilt slab panel is tightly pressure fitted onto the **Bentech 20/10 Water-stop**. Make sure the **Bentech 20/10 Water-stop** is compressed onto the foundation surface forming continuous compression between the panel underside and the foundation surfaces.

3.14 FLOOR TO WALL JUNCTION

Extend the floor slab membrane 200mm beyond the perimeter of the footing. Protect this extended membrane from damage until floor-to-wall junction is installed and it can form a lap with the vertical membrane. Refer to Det 15.

3.15 FOOTING – WALL TRANSITION

Plaster fillet 25mm x 25mm ensure where the panels are packed out to given heights that a plaster fillet is installed covering the entire gap at the bottom panel toe edge. Refer to Det 10.

3.16 COVERING AND CONFINEMENT

Confine horizontal membrane. Confine with reinforced concrete immediately after the membrane installation is complete - this prevents premature edge paste hydration or over night rain causing premature swelling. Concrete to be vibrated ensuring no voids.

In situ shutter pour: refer to Det 19, 19A. Ensure all voids are plastered smooth. Concrete lumps and bumps are removed from piles. All rebar protrusions are wrapped with **Bentech 20/10 Water-stop**. Ensure all laps are mechanically fixed and pasted preventing any concrete grout spreading between membrane layers.

3.17 PROTECTION CORFLUTE

Ensure corflute 3.3mm plastic protection is installed to vertical membrane application. Fixing off at 150mm ctrs to the termination bar, then apply suitable polyurethane sealant to top of termination bar and concrete substrate wall preventing any metal getting behind protection sheet and membrane.

Ensure the **Bentech** membrane is not damaged during backfill.

- 3.18 **BACK FILL**
Ensure the quality of the back fill (GAP 40) is such that the **Bentech** membrane is not damaged and it allows uniform compaction and confining pressure of the membrane. Preferably a whacker is best for compaction or very least vibrating plate compactor. Ensure backfill does not get behind the membrane during installation. Place backfill in layers and compact to a minimum of 85% Proctor, every 500mm.

Protection

- 3.19 **PROTECT HORIZONTAL SURFACES**
After laying is complete the membrane can be protected **until the floor slab** is poured by covering the tanking with a 50 mm layer of 20 MPA blinding concrete. This situation arises when there is an extended delay between the membrane installation and the placement of the floor slab or where construction machinery is being taken over the membrane.

Completion

- 3.20 **SECTIONAL COMPLETION**
As sections of the tanking are completed, arrange for inspection of the work before covering with protective sheets, walls, or slabs. Complete the **Bentech Pacific Ltd** Quality Control Sheets, and provide to them for Material Warranty issuing.
- 3.21 **ACCEPTANCE**
Arrange for an inspection of the completed work.
Complete **Bentech Pacific Ltd** Quality Control sheets and provide to them for the issuing of Materials Warranty. Protect the membrane until completion of the contract works.
- 3.22 **CLEAN UP**
Clean up as the work proceeds.
- 3.23 **LEAVE**
Leave this work in a sound condition, free of any defect.

4. PRODUCT SPEC/RATING

4.1 PRESSURE RATING

Designated water pressure head: 70 metres

Bentonite system

4.2 BENTECH BENTONITE TANKING MEMBRANE

Location: Auckland, New Zealand
Supplier: Bentech Pacific Ltd
Brand: Bentech
Membrane type: GCL 1.0 X 9M 2.0 X 9M
HDPE-GCL 1.0 x 9M 2.0 X 9M

4.3 BENTECH WATER STOPS

Supplier: Bentech Pacific Ltd
Type: 20/10 Rectangular

4.4 BENTECH GRANUALS/PASTE

Supplier: Bentech Pacific Ltd
Type: Sealed 20Kg bag

Protection

4.4 COREFLUTE PROTECTION SHEET/BOARD

Manufacturer: ~
Thickness: 3.3mm (2.4x1.2) or (1.8x1.2) White or black

4.6 TERM BAR

50mm Flat bar Galvanised (primarily used when concrete is placed adjacent)
30mm x 3mm Flat Alloy bar (primarily used at ground level) or any termination point other wise not confined by concrete.
Manufacturer: ~

4.7 NAILS

Hilti Drive pins 25mm, 27mm, 30mm
Manufacturer: Hilti

4.8 WASHERS

Hilti flat washers 48mm
Manufacturer: Hilti