VOLTEX®

BENTONITE GEOTEXTILE WATERPROOFING SYSTEM

TECH DATA

DESCRIPTION

Voltex is a highly effective waterproofing composite of high strength geotextile and 4.88 kg of sodium bentonite per square metre. The high swelling, low permeable sodium bentonite is encapsulated between a non-woven and woven geotextile. A patented needle-punch process interlocks the geotextiles together forming an extremely strong composite that maintains the equal coverage of bentonite, as well as, protects it from inclement weather and construction related damage. Once backfilled, Voltex hydrates and forms a monolithic waterproofing membrane. Voltex contains zero VOC, can be installed in almost any weather condition to green concrete, and most importantly, has proven effective on both new and remedial waterproofing projects worldwide.

Voltex works by forming a low permeability membrane upon contact with water. When wetted, unconfined bentonite can swell up to 15 times its dry volume. When confined under pressure the swell is controlled, forming a dense, impervious waterproofing membrane. The swelling action of Voltex can self-seal small concrete cracks caused by ground settlement, concrete shrinkage, or seismic action; problems over which there is normally no control. Voltex forms a strong mechanical bond to concrete when the geotextile fibres are encapsulated into the surface of poured-in-place concrete.

APPLICATIONS

Voltex is designed for below-ground vertical and horizontal structural foundation surfaces. Typical applications include backfilled concrete walls, earth covered roofs, structural slabs, tunnels and property line construction. Property line construction applications include secant and contiguous piling, skin wall, metal sheet piling, shotcrete and stabilized earth retention walls. Applications may include structures under continuous or intermittent hydrostatic pressure.

Where contaminated ground-water or saltwater conditions exist, use Voltex CR with contaminant resistant sodium bentonite. Voltex CR resists higher levels of the following contaminants: nitrates, phosphates, chlorides, sulfates, lime and organic solvents.

INSTALLATION

General

Install Voltex in strict accordance with the manufacturer's installation guidelines. Use accessory products as recommended. Also, use Voltex CR as required for contaminated conditions. Install Voltex with the dark grey (woven) geotextile toward the concrete to be waterproofed. Install Waterstop-RX in all applicable horizontal and vertical concrete construction joints. Schedule waterproofing material installation to permit prompt

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placement of backfill material or concrete. For applications not covered herein, refer to Voltex Product Manual or contact CETCO for specific installation guidelines.

Preparation

Substrate should be smooth and compacted to a minimum of 85% modified proctor density. 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 Bentoseal, and tie-bolt holes must be filled with proprietary non-shrink mortar/grout.

Application

Under concrete floor slabs

Voltex is recommended for use under structural reinforced concrete slabs 150 mm thick or greater on compacted earth, substrate, or 50 mm lean-mix concrete. Install Voltex around all foundations (ground beams, pads, pile caps, etc.)

Place Voltex over the properly prepared substrate with the dark grey (woven) geotextile side facing the concrete to be waterproofed (ie the white (spun) side should face the groundwater). Overlap all adjoining edges a minimum of 100 mm and stagger ends to a minimum of 300 mm. Staple or nail edges together as required to prevent any displacement before and during concrete placement.

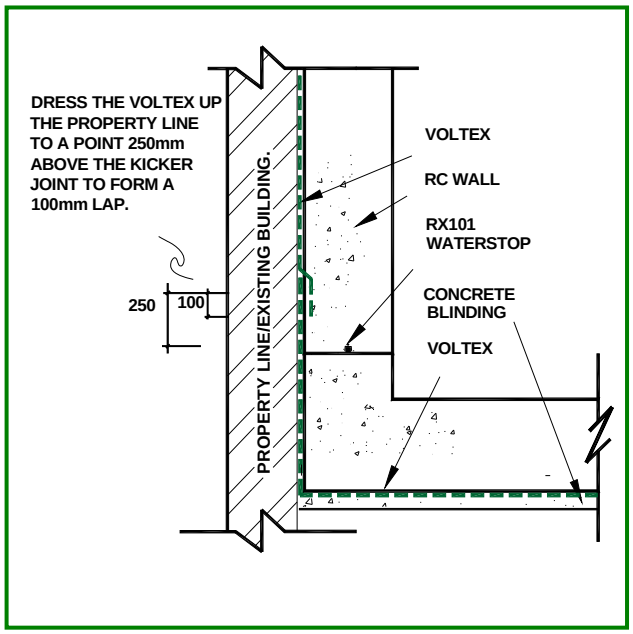
Voltex should not extend into foundation bearing planes (i.e. pile caps, ground beams, pads etc.,) but should completely envelop them. Where this is not possible/desirable, VolSeal 200 (cementitious waterproofing by crystallization) or similar can be used as a continuity 'membrane' through the bearing plane, to which Voltex can be sealed using a 100 mm lap, incorporating a 5 mm x 50 mm fillet of Bentoseal.

Cut Voltex to provide a snug fit around all applicable penetrations (pipes, piles etc).

Detail all penetrations with a 40 mm fillet of Bentoseal or Voltex Paste (Granules & water) around the penetration on top of the Voltex. Where concrete underblinding is not used, detail an additional 50 mm chase filled with Voltex Granules around the penetration under the Voltex.

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 Voltex installation up the property line a minimum of 250 mm above the top edge of the floor slab, foundation, or kicker level.

The extra 250 mm is very important since there is no access to the outer edge after the concrete pour, and the top 100 mm is to be kept free of concrete splashes to enable a clean lap later.



Backfilled concrete walls

Voltex can be applied to backfilled walls in two ways: mechanically fastening to cast concrete just prior to backfilling (post-applied), or preferably, by utilizing the peel-adhesion properties of the Voltex

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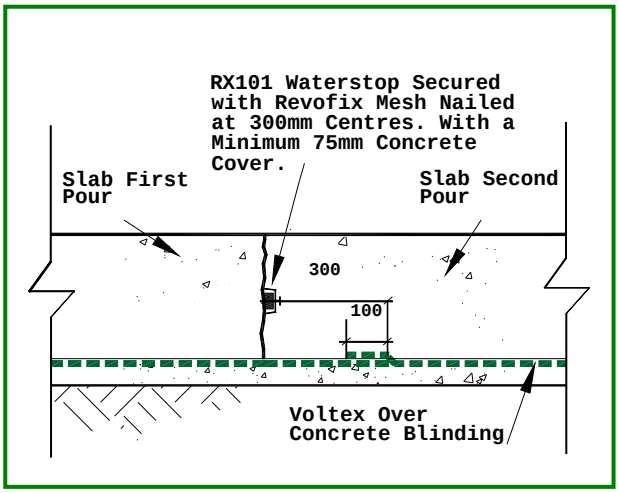
(pre-applied). The needle-punched geotextile fibres, which have been forced from the white (spun) side through the bentonite and dark grey (woven) side, will be trapped within the wet concrete, and allow the Voltex to remain firmly attached to the concrete after the formwork has been removed.

All through concrete tie holes, etc., must be filled, from the outside, using a proprietary non-shrink grout or similar, covered in a 'mushroom' of Voltex Paste or Bentoseal, either prior to Voltex (post-fix) application, or prior to backfilling (pre-fix/peel-adhered application), where additional Voltex patching will be required.

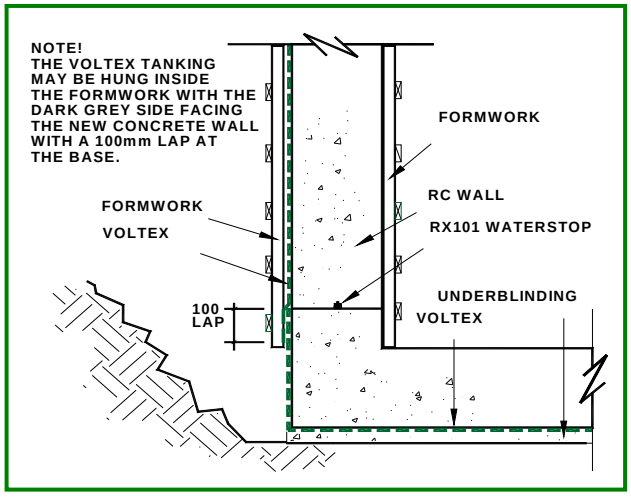


Detail all pipe penetrations with Waterstop RX101 as a 'puddle flange' within the concrete, ensuring no less than 75 mm concrete cover to all sides, and where penetrations pass through Voltex, ensure that Voltex is cut to provide a snug fit, and detail with a 40 mm x 40 mm fillet of Voltex Paste (Granules & water) or Bentoseal, prior to backfilling.

Backfill material shall be compactable soils and free of construction debris. Backfill shall be clean, well graded, and compacted every 300 mm to 85% modified proctor (as defined by ASTM 1557), and meet these general specifications:

- No rocks, stones or boulders larger than 50 mm
- 90% minimum soil particles smaller than 5 mm
- 10% maximum soil particles finer than 74 micron (200 mesh)

Terminate Voltex at ground level, etc., integrating the Voltex with a damp proof course/cavity tray (as per architects arrangement), by extending the DPC to overlap Voltex a minimum of 150 mm. The Voltex/DPC lap should be enhanced by the inclusion of a 5mm x 50 mm fillet of Bentoseal, centrally located.



Pre-applied

Apply Voltex to timber formwork, either horizontally or vertically, by nailing or stapling, following general application guidelines for lapping all adjacent edges 100 mm, and staggering adjacent roll ends no less than 300 mm (avoiding four-way laps), and additionally ensuring that laps face downwards, as applicable. The white (spun) side should be against the formwork, and the dark grey (woven) side should face the concrete to be waterproofed.
Extend Voltex the full depth of the formwork, so that the Voltex laps 100 mm over the Voltex already cast into the slab edge and wall kicker, and allow no less than 150 mm at the top of the formwork, to provide ground slab continuity later, if required.

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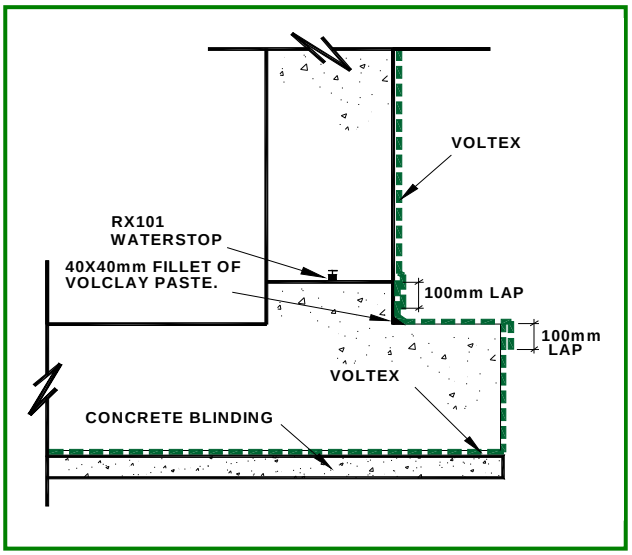
Position formwork as required, and tie/space forms, penetrating Voltex as necessary. Normal concrete practice is sufficient in terms of striking times for formwork, but due care should be taken to ensure that Voltex remains bonded to green concrete.

Where a slab 'toe' exists, and underslab Voltex has terminated at the top edge of slab, additional Voltex will be required to link underslab/edge of slab Voltex with wall Voltex. Apply a 40 mm x 40 mm fillet of Voltex Paste (Granules & water) at the internal wall/slab corner, and place additional Voltex over the slab 'toe' lapping 100 mm over the edge of slab Voltex, and continue over the 'toe' terminating under the unbonded wall Voltex 'flap' at the back of the kicker.



Post-applied

Apply Voltex vertically or horizontally against concrete, starting with a 100 mm lap with the underslab/edge of slab Voltex (peel-adhered to concrete), using CETCO's proprietary shot-fired 'soft-washer' fasteners, and following general application guidelines for lapping all adjacent edges 100 mm, and staggering adjacent roll ends no less than 300 mm, (avoiding four-way laps), and additionally ensuring that laps face downwards, as applicable. The dark grey side should be against the concrete, and the white (spun) side facing the installer.

Detail all horizontal and vertical internal corners with a 40 mm x 40 mm fillet of Voltex paste (Granules & water) or Bentoseal, prior to Voltex application.

NOTE: Voltex is not recommended for masonry block walls.

Property line construction

Voltex is used to waterproof various types of property line construction, including metal sheet piling, secant and contiguous piling, skin wall, shotcrete and stabilized-earth retention walls. Shotcrete can be applied directly against Voltex.

Concrete surfaces shall be free of large voids or projections. Voids, pits, and cracks in excess of 20mm, shall be parged to flush condition using cement grout, Bentoseal or Voltex paste (Granules & water). Projections greater than 20 mm shall be removed or smoothed flush. Generally, gradual undulating surfaces are acceptable, sudden changes in level, i.e. ridges and hollows, are not.

When working against property line, always start with the vertical installation, prior to installing Voltex under slab. Apply the bottom run of Voltex length ways/horizontally against the property line, approximately 1100 mm from the substrate/blinding level, allowing 150 mm of Voltex to extend under slab.

On profiled property line (metal sheet piling, secant and contiguous piling, etc) the 150 mm base 'flap' will need to be cut and splayed as necessary, to allow the material to lay flat.

Using CETCO's proprietary shot-fired 'soft-washer' fasteners, and following general application guidelines for lapping all adjacent edges 100 mm, and staggering adjacent roll ends no less than 300mm (avoiding four-way laps), and additionally ensuring that laps face downwards, as applicable, ensure that Voltex closely contours the application

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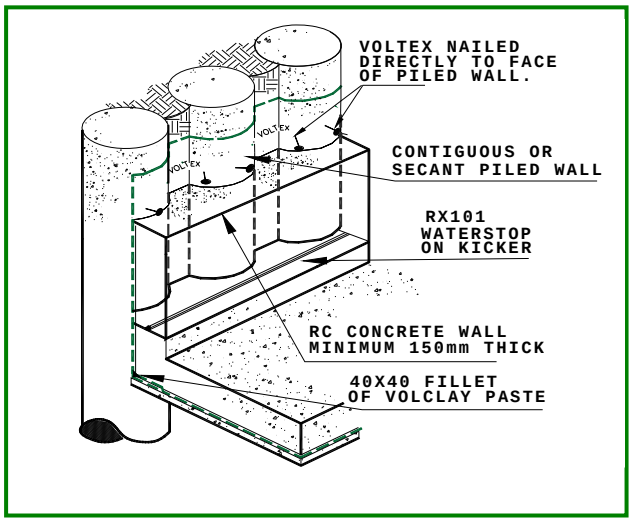
surface. For secant piling, locate fixings close to cleavages. On contiguous piling, ensure that soil columns between piles are cut back to no less than one third of the pile diameter, to create a fixing cleavage, and reduce the likelihood of soil dislodging behind the membrane.



Detail all through wall pipe/sleeve penetrations with Waterstop RX101® as a 'puddle flange' within the concrete, ensuring no less than 75 mm concrete cover to all sides.

Where pipe, tie-back etc., penetrations pass through Voltex, ensure that Voltex is cut to provide a snug fit, and detail with a 40 x 40mm fillet of Bentoseal. Where through wall removable formwork ties are used, as opposed to 'lost' ties, please consult CETCO for guidance.

Due consideration should be given to termination levels and details, with reference to the height of the property line construction, since cutting down the property line after Voltex installation/concrete placement, will inevitably destroy the waterproofing.

LIMITATIONS

Horizontal installation surfaces shall be free of excessive* standing water, particularly where concrete underblinding is not utilized. (*Voltex can be installed in almost all inclement weather conditions, providing the quality/accuracy of the installation is not affected e.g. Voltex floating, Waterstop RX submersed, etc).

If ground water contains strong acids, alkalis, or is of a conductivity of 2,500 umhos or greater, submit water samples to the manufacturer for compatibility testing. If contaminated ground-water or saltwater conditions exist, please contact manufacturer.

Voltex is not designed for unconfined above-ground waterproofing applications or below-ground masonry block foundation walls. Voltex is engineered for use under reinforced structural concrete slabs of 150 mm thick or greater. Do not install Voltex in horizontal split-slab, plaza deck and roof applications that will receive a poured concrete wear surface or other solid topping.

***Voltex is not designed to waterproof expansion joints. Expansion joints require a properly engineered expansion joint sealant product manufactured by other companies*.**

TECHNICAL DATA

Property	Test	Value
Bentonite Mass per unit area	ASTM D 3776 (mod)	4.88 kg/m²
Peel Adhesion to concrete	ASTM D 903 (mod)	2.5 KN (per m width)
Hydrostatic Pressure resistance	ASTM D 5385 (mod)	70 m
Permeability	ASTM D 5084	1 X 10^{-9} cm/sec
Grab Tensile Strength	ASTM D 4632	422N
Puncture resistance	ASTM D 4833	455N
Low temperature flexibility	ASTM D 1970	Unaffected @-32°C

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SIZE & PACKAGING

Materials Supplied

Standard Voltex roll sizes are 1.1 m x 5.0 m (5.5m²) packaged 35 No. rolls per pallet (192.5 m²). Average product weight varies with moisture content, and is between 6 and 7 Kg / m². Voltex dimensions can be tailored to suit project requirements (depending on project size) keeping one dimension at 5.0 m, and the other from 1.1 m up to 40.0 m. Larger rolls may be subject to special handling requirements.

STORAGE

Keep Voltex and all accessory products dry, with adequate polyethylene or canvas cover for sides and top. Block up or pallet materials to prevent contact with ground surface water.

HEALTH & SAFETY

Always consult the relevant Material Safety Sheet before using Voltex.

NOTES

This data sheet is for general guidance purposes only and may contain information that is inappropriate for certain conditions of use. Accordingly, all recommendations and suggestions are made without guarantee.

Further information is available from our Technical Department.

ACCESSORY PRODUCTS

Voltex accessories include:

BENTOSEAL®

Patented trowel grade sodium bentonite compound used as a detailing mastic around penetrations and corner transitions. Bentoseal is packaged in 14.25 litre tubs.

VOLTEX GRANULES®

Pure granular Bentonite used to detail critical areas that may require extra Voltex protection. Voltex Granules are packaged in 20 kg bags.

WATERSTOP RX101®

Expanding bentonite-based concrete joint strip waterstop for use in non-moving concrete construction joints. Waterstop RX101 is manufactured in flexible strips.

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