VOLCLAY VOLTEX® DS

BENTONITE GEOTEXTILE WATERPROOFING SYSTEM WITH INTEGRATED HDPE LINER

TECH DATA

DESCRIPTION

Voltex DS is a highly effective waterproofing membrane designed for below-ground applications. Voltex DS is a composite of two high-strength geotextiles, 4.88kg of sodium bentonite per square metre, and a HDPE Liner integrally bonded to the non-woven geotextile. The high swelling, low permeability sodium bentonite is encapsuled between the two geotextiles. A patented needlepunching process interlocks the geotextiles together forming an extremely strong composite that ensures uniformity of the bentonite layer, in addition to protecting the product from inclement weather and construction site related damage.

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

APPLICATIONS

Voltex DS 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.

Voltex DS is particularly appropriate for use in conditions where excessive precipitation and / or contamination exist.

Voltex DS provides Methane, Radon & CO2 protection as defined in BRE Report 212.

INSTALLATION

GENERAL

Install Voltex DS in strict accordance with the manufacturer's installation guidelines. Use accessory products as recommended. Install Voltex DS with the dark grey (woven) geotextile side against the concrete to be waterproofed. Install Waterstop RX101 in all applicable horizontal and vertical concrete construction joints. Schedule waterproofing material installation to permit prompt placement of backfill material or concrete. For applications not covered herein, refer to Voltex Product Manual or contact CETCO for specific installation guidelines.

STORAGE

Store Voltex DS and all accessory products in a dry shelter. If stored outside protect with weatherproof cover on all sides and top. Block up or pallet materials to prevent contact with ground surface water.

PREPARATORY WORK

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.

UNDER CONCRETE FLOOR SLABS

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

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

Voltex DS 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 20 (cementitious waterproofing by crystallization) or similar can be used as a continuity 'membrane' through the bearing plane, to which Voltex DS can be sealed using a 100 mm lap, incorporating a 5 mm X 50 mm fillet of Bentoseal.

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

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

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 DS installation up the property line a minimum 250 mm above the top edge of the finished 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 needs to be kept free of concrete splashes to enable a clean lap later.

BACKFILLED CONCRETE WALL

Voltex DS 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 DS (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 DS 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 Volclay Paste or Bentoseal, either prior to Voltex DS (post-fix) application, or prior to backfilling (pre-fix/peel-adhered application), where additional Voltex DS 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 DS, ensure that Voltex DS is cut to provide a snug fit, and detail with a 40 mm X 40 mm fillet of Volclay Paste (granules & water) or Bentoseal, prior to backfilling.

Backfill material shall be compactable soils and free of construction debris. Backfill shall be clean, well grounded, 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 DS 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 DS a minimum of 150 mm. The Voltex/DPC lap should be enhanced by the inclusion of a 5 mm X 50 mm fillet of Bentoseal, centrally located.

PRE-APPLIED

Apply Voltex DS 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 HDPE 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.

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

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

POST-APPLIED

Apply Voltex DS 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 HDPE 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 Volclay paste (granules & water) or Bentoseal, prior to Voltex DS application.

NOTE: Voltex DS is not recommended for masonry block walls.

PROPERTY LINE CONSTRUCTION

Voltex DS 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 DS.

Concrete surfaces shall be free of large voids or projections. Voids, pits, and cracks in excess of 20 mm, shall be parged to flush condition using cement grout, Volclay Bentoseal or Volclay 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 DS under slab. Apply the bottom run of Voltex DS lengthways/horizontally against the property line, approximately 1,100 mm from the substrate/blinding level, allowing 150 mm of Voltex DS 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 300 mm (avoiding four-way laps), and additionally ensuring that laps face downwards, as applicable, ensure that Voltex DS closely contours the application 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 DS, ensure that Voltex DS is cut to provide a snug fit, and detail with a 40 mm X 40 mm 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 DS 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 DS can be installed in almost all inclement weather conditions, providing the quality/accuracy of the installation is not affected eg Voltex DS 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 DS is not designed for unconfined above-ground waterproofing applications or below-ground masonry block foundation walls. Voltex DS is engineered for use under reinforced structural concrete slabs of 150 mm thick or greater. Do not install Voltex DS in horizontal split-slab, plaza deck and roof applications that will receive a poured concrete wear surface or other solid topping.

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

SIZE & PACKAGING

Voltex DS is supplied in rolls, measuring 1.15 m X 5.0 m, each weighing 35 – 40 Kg. There are 32 rolls per pallet (184m²). Large rolls are also available, but require special handling equipment.

ACCESSORY PRODUCTS

Volclay Voltex DS 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 Volclay Bentonite used to detail critical areas that may require extra Volclay 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.

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.

TECHNICAL DATA		
PROPERTY	**TEST METHOD**	**TYPICAL VALUE**
BENTONITE MASS PER UNIT AREA	**ASTM D 3776 (mod)**	**4.88 kg/m²**
PEEL ADHESION TO CONCRETE	**ASTM D 903 (mod)**	**15llb/in (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**
PERMEABILITY AT MEMBRANE SEAM	**ASTM D 5084**	**1 10^{-9} cm/sec**
GRAB TENSILE STRENGTH	**ASTM D 4632**	**530N**
PUNCTURE RESISTANCE	**ASTM D 4833**	**620N**
LOW TEMPERATURE FLEXIBILITY	**ASTM D 1970**	**UNAFFECTED @-32°C**

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