

VOLCLAY VOLTEx™

BENTONITE GEOTEXTILE WATERPROOFING SYSTEM

DESCRIPTION

Voltex is a highly effective waterproofing composite of high strength geotextiles and 1.10 pounds of sodium bentonite per square foot. 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 Volclay 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 fibers are encapsulated into the surface of poured-in-place concrete.

APPLICATIONS

Voltex is designed for below-grade 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 soldier pile and lagging, 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.



Certified to
ANSI/NSF 61

Voltex is certified by NSF International to conform with the requirements of NSF Standard 61 — Drinking Water System Components — Health Effects. Voltex is certified as an external protective barrier material for potable water concrete tanks with a 1,000 gallon capacity or greater.

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

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.

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. Apply Bentoseal® to form-tie pockets, construction joints and honeycombs in concrete. Tapered form-tie holes extending through the wall should be completely filled with non-shrink grout.

UNDER CONCRETE FLOOR SLABS

Voltex is recommended for use under structural reinforced concrete slabs 4" (100 mm) thick or greater on a compacted earth/gravel substrate. A minimum 6" (150 mm) thick reinforced slab if installed over a mud slab. Where hydrostatic conditions exist, install Voltex under footings and grade beams.

Place Voltex over the properly prepared substrate with the dark gray (woven) geotextile side up. Overlap all adjoining edges a minimum 4" (100 mm) and stagger ends a minimum 12" (300 mm). Staple or nail edges together as required to prevent any displacement before and during concrete placement.

Cut Voltex to closely fit around penetrations and pile caps. Do not extend Voltex over the top of pile caps. Apply a minimum 3/4" (18 mm) thick fillet of Bentoseal to seal between Voltex edge and penetration, pile cap or grade beam. Extend Bentoseal onto Voltex and detail a minimum of 2" (50 mm). For hydrostatic conditions, Voltex should be installed under grade beams. Extend Voltex onto footing a minimum 12" (300 mm) when required to tie into vertical wall waterproofing.

Where property line retaining walls, such as soldier pile and lagging, are used as the outside concrete form, continue the underslab Voltex installation up the retaining wall a minimum 12" (300 mm) above the top edge of the floor slab or footing. The extra 12" (300 mm) is very important since there is no access to the outer edge after the concrete pour.

BACKFILLED CONCRETE WALLS

Before installing the first course of Voltex, place Hydrobar Tubes® at the wall/footing transition corner. Butt the ends of Hydrobar Tubes together to form a continuous line.

Beginning at the bottom corner of the wall, install Voltex horizontally oriented with 5' (1.5 m) on one wall and the remainder around the corner on the other wall surface. Cut the bottom edge of Voltex at the corner a minimum of 12" (300 mm) so that Voltex can be extended onto the footing. Fasten Voltex into position with washer headed fasteners a minimum of 24" (600 mm) on center. Then cut and install a Voltex section over the uncovered footing corner area. Apply Bentoseal at the Voltex section to Voltex overlap at the corner.

Install adjacent Voltex rolls of the bottom course horizontally oriented. Each roll should overlap the preceding roll a minimum 4" (100 mm) and should extend onto the footing a minimum 12" (300 mm). At inside corners apply a continuous 3/4" (18 mm) fillet of Bentoseal directly in the corner prior to installing Voltex. Stagger all vertical overlap joints a minimum of 6" (150 mm).

Cut Voltex to closely fit around penetrations. After installing Voltex, trowel a minimum 3/4" (18 mm) thick fillet of Bentoseal around the penetration to completely fill any space between the penetration and the Voltex edge. Extend Bentoseal onto the penetration and over the Voltex edge 1-1/2" (38 mm). In areas where multiple penetrations are close together, it may be impractical to cut Voltex to fit around each penetration. Trowel Bentoseal 3/4" (18 mm) thick covering the entire surface around the penetrations. Then apply a 3/4" (18 mm) thick fillet of Bentoseal around each penetration, extending 1-1/2" (38 mm) onto the penetration and covering the area between the penetrations.

When hydrostatic conditions exist, the vertical wall Voltex should cover the entire footing and overlap the underslab waterproofing a minimum 12" (300 mm).

Terminate Voltex at finished grade with a rigid termination bar fastened 12" (300 mm) on center. Embed top edge of Voltex in 2" (50 mm) wide, by 1/2" (12 mm) thick layer of Bentoseal.

Place backfill and compact following the application of each course of Voltex. Backfill should consist of compactible soils, pea gravel, or crushed stone (3/4" or less). Compact soils to minimum 85% Modified Proctor density. Stone backfill larger than 3/4" (19 mm) may require the use of a protection course; consult CETCO for specific guidelines. Avoid backfill with aggregate larger than 1-1/2" (38 mm).

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, soldier pile and lagging, shotcrete and stabilized-earth retention walls. Shotcrete can be applied directly against Voltex.

Remove all projections and fill all voids in the retaining wall larger than 1" (25 mm) with non-shrink grout. Aquadrain® drainage composite or Protection Mat 10V can be installed over large gaps between wood lagging to provide a uniform surface to mount the Voltex.

Starting at the base of the property line retaining wall, install Voltex horizontally oriented with the dark gray (woven) geotextile facing the installer; white (non-woven geotextile) against the retaining wall. As required, overlap the underslab bentonite waterproofing a minimum of 12" (300 mm). Secure Voltex with washerhead fasteners 24" (600 mm) on center around the edge to contour retaining wall surface. Overlap all adjoining edges 4" (100 mm) and stagger vertical joints of succeeding courses minimum 12" (300 mm). Continue Voltex to finished grade level or as identified on project drawings.

Cut Voltex to closely fit around penetrations and tie-back plates. After installing the Voltex, trowel a 3/4" (18 mm) thick fillet of Bentoseal to completely fill the void area between the detail and the cut Voltex edge. When multiple penetrations are close together it may be impractical to closely cut the Voltex. Therefore, trowel Bentoseal 3/4" (18 mm) thick over the entire surface area between the penetrations and extend the Bentoseal onto each penetration. Trowel a 3/4" (18 mm) thick layer of Bentoseal over all tie-back plates and around penetrations. Bentoseal should extend outward from each penetration a minimum 2" (50 mm). Install Waterstop-RX around all through-wall penetrations.

Use care in placing and vibrating concrete to avoid product damage. Terminate at grade following "Backfilled Concrete Wall" termination instructions stated herein. Note: It may be necessary to dig and remove several pieces of lagging to facilitate the termination against the structure.

LIMITATIONS

Do not install Voltex in standing water or during precipitation. If ground water contains strong acids, alkalies, or is of a conductivity of 2,500 µmhos or greater, submit water samples to the manufacturer for compatibility testing. If contaminated ground-water or saltwater conditions exist, Volclay CR bentonite is recommended.

Voltex is not designed for unconfined above-grade waterproofing applications or below-grade masonry block foundation walls. Voltex is engineered for use under reinforced structural concrete slabs of 6" (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.

SIZE AND PACKAGING

Voltex is available in 4' x 15' (1.2 x 4.5 m) rolls. Each roll weighs approximately 85 lbs. (38.6 Kg). Voltex is packaged 30 rolls; 1800 sq. ft. (167 sq.m.) per pallet.

ACCESSORY PRODUCTS

Volclay Voltex accessories include:

BENTOSEAL®: patented trowel grade sodium bentonite compound used as a detailing mastic around penetrations and corner transitions. Bentoseal is packaged in 3 gallon pails (36 lbs (16.34 Kg)); 75 pails per pallet.

HYDROBAR TUBE®: 2" (50 mm) diameter x 24" (600 mm) long, water soluble plastic tube filled with Volclay Bentonite. It is used as a convenient method of adding extra bentonite at the footing/wall intersection. Hydrobar Tube is packaged 32' (9.7 m) per carton; 50 cartons per pallet.

WATERSTOPPAGE®: pure granular Volclay Bentonite used to detail critical areas that may require extra Volclay protection. Waterstoppage is packaged in 50 lb. (22.70 Kg) bags; 40 bags per pallet.

PROTECTION MAT 10V: heavy geotextile protection course material that protects installed Voltex from construction site damage.

ASSOCIATED SYSTEM PRODUCTS

AQUADRAIN®: subsurface drainage composite consisting of a heavy filter fabric adhered to a high-strength plastic drainage core. Aquadrain is available in 4' x 52' rolls.

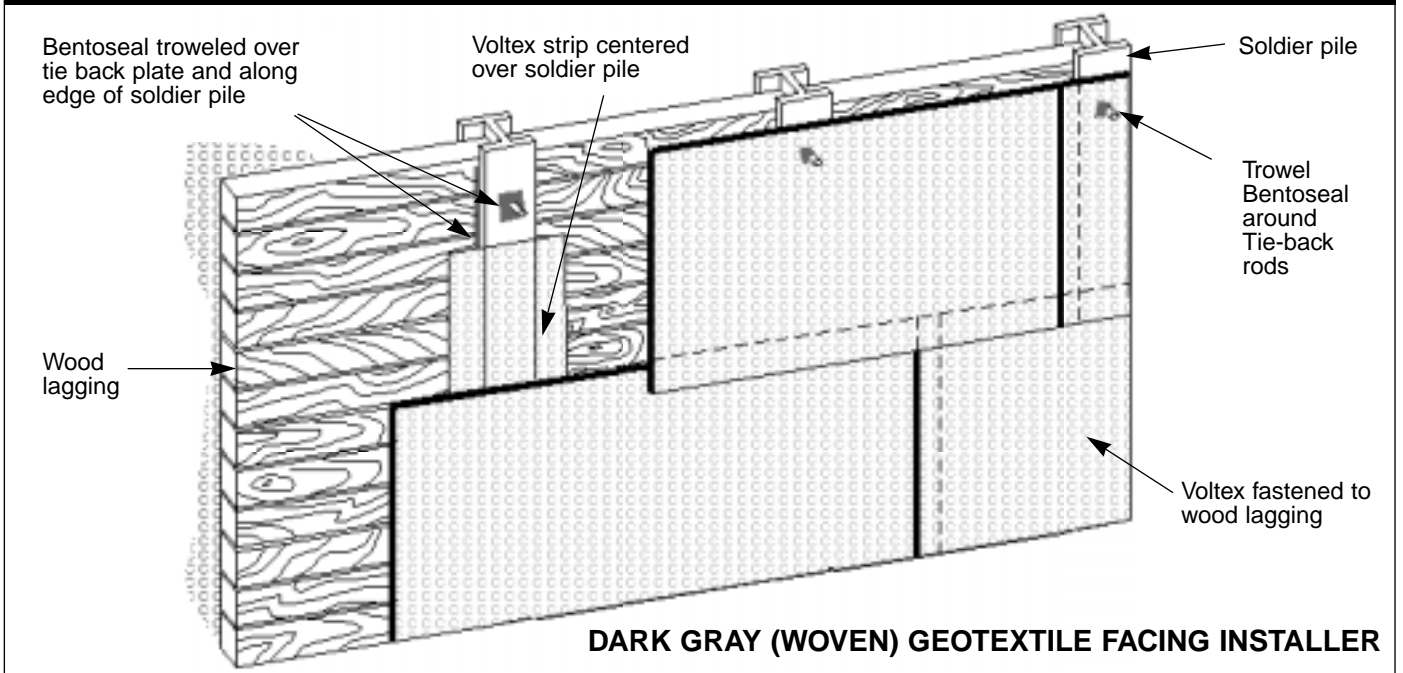
WATERSTOP-RX®: expanding bentonite-based concrete joint strip waterstop for use in non-moving concrete construction joints. Waterstop-RX is manufactured in flexible strips that are adhered into place with Volclay WB-Adhesive. Also install Waterstop-RX around applicable penetrations.

TECHNICAL DATA

Property	Test Method	Typical Value
Bentonite Mass Per Unit Area	ASTM D 3776 (mod.)	1.10 lb./sq. ft.
Peel Adhesion to Concrete	ASTM D 903 (mod.)	15 lbs./in. (2.6 kN/m min.)
Hydrostatic Pressure Resistance	ASTM D 5385 (mod.)	231 ft. (70 m)
Permeability	ASTM D 5084	1 x 10 ⁻⁹ cm/sec
Grab Tensile Strength	ASTM D 4632	95 lbs. (422 N)
Puncture Resistance	ASTM D 4833	100 lbs. (445 N)
Low Temperature Flexibility	ASTM D 1970	Unaffected @ -25°F (-32°C)

FOR APPLICATIONS NOT COVERED HEREIN, REFER TO THE "VOLTEX PRODUCT MANUAL" OR CONSULT CETCO.

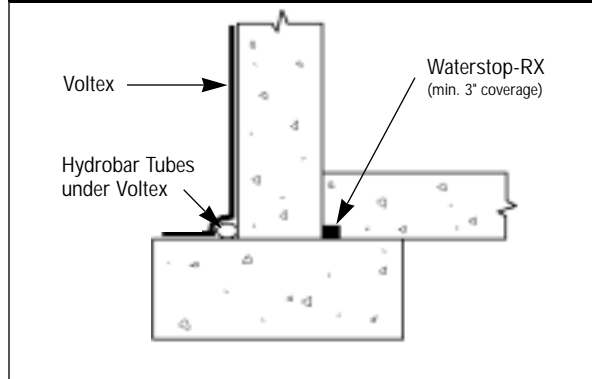
PROPERTY LINE SOLDIER PILE & LAGGING WALL DETAIL



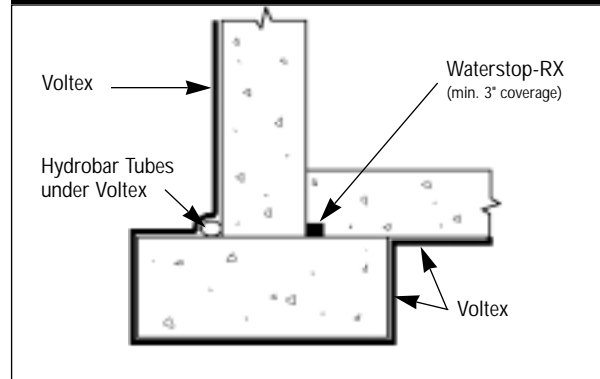
VOLCLAY™ VOLTEX WATERPROOFING

GENERAL APPLICATION DETAILS

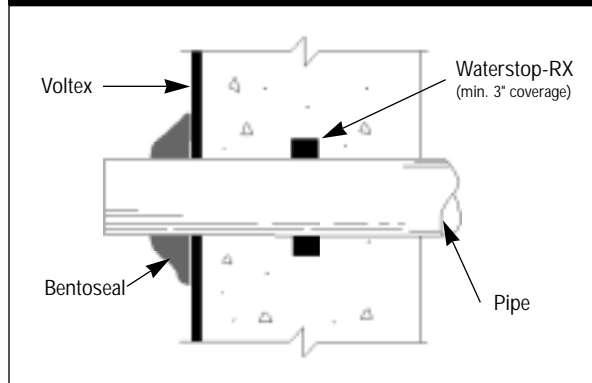
NON-HYDROSTATIC CONDITION



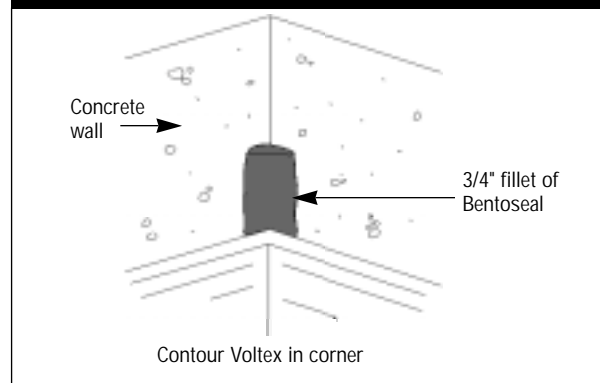
HYDROSTATIC CONDITION



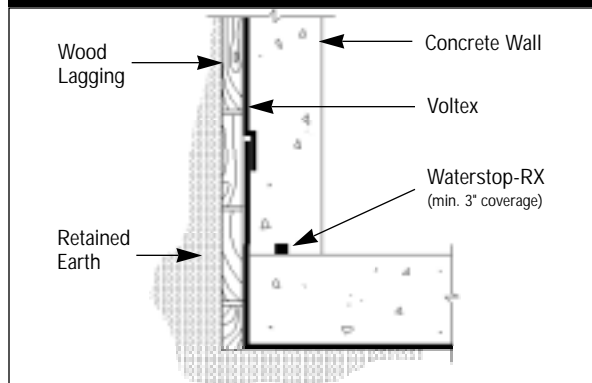
WALL PENETRATION DETAIL



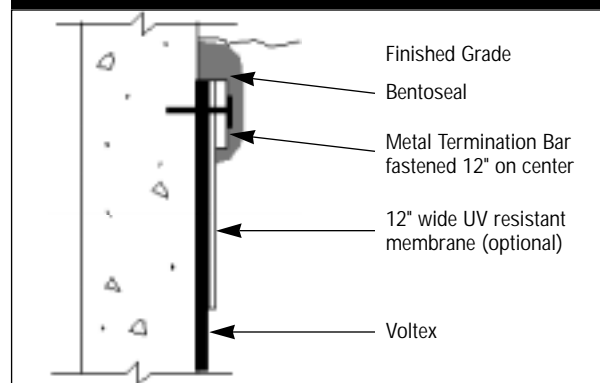
INSIDE CORNER DETAIL



SOLDIER PILE & LAGGING



TYPICAL GRADE TERMINATION



JANUARY 2001
(Supersedes All Previous Versions)

The information contained herein supersedes all previous versions printed prior to January 2001, and is believed to be accurate and reliable. CETCO warrants that the product conforms to the specifications published in this literature. Contact CETCO for limitations to this warranty. CETCO reserves the right to update information without notice.

CETCO

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