VOLTEX®

BENTONITE GEOTEXTILE WATERPROOFING SYSTEM

DESCRIPTION

VOLTEX is a highly effective waterproofing composite of high strength geotextiles and 4.8 kg/sqm of sodium bentonite per square meter (1.0 lbs/sf). The high swelling, low permeable sodium bentonite is encapsulated between a non-woven and woven geotextile. A needlepunch 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's, can be installed in almost any weather condition to green concrete, and most importantly, it 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 fibers are encapsulated into the surface of cast-in-place concrete.

APPLICATIONS

VOLTEX is designed for below-grade vertical and horizontal structural foundation surfaces. Typical cast-in-place concrete 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 conditions exist, use VOLTEX CR with contaminant resistant sodium bentonite. VOLTEX CR resists higher levels of the following contaminant's: nitrates, phosphates, chlorides, sulfates, lime and organic solvents.

INSTALLATION

General: Installation guidelines herein are for cast-in-place concrete applications. For shotcrete, precast concrete, and other applications not covered herein, refer to specific VOLTEX literature or contact CETCO for applicable installation guidelines. Install VOLTEX in strict accordance with the manufacturer's installation guidelines using accessory products as required. 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 concrete or compacted backfill.

Preparatory Work: Under Slab: Substrate should be smooth and compacted to a minimum of 85% Modified Proctor density. Concrete Walls: Concrete should be free of voids and projections. Surface irregularities should be removed before installation. Apply BENTOSEAL to form-tie pockets, construction joints and honeycombs. Tapered form-tie holes extending through the wall should be completely filled with Department of Transportation (D.O.T.) non-shrink grout and a piece of WATERSTOP-RX centered in the wall.

Property Line Shoring Walls:

Install VOLTEX only after proper substrate preparation has been completed and is suitable to receive the waterproofing.

UNDER CONCRETE FLOOR SLABS

VOLTEX is recommended for use under structural reinforced concrete slabs 100 mm (4") thick or greater on a compacted earth/gravel substrate. A minimum 150 mm (6") 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 100 mm (4") and stagger sheet ends a minimum 300 mm (12"). Fasten edges together a maximum of 450 mm (18") on center.

Cut VOLTEX to closely fit around penetrations and pile caps. Install WATERSTOPPAGE under cut VOLTEX edge at detailing and then apply a minimum 20 mm (¾") thick fillet of BENTOSEAL to top of cut VOLTEX edge at penetrations, pile caps, grade beams, and other detailing. Extend BENTOSEAL onto VOLTEX and detail a minimum of 50 mm (2"). For hydrostatic conditions, VOLTEX should be installed under grade beams and footings. Extend VOLTEX onto footing a minimum 150 mm (6") 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, install a horzontally oriented VOLTEX transition course at the base of the wall per "Shoring Wall Transition" instructions within the "Property Line Construction" section herein. Continue the underslab VOLTEX installation up to the retaining wall overlapping the corner transition course a minimum 300 mm (12").

BACKFILLED CAST-IN-PLACE 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 1.5 m (5-ft.) 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 150 mm (6") so that VOLTEX can be extended onto the footing. Fasten VOLTEX into position with washer headed fasteners a maximum 600 mm (24") 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 100 mm (4") and should extend onto the footing a minimum 150 mm (6"). At inside wall corners apply a continuous 20 mm (¾") fillet of BENTOSEAL directly in the corner prior to installing VOLTEX. Stagger all vertical overlap joints a minimum of 300 mm (12"). For hydrostatic conditions, the vertical wall

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VOLTEX should cover the entire footing and overlap the underslab waterproofing a minimum 150 mm (6”).

Cut VOLTEX to closely fit around penetrations. After installing VOLTEX, trowel a minimum 20 mm (¾”) thick fillet of BENTOSEAL around the penetrations to completely fill any space between the penetration and the VOLTEX edge. Extend BENTOSEAL onto the penetration and over the VOLTEX edge 38 mm (1-½”). In areas where multiple penetrations are close together, it may be impractical to cut VOLTEX to fit around each penetration. Therefore, apply a 20 mm (¾”) thick fillet of BENTOSEAL around base of each penetration and cover the entire area between the penetrations. Extend BENTOSEAL 38 mm (1-½”) onto the penetrations.
Terminate VOLTEX membrane 300 mm (12”) below finished grade elevation with washer-head fasteners maximum 300 mm (12”) on center and a tooled bead of CETSEAL or M-2000. Install ENVIROSHEET flashing to primed concrete substrate with bottom edge overlapping top edge of VOLTEX membrane minimum 150 mm (6”). Overlap all roll ends a minimum 100 mm (4”) to form a continuous flashing. Height of flashing shall be per project details and specifications. Install a rigid termination bar along top edge of ENVIROSHEET; fastened maximum 300 mm (12”) on center. Complete grade termination detail with tooled bead of CETSEAL or M-2000 along the top edge, at all penetrations through the flashing, and all exposed overlap seams. Backfill should be placed and compacted to minimum 85% modified proctor density promptly after waterproofing installation. Backfill should consist of compactable soil or angular aggregate 20 mm (¾”) or less and free of debris and sharp objects.

NOTE: VOLTEX is not recommended for masonry block walls. Contact CETCO regarding products and installation guidelines for masonry block foundation walls.

PROPERTY LINE CAST-IN-PLACE CONSTRUCTION

Use VOLTEX to waterproof various types of cast-in-place property line construction, including: metal sheet piling, soldier pile and lagging, auger cast caisson, shotcrete, and stabilized-earth shoring walls. The following guidelines outline the installation of VOLTEX on soldier pile and lagging walls. For other property line shoring wall applications refer to the “VOLTEX Cast-In-Place Product Manual” or consult CETCO. For Shotcrete applications refer to the “VOLTEX DS Shotcrete Product Manual” for installation guidelines.

Lagging Wall Preparation: Remove all projections and fill all voids in the retaining wall larger than 25 mm (1”) with cementitious grout per project design or compacted soil. AQUADRAIN drainage composite can be installed over lagging gaps up to 63 mm (2-½”) to provide a uniform surface to mount the VOLTEX. Gaps larger than 63 mm (2-½”) should be completely filled with cementitious grout per project design, wood, extruded polystyrene (25 psi min.), spray foam (20 psi min.), or compacted soil even if AQUADRAIN is installed prior to VOLTEX. Do not use plywood or other surface treatment that leaves the lagging gaps void.

Shoring Wall Transition: At base of shoring wall, install VOLTEX corner transition sheet horizontally oriented (dark gray woven geotextile facing installer) with the bottom edge extending out onto the horizontal substrate a minimum 300 mm (12”) and the top edge of the sheet extending a minimum 300 mm (12”) above the finished slab elevation. Secure VOLTEX sheet to shoring wall with washer-head fasteners maximum 600 mm (24”) on center. Overlap edges of VOLTEX sheets a minimum 100 mm (4”). If the slab thickness is greater than 600 mm (24”), install a second full sheet or cut strip of VOLTEX on the shoring wall to meet the 300 mm (12”) requirement above of the top slab elevation. Overlap top edge of previous sheet and edges of adjacent sheets a minimum 100 mm (4”).

Shoring Wall Installation: Starting at the base corner, install course of VOLTEX (horizontally oriented) to lagging wall over the previously installed corner transition sheet; with the bottom edge extending down to the wall/slab transition. Secure sheet edges to shoring wall with washer-head fasteners maximum 600 mm (24”) on center. After the bottom horizontal course, VOLTEX sheets can be installed either vertically or horizontally oriented. Continue VOLTEX installation up wall to finished grade elevation overlapping adjacent VOLTEX sheet edges a minimum 100 mm (4”) and staggering all sheet roll ends of adjacent courses a minimum 300 mm (12”). **Do not allow VOLTEX overlap joints to run at same elevation as the concrete pour lift joints; extend membrane past a minimum 150 mm (6”).**

Prior to installing VOLTEX at grade, install 12 mm (½”) thick cementitious wall board centered over metal soldier pile from finished grade elevation to specified depth of soldier pile and lagging removal. Remove cement wall board during excavation to terminate system at grade.

Tie-Back Heads: Select appropriate size TB-BOOT to fit over tie-back plate and allow proper cast-in-place concrete coverage per project requirements. TB-BOOT should fit over entire tie-back head without the tie-back plate or cables in direct contact with the TB-BOOT. Prior to TB-BOOT installation, fill voids in retention wall substrate and tie-back head assembly with spray foam (min 20 psi) or cementitious grout per project design. For non-hydrostatic conditions, install and secure AQUADRAIN drainage composite course per manufacturer’s guidelines to soil retention wall prior to installing TB-BOOT. For hydrostatic conditions, install TB-BOOT prior to waterproofing membrane.

With soldier piles, strip piles with waterproofing membrane prior to TB-BOOT placement.

Secure TB-BOOT to soil retention system using washer head fasteners along the outside edge of the flat base. Apply 6 mm (1/4”) thick by minimum 75 mm (3”) wide continuous ring of BENTOSEAL onto the flat base just outside of the 12 mm (½”) raised collar. Install 1.2 m by 1.2 m (4’ x 4’) piece of VOLTEX (with precut hole in center to fit tight around the 12 mm (½”) raised collar) over the entire flat base with outside edges fastened to the retaining wall. Secure inside VOLTEX edge around raised collar with washer-head fasteners that pass through the BENTOSEAL ring; typical fastener spacing 150 mm (6”).

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Do not install fasteners or puncture TB-BOOT inside of the 12 mm (½") raised collar. Apply counter flashing of BENTOSEAL along VOLTEX sheet edge around raised collar. Then install VOLTEX field sheet overlapping outer membrane edge minimum 100 mm (4").

Penetrations: Install a cut collar of VOLTEX tightly around the penetration; extending a minimum 200 mm (8") radius. Apply BENTOSEAL over VOLTEX collar around penetration; extending BENTOSEAL a minimum 75 mm (3") radius at 6 mm (1/4") thickness. Then install main course of VOLTEX membrane tightly around the penetration. Next, detail around penetration with 20 mm (3/4") thick cant of BENTOSEAL. Last, install WATERSTOP-RX around the pipe maintaining Min. 75 mm (3") concrete coverage. With sleeved pipes, Division 3 work should include filling the gap between the pipe and the sleeve with D.O.T. non-shrink grout and install WATERSTOP-RX around pipe sleeve.

Soldier Pile Stripping: Install a strip of VOLTEX over all soldier piles with raised lagging hanger bolts, form tie rods, or other irregular surface. VOLTEX strip should extend a minimum 150 mm (6") to both sides of the piling. Apply BENTOSEAL 6 mm x 50 mm (¼" x 2") to VOLTEX strip surface along both edges of each soldier pile.

Cementitious Board: Prior to installing VOLTEX to finished grade detail, install 12 mm (½") thick cementitious wall board centered over steel soldier pile from finished grade elevation to specified depth that the top of steel soldier pile and lagging will be removed.

Grade Termination: Terminate VOLTEX membrane 300 mm (12") below finished grade elevation with washer-head fasteners maximum 300 mm (12") on center and a tooled bead of CETSEAL or M-2000. Install ENVIROSHEET flashing to primed concrete substrate with bottom edge overlapping top edge of VOLTEX membrane minimum 150 mm (6"). Overlap all roll ends a minimum 100 mm (4") to form a continuous flashing. Height of flashing shall be per project details and specifications. Install a rigid termination bar along top edge of ENVIROSHEET; fastened maximum 300 mm (12") on center. Complete grade termination detail with tooled bead of CETSEAL or M-2000 along the top edge, at all penetrations through the flashing, and all exposed overlap seams.

Where lagging timbers and the top of steel soldier piles are removed, repair any waterproofing damaged by the excavation and removal of the retention wall system. Secure all excavated VOLTEX overlap seams with washer-head fasteners maximum 600 mm (24") on center. Backfill shall be placed and compacted to minimum 85% Modified Proctor density promptly after waterproofing installation. Backfill should consist of compactable soil or angular aggregate 20 mm (¾") or less and free of debris and sharp objects.

LIMITATIONS

VOLTEX should only be installed after substrate preparation has been properly completed and is suitable to receive the waterproofing system. Concrete work should be cast-in-place with conventional forms that produce a smooth surface. Do not use stay-in-place concrete forming; use removable forming products only.

VOLTEX is designed for below-grade waterproofing applications where the product is properly confined. VOLTEX should not be installed in standing water or over ice. If ground water contains strong acids, alkalies, or is of a conductivity of 2,500 µmhos/cm or greater, water samples should be submitted to the manufacturer for compatibility testing. VOLTEX CR, ULTRASEAL, or COREFLEX may be required if contaminated ground water or saltwater conditions exist.

VOLTEX is designed for use under reinforced concrete slabs 100 mm (4") thick or greater on a compacted earth/gravel substrate. VOLTEX requires a minimum 150 mm (6") thick reinforced concrete slab if installed over a mud slab. VOLTEX is not designed for split-slab plaza deck construction.

VOLTEX is not intended to seal expansion joints; contact CETCO for expansion joint applications. Do not use VOLTEX on masonry block foundation walls. Consult CETCO for special installation guidelines that apply to shotcrete and precast concrete construction.

VOLTEX installation guidelines contain herein are for cast-in-place concrete applications and do not cover shotcrete or precast concrete applications. Refer to VOLTEX Product Manuals for additional property line shoring wall construction technique applications. Consult CETCO for applicable products and installation guidelines for applications not covered herein.

PACKAGING

VOLTEX is available in 1.2 x 4.5 m (4-ft x 15-ft) rolls. Typical roll weight is approximately 31.7 kg (70 lbs.). VOLTEX is packaged 35 rolls per pallet (195 sq. m. (2,100 sq. ft.)).

Storage

Keep VOLTEX and all accessory products dry prior to back fill or concrete placement.

ACCESSORY PRODUCTS

Install VOLTEX using accessory products in strict accordance with the manufacturer's installation guidelines and details. Primary accessory products include BENTOSEAL®, CETSEAL, ENVIROSHEET grade flashing, HYDROBAR TUBES®, SEAMTAPE, TB-BOOT, and WATERSTOPPAGE.

ASSOCIATED SYSTEM PRODUCTS

AQUADRAIN® subsurface drainage composite, CXJ Expansion Joints, and WATERSTOP-RX® expanding concrete joint waterstop.

IMPORTANT NOTICE: CONTACT CETCO FOR VERIFICATION OF SPECIFICATION AND INSTALLATION REQUIREMENTS TO COMPLY WITH ISSUANCE FOR ELIGIBILITY OF HYDROSHIELD WARRANTY.

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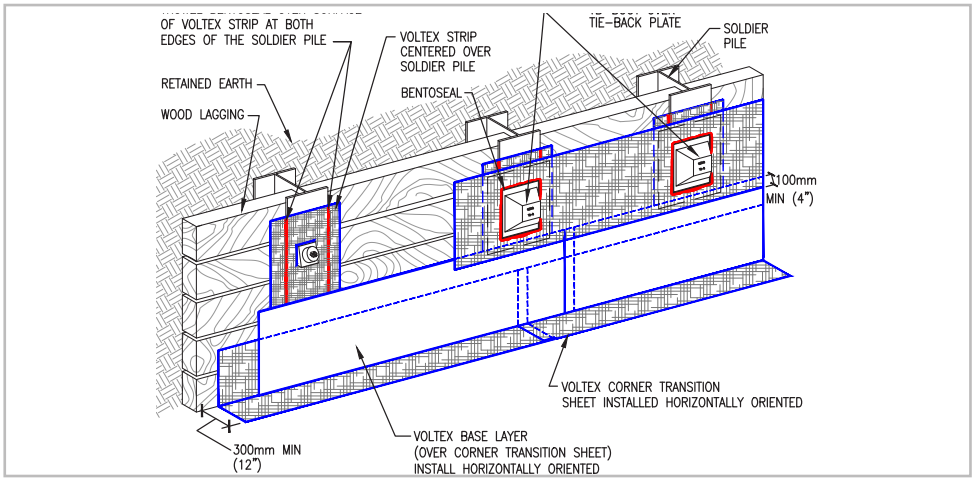
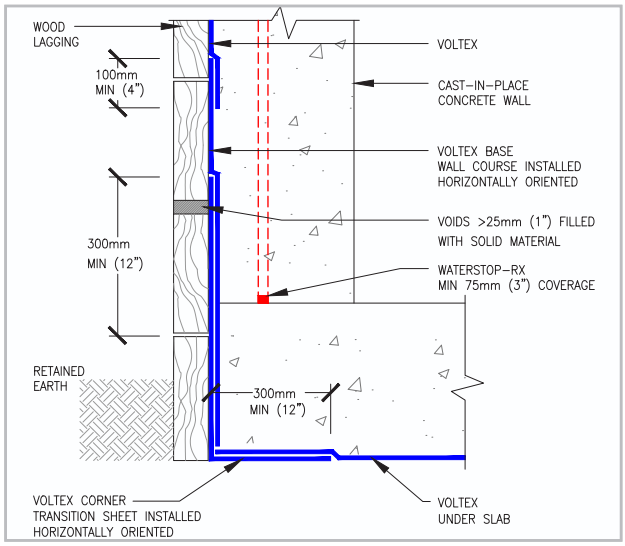
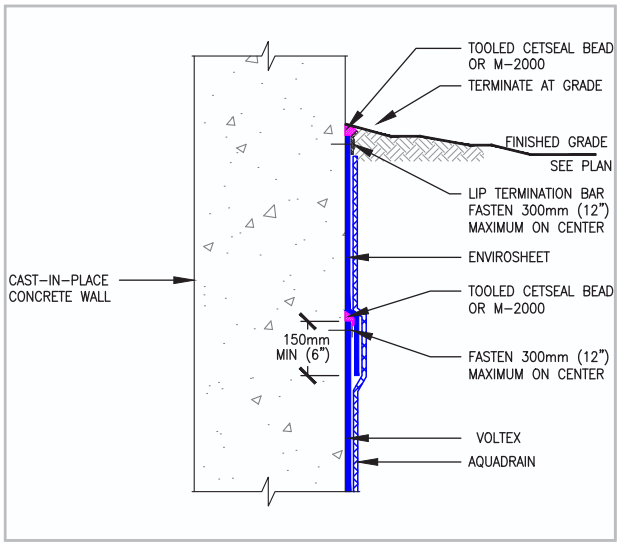
TECHNICAL DATA		
PROPERTY	TEST METHOD	NOMINAL VALUE
Bentonite Mass Per Unit Area	ASTM D 3776 (mod.)	4.8kg/sqm (1.0lb/sqft)
Peel Adhesion to Concrete	ASTM D 903 (mod.)	2.6kN/m min (15 lbs/in)
Hydrostatic Pressure Resistance	ASTM D 5385 (mod.)	70 m (231 ft)
Permeability	ASTM D 5084	1 x 10^{-9} cm/sec
Grab Tensile Strength	ASTM D 4632	530 N (120 lbs)
Puncture Resistance	ASTM D 4833	445 N (100 lbs)
Low Temperature Flexibility	ASTM D 1970	Unaffected at –32° C (–25° F)



Property Line Soldier Pile & Lagging Wall Detail



Property Line Transition



Grade Termination

North America: cetco@mineralstech.com | www.cetco.com

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FORM: TDS_VOLTEX_AM_EN_202503_V8