

# ULTRASEAL® AB

## APC WATERPROOFING MEMBRANE WITH ADVANCED BOND COATING

### DESCRIPTION

ULTRASEAL AB is a unique waterproofing membrane comprised of a polyethylene liner and an advanced Active Polymer Core (APC) layer integrally bonded to an aggressive pressure sensitive adhesive that locks the membrane to concrete. The active hydrophilic polymer APC layer swells and seals against water ingress while the aggressive adhesive bond to concrete prevents migration of water. Thus this advanced membrane combines two proven technologies into one membrane to provide excellent waterproofing performance.

The aggressive adhesive bond is formed by pouring concrete directly against the membrane. The bond provides lateral water migration resistance continuously across the exterior surface of the concrete and ensures ULTRASEAL AB remains bonded to the concrete. Unlike other adhesive-bonding membranes, the APC Technology layer can seal small punctures and tears in the membrane resulting from construction activities conducted after the initial membrane installation. This active waterproofing sealing performance, in conjunction with the continuous adhesive bond, prevents water movement between the ULTRASEAL AB membrane and the concrete.

The APC Technology layer works by forming a very low permeable membrane layer upon contact with water. When hydrated, unconfined APC can swell many times its dry volume. When confined by backfill or concrete the swell is controlled, forming a dense, impervious waterproofing layer. The swelling action of the APC technology resists high levels of groundwater contaminants and can seal small concrete cracks caused by ground settlement, concrete shrinkage, or seismic action.

ULTRASEAL AB contains zero VOC, can be installed in almost any weather condition and most importantly has proven effective in both hydrostatic and non-hydrostatic conditions.

### APPLICATIONS

ULTRASEAL AB is designed primarily for under slab and property line foundation shoring wall construction waterproofing applications. Property line construction applications include soldier pile and lagging, metal sheet piling, auger cast caisson, shotcrete, and stabilized earth retention walls. Applications may include structures under continuous or intermittent hydrostatic pressure. ULTRASEAL AB is not suitable for vegetated greenroofs or other above ground deck waterproofing applications.

### 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 ULTRASEAL AB literature or contact CETCO for applicable installation guidelines. Install ULTRASEAL AB in strict accordance with the manufacturer's installation guidelines using accessory products as required. Install ULTRASEAL AB with the aggressive adhesive side toward the concrete to be waterproofed. Always peel off the clear silicone release liner during the initial placement of the membrane so that the concrete can be cast directly against the adhesive. Install WATERSTOP-RX in all applicable horizontal and vertical concrete construction joints and around penetrations. Schedule waterproofing material installation to permit prompt placement of concrete or compacted backfill immediately following installation.

### PREPARATORY WORK

**UNDER SLAB:** Substrate should be smooth and compacted to a minimum of 85% Modified Proctor density. **PROPERTY LINE SHORING WALLS:** Install ULTRASEAL AB only after proper substrate preparation has been completed and is suitable to receive the waterproofing. Remove all projections and fill all voids in the retaining wall larger than 25 mm (1") with non-shrink grout or compacted soil. AQUADRAIN drainage composite can be installed over lagging gaps up to 63 mm

(2-1/2") to provide a uniform surface to mount the ULTRASEAL AB. Gaps larger than 63 mm (2-1/2") should be completely filled with grout, wood, extruded polystyrene (25 psi min.) or compacted soil even if AQUADRAIN is installed prior to ULTRASEAL AB. Do not use plywood or other surface treatment that leaves the lagging gaps not completely filled.

### UNDER CONCRETE FLOOR SLABS

ULTRASEAL AB is recommended for use under 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 ULTRASEAL AB under footings and grade beams.

Place ULTRASEAL AB onto the properly prepared substrate with the adhesive coated side up; remove the clear release liner film. Overlap all adjoining membrane edges a minimum 100 mm (4") and stagger sheet ends a minimum 300 mm (12"). Staple or nail membrane overlap edges together as required to prevent displacement before and during concrete placement.

Cut ULTRASEAL AB to closely fit around penetrations and pile caps. Install Waterstoppage under cut ULTRASEAL AB edge at detailing and then apply a minimum 18 mm (3/4") thick fillet of BENTOSEAL to top of cut ULTRASEAL AB edge at penetrations, pile caps, grade beams, and other detailing. Extend BENTOSEAL onto ULTRASEAL AB and detail a minimum of 50 mm (2"). For hydrostatic conditions, ULTRASEAL AB should be installed under grade beams and footings. Extend ULTRASEAL AB onto footing a minimum 150 mm (6") when required to tie into vertical wall waterproofing.

Where property line walls, such as soldier pile and lagging, are used as the outside concrete form, install a ULTRASEAL AB transition course at the base of the wall per "Shoring Wall Transition" instructions within the "Property Line Construction" section herein. Continue the underslab ULTRASEAL AB in-

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stallation to the retaining wall overlapping the ULTRASEAL AB transition course a minimum 300 mm (12").

#### BACKFILLED CAST-IN-PLACE CONCRETE WALLS

Remove release liner, then install ULTRASEAL AB with the adhesive side against the concrete wall (white geomembrane side facing installer) on cast-in-place concrete foundation walls prior to backfilling. ULTRASEAL AB may be applied as soon as the forms are removed. It is not necessary to wait for the concrete to completely cure. Use ULTRASEAL AB with concrete cast with conventional forms that produce a smooth surface.

**Surface Preparation:** Footing should be swept clean of silt, rocks and debris to provide ULTRASEAL AB with direct contact to the concrete in the application area. The wall surface must be properly prepared before ULTRASEAL AB is installed. Areas of surface honeycombing or voids should be filled with cementitious grout or BENTOSEAL. Knock off protrusions over 6 mm (1/4") to ensure a smooth concrete surface. Concrete work should include completely filling taper-tie holes with non-shrink cementitious grout and a piece of WATERSTOP-RX centered in the wall. Apply BENTOSEAL over exterior grouted surface of all form-tie holes.

**Membrane Installation:** Before installing the first course of ULTRASEAL AB, place HYDROBAR TUBES at the wall/footing inside corner. "Butt" the ends of HYDROBAR TUBES together to form a continuous line. Beginning at the bottom of the wall, install ULTRASEAL AB horizontally oriented with the bottom edge over the HYDROBAR TUBES and extending out a minimum 150 mm (6") onto the footing. Secure ULTRASEAL AB into position with washer-head fasteners a minimum 600 mm (24") on center. Install adjacent bottom course ULTRASEAL AB rolls horizontally oriented. Each roll should overlap the preceding roll a minimum 50 mm (2") and should extend onto the footing a minimum 150 mm (6"). At corners cut the bottom edge of ULTRASEAL AB so that it can be extended onto the footing. Then cut and install a section over the uncovered footing corner area. Apply BENTOSEAL

at the corner section to the overlaps. At vertical inside corners apply a continuous 18 mm (3/4") fillet of BENTOSEAL directly in the corner prior to installing membrane. Stagger all vertical overlap joints minimum 300 mm (12"). When hydrostatic conditions exist, the vertical wall ULTRASEAL AB should cover the entire footing and overlap the underslab waterproofing a minimum 150 mm (6"). Succeeding membrane courses can be installed either vertically or horizontally oriented. Tape all membrane overlap seams with CETCO SEAMTAPE.

**Penetrations:** Cut ULTRASEAL AB to closely fit around penetrations. Trowel a minimum 18 mm (3/4") thick fillet of BENTOSEAL around the penetrations to completely fill any space between the penetration and the membrane edge. Extend BENTOSEAL onto the penetration and over the membrane edge 38 mm (1-1/2"). In areas where multiple penetrations are close together, it may be impractical to cut ULTRASEAL AB to fit around each penetration. Therefore, apply a 18 mm (3/4") thick fillet of BENTOSEAL around base of each penetration and cover the entire area between the penetrations. Extend BENTOSEAL 38 mm (1-1/2") onto the penetrations.

**Grade Termination:** Terminate ULTRASEAL AB membrane 300 mm (12") below finished grade elevation with washer-head fasteners maximum 300 mm (12") on center. Install ENVIROSHEET flashing to primed concrete substrate with bottom edge overlapping top edge of ULTRASEAL AB membrane minimum 100 mm (4"). 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 along the top edge, at all penetrations through the flashing, and all exposed overlap seams. 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 (18 mm (3/4") or less) free of debris, sharp objects, and stones larger than 18 mm (3/4").

**NOTE:** ULTRASEAL AB is not suitable for masonry block foundation walls.

#### PROPERTY LINE CAST-IN-PLACE CONSTRUCTION

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

**Lagging Wall Preparation:** Remove all projections and fill all voids in the retaining wall larger than 25 mm (1") with non-shrink grout or compacted soil. AQUADRAIN® drainage composite can be installed over lagging gaps up to 63 mm (2-1/2") to provide a uniform surface to mount the ULTRASEAL AB. Gaps larger than 63 mm (2-1/2") should be completely filled with grout, wood, extruded polystyrene (25 psi min.) or compacted soil even if AQUADRAIN is installed prior to ULTRASEAL AB. AQUADRAIN drainage composite system should be connected to operative water discharge system. Do not use plywood or other surface treatment that leaves the lagging gaps void.

**Shoring Wall Transition:** At base of shoring wall, install ULTRASEAL AB horizontally oriented (adhesive side facing installer) with the bottom edge extending onto the horizontal substrate a minimum 300 mm (12") and the top edge of the sheet extending a min. 300 mm (12") above the finished slab elevation. Remove release liner and secure ULTRASEAL AB sheet to shoring wall with washer-head fasteners maximum 600 mm (24") on center. Overlap edges of ULTRASEAL AB 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 ULTRASEAL AB on the shoring wall to meet the 300 mm (12") requirement above of the top slab elevation.

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**Shoring Wall Installation:** Starting at the base corner, install course of ULTRASEAL AB (horizontally oriented with adhesive side facing installer) to lagging wall over the previously installed corner transition sheet; with the bottom edge extending down to the wall/slab transition. Remove release liner from membrane.

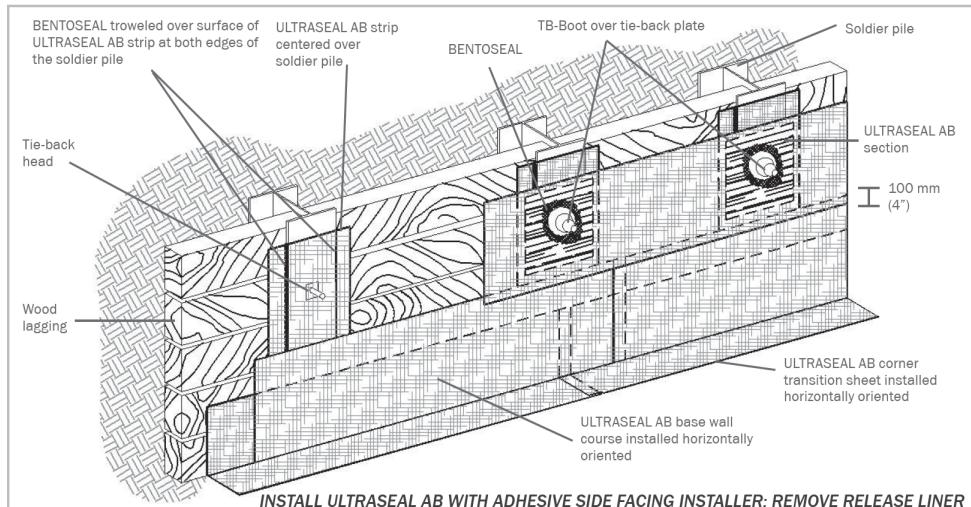
Secure sheet edges to shoring wall with washer-head fasteners maximum 600 mm (24") on center. After the bottom horizontal course, ULTRASEAL AB sheets can be installed either vertically or horizontally oriented. Continue ULTRASEAL AB installation up wall to finished grade detail elevation overlapping adjacent ULTRASEAL AB sheet edges a minimum 100 mm (4") and staggering all sheet roll ends of adjacent courses a minimum 300 mm (12"). Do not allow ULTRASEAL AB overlap joints to run at same elevation as the concrete pour lift joints; extend membrane past a minimum 150 mm (6").

Prior to installing ULTRASEAL AB at grade, install 12 mm (1/2") thick cementitious wall board (Durock) centered over metal soldier pile from finished grade detail elevation to specified depth of soldier pile and lagging removal. Remove cement wall board during excavation to terminate system at grade.

**Tie-Back Covers:** For all tie-back heads and soil nails, install ULTRASEAL AB system with applicable size TB-Boot cover for specific project condition(s). For irregular shoring wall conditions at tie-backs or oversize tie-back heads consult CETCO for alternate detail for specific project condition(s).

**Penetrations:** For all mechanical, structural and other penetrations, install waterproofing system per manufacturer's detail for specific project condition(s).

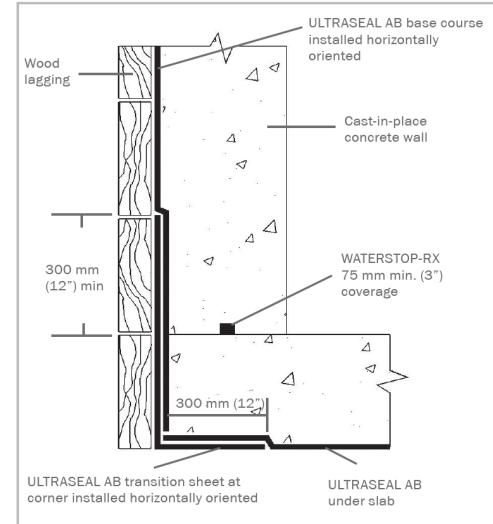
**Soldier Pile Stripping:** Install a strip of ULTRASEAL AB over all soldier piles with raised lagging hanger bolts, form tie rods, or other irregular surface. ULTRASEAL AB strip should extend a minimum 150 mm (6") to both sides of the piling. After removing release liner, apply BENTOSEAL 6 mm x 50 mm (1/4" x 2") to ULTRASEAL AB strip surface along edges of each soldier pile.



Property Line Soldier Pile & Lagging Wall Detail

**Grade Termination:** Terminate ULTRASEAL AB membrane 300 mm (12") below finished grade elevation with washer-head fasteners maximum 300 mm (12") on center. Install ENVIROSHETT flashing to primed concrete substrate with bottom edge overlapping top edge of ULTRASEAL AB membrane minimum 100 mm (4"). 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 ENVIROSHETT; fastened maximum 300 mm (12") on center. Complete grade termination detail with tooled bead of CETSEAL along the top edge, at all penetrations through the flashing, and all exposed overlap seams. Where lagging timbers and the top end of soldier piles are removed, repair any waterproofing damaged by the excavation and removal of the retention wall system. Secure all excavated ULTRASEAL AB overlap seams with washer-head fasteners maximum 600 mm (24") on center and then apply SEAMTAPE centered along overlap seams. 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 (3/4" or less) free of debris, sharp objects, and stones larger than 19 mm (3/4").



Property Line Transition Detail

## SIZE AND PACKAGING

ULTRASEAL AB is available in 1.2 m x 7.6 m (4-ft x 25-ft) rolls.

## ASSOCIATED SYSTEM PRODUCTS

AQUADRAIN subsurface drainage composite and WATERSTOP-RX expanding concrete joint waterstop.

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#### ACCESSORY PRODUCTS

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

#### STORAGE

Keep ULTRASEAL AB and all accessory products dry prior to use.

#### LIMITATIONS

ULTRASEAL AB 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.

ULTRASEAL AB is designed for below-grade waterproofing applications where the product is properly confined. Products 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  $\mu\text{hos}/\text{cm}$  or greater, water samples should be submitted to the manufacturer for compatibility testing. ULTRASEAL AB is designed for use under reinforced concrete slabs 100 mm (4") thick or greater on a compacted earth/gravel substrate. ULTRASEAL AB requires a minimum 150 mm (6") thick reinforced concrete slab if installed over a mud slab. ULTRASEAL AB is not designed for split-slab plaza deck construction and vegetated roofs. ULTRASEAL AB is capable of bridging typical shrinkage cracks in concrete up to 1.5 mm (1/16").

ULTRASEAL AB is not designed to waterproof expansion joints. Do not use ULTRASEAL AB on masonry block foundation walls. Consult CETCO for special installation guidelines that apply to shotcrete and precast concrete construction.

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

**IMPORTANT NOTICE: TO COMPLY WITH ISSUANCE OF HYDROSHIELD QUALITY ASSURANCE PROGRAM, CONTACT CETCO FOR VERIFICATION OF SPECIFICATION AND INSTALLATION REQUIREMENTS.**

#### TECHNICAL DATA

PROPERTY	TEST METHOD	TYPICAL VALUE
<b>ULTRASEAL</b>		
Hydrostatic Pressure Resistance	ASTM D 5385 (mod.)	231 ft. (70 m)
Permeability	ASTM D 5084	$<1 \times 10-11 \text{ cm/sec.}$
Peel Adhesion to Concrete	ASTM D 903 (mod.)	15 lbs./in.
Grab Tensile Strength	ASTM D 4632	150 lbs.
Puncture Resistance	ASTM D 4833	70 lbs.
Elongation	ASTM D 4632	50%
Crack Bridging	ASTM C 836	Passed
Resistance to Decay	ASTM E 154	Passed
Permeance	ASTM E 96 B	0.03 Perms

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