SECTION 07 17 13

BENTONITE PANEL WATERPROOFING

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\*\* NOTE TO SPECIFIER \*\* Carlisle Coatings & Waterproofing; coatings and waterproofing products.
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This section is based on the products of Carlisle Coatings & Waterproofing, which is located at:
900 Hensley Ln.
Wylie, TX 75098
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Web: [www.carlisle-ccw.com](http://www.carlisle-ccw.com)
 [ [Click Here](http://www.arcat.com/arcatcos/cos31/arc31251.html) ] for additional information.
Carlisle Coatings & Waterproofing, Inc. (CCW) provides a broad range of solutions to meet specific waterproofing needs. CCW offers technical services, research and development and manufacturing capabilities from its headquarters in Wylie, Texas and three additional manufacturing facilities in Terrell, TX, Elberton, GA, and Carlisle, PA. The CCW network is further supported by over 50 Manufacturer's sales representatives directed by regional sales offices throughout the country. CCW offers a complete line of waterproofing and moisture protection products for the architectural, general construction, industrial and maintenance industries. Carlisle Coatings & Waterproofing, Inc. is part of the Syntec Division of Carlisle Companies, Inc.

1. GENERAL
	1. SECTION INCLUDES
		1. Geotextile/bentonite clay waterproofing membrane and accessories.
	2. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 31 20 00 - Earth Moving.
		2. Section 03 30 00 - Cast-in-Place Concrete.
		3. Section 04 20 00 - Unit Masonry.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Submit product data sheets, specifications, installation instructions and general recommendations for each type of product specified., including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Shop Drawings: Submit detail drawings for installation of product specified.
		4. Water Sample Test Result: A water sample (2 liters) is required on projects that have ground water and shall be submitted to the waterproofing manufacturer to test for contamination and compatibility with waterproofing membrane. Submit to architect a letter of compatibility recommending which formulation to use.
		5. Warranty: Submit specimen of manufacturers' standard warranty.
	2. QUALITY ASSURANCE
		1. Manufacturer: Provide Geotextile/Bentonite Clay waterproofing membrane produced by a manufacturer with a minimum of 5 years experience in the waterproofing industry.
		2. Installer: Minimum of 2 years experience in installing bentonite clay or other related waterproofing products.
		3. Shotcrete installations shall have an independent inspector to record and monitor the shotcrete installation.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Finish areas designated by Architect.
			2. Do not proceed with remaining work until workmanship is approved by Architect.
			3. Rework mock-up area as required to produce acceptable work.
	1. PRE-INSTALLATION MEETINGS
		1. Convene minimum two weeks prior to starting work of this section.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
		2. Store materials in strict accordance with manufacturer's instructions.
		3. Remove and replace products that have been prematurely exposed to moisture.
		4. Handle materials to avoid damage.
	3. PROJECT CONDITIONS
		1. Install materials in accordance with all safety and weather conditions required by the manufacturer.
		2. Install materials only after work on the applicable substrate is complete.
		3. Complete cast-in-place reinforced columns prior to membrane installation.
	4. SEQUENCING
		1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
	5. WARRANTY
		1. Warranty: Provide manufacturer's standard limited five year material warranty.
		2. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration, or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Carlisle Coatings & Waterproofing, which is located at: 900 Hensley Ln.; Wylie, TX 75098; Toll Free Tel: 888-229-0199; Tel: 972-442-6545 ; Fax: 972-442-0076; Email: [request info (Caitlyn.Ruhl@carlisleccm.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Carlisle+Coatings+%26+Waterproofing&coid=31251&rep=&fax=972-442-0076&message=RE:%20Spec%20Question%20(07170ccw):%20%20&mf=); Web: [www.carlisle-ccw.com](http://www.carlisle-ccw.com)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. WATERPROOFING SYSTEM
		1. The Geotextile/Bentonite clay waterproofing membrane shall be CCW MiraCLAY supplied by Carlisle Coatings & Waterproofing Incorporated, 900 Hensley Lane, Wylie, Texas 75098, Phone (800) 527-7092 Fax: (972) 442-0076.
		2. Physical Properties for Geotextile/Bentonite Clay Waterproofing Membrane:
			1. CCW MiraCLAY Physical Properties:
				1. Bentonite Content: 1.0 lb/ft2 (.488 kg/m2) @ 12% moisture content.
				2. Nominal Dry Thickness: 0.25 in (6.4 mm)
				3. Weight: 75 lb (34.05 kg)
				4. Permeability (ASTM D 5084): 5 x 10-9 cm/sec.
				5. Grab Tensile Strength (ASTM D 4632): 95 lb (422 N).
				6. Grab Elongation (ASTM D 4632): 150%.
				7. Puncture Resistance (ASTM D 4833): 120 psi (828 kPa)
				8. Hydrated Internal Shear (ASTM D 5321): 500 psf (24 kPa).
				9. Swell Index (ASTM D 5890): 2g (24 ml) min.
				10. Fluid Loss: (ASTM D 5891): 18 ml max.
				11. Dimensions: 5.12 ft x 13.62 ft (69.75 ft 2).
				12. Hydrostatic Head Pressure (ASTM D751): 228 ft (69.49 meter).
				13. Adhesion to Concrete (ASTM D903): 17.7 lb/in (8 kg/cm)
		3. Waterproofing system accessories supplied by waterproofing membrane manufacturer:
		4. Mastic: CCW MiraCLAY Sealant is used for detailing at terminations and penetrations. Also used to fill minor voids in concrete and as a fillet in angle changes.
		5. Granules: CCW MiraCLAY Granules used for horizontal to vertical transitions and for detailing at seams and slab penetrations.
		6. Waterstop: CCW MiraSTOP used as a waterstop at cold concrete pours and between pre-cast concrete panels.
		7. Membrane to Substrate Fasteners: Fasteners, of the type and length suitable for the substrate, shall be used in conjunction with washers, of at least 1 inch (25.4 mm) diameter to attach the geotextile/bentonite clay waterproofing membrane to the substrate.
		8. Membrane to Membrane Fasteners: Mechanically fasten membrane sheets together with a box stapler or similar device for horizontal applications.
		9. Geotextile/Bentonite Membrane: geotextile panels of sodium bentonite clay sandwiched between two layers of needle-punched woven and non-woven polypropylene fabrics.
		10. Drainage Composite: CCW MiraDRAIN as recommended by the manufacturer for each condition.
		11. Perimeter Drainage System: Where required shall be CCW QuickDRAIN.
1. EXECUTION
	1. EXAMINATION
		1. Examine substrate and condition under which waterproofing will be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.
	2. SURFACE PREPARATION
		1. Lagging, Concrete Caissons, Shotcrete or Gunite Applications:
			1. Fill all spaces that are over 1 inch (25.4 mm) in width with grout or concrete to a smooth and uniform surface. Cover large gaps with 1/2 inch (13 mm) plywood or CCW MiraDRAIN 6000 or 6000XL.
			2. Trowel CCW MiraCLAY Sealant around all tieback plates and soldier beams a minimum of 1-1/2 inches (38 mm) thick and extend a minimum of 4 inches (102 mm) beyond the flange.
			3. Remove projections from the wall surface in excess of 3/4 inch (19 mm).
		2. Grade Substrates: Shall be level and uniform that is compacted to a minimum of 85% modified proctor.
		3. Concrete Application:
			1. Apply CCW MiraCLAY Sealant to all construction joints at a minimum of 1/4 inch (6 mm) thickness and a 3 inches (76 mm) minimum width.
			2. Remove projections from the wall surface in excess of 3/4 inch (19 mm).
		4. Honeycombing, voids and aggregate pockets exceeding 1 inch (25.4 mm) in diameter or have a depth greater than 3/4 inch (19 mm) shall be filled with a non-shrink cementitious grout. Fill tie-rod holes with a non-shrink cementitious grout.
			1. INSTALLATION
		5. Prevent geotextile/bentonite clay waterproofing membrane from hydrating before being covered with overburden. When threat of rain is imminent or backfill is not immediate, geotextile/bentonite clay waterproofing membrane shall be covered with polyethylene sheeting.
		6. Lagging Application:
			1. Install a stripping piece of CCW MiraCLAY over each soldier beam that extends a minimum of 8 inches (203 mm) beyond either side of the beam. Each soldier beam shall have a double layer of CCW MiraCLAY Membrane.
			2. Install CCW MiraCLAY with the white non-woven side out, facing the installer.
			3. Starting at the bottom of the wall, unroll CCW MiraCLAY and nail across top of panel one nail per 12 inches (305 mm) on center. Allow sheet to hang down, nailing only as required to stabilize.
			4. Install adjacent membrane by overlapping edges a minimum of 4 inches (102 mm).
			5. Fasten membrane once every 18 inches (457 mm) on seams or as required to prevent blousing.
			6. Extend waterproofing membrane to or above grade and fasten membrane once every 12 inches (305 mm).
			7. Install CCW MiraSTOP at all pour joints and exterior perimeter of tie-back box outs.
		7. Underslab Application: (Concrete slab shall have a minimum thickness of 4 inches (102 mm) if reinforced or 5 inches (127 mm) if not reinforced).
			1. Install CCW MiraCLAY with the white non-woven side up, facing the installer.
			2. Overlap edges a minimum of 4 inches (102 mm).
			3. Protect CCW MiraCLAY from damage caused by chairs with sharp edges or points by placing a patch of CCW MiraCLAY under the chair.
			4. Staple joints often enough to prevent excessive movement.
			5. Pour CCW MiraCLAY Granules or trowel CCW MiraCLAY Sealant around all penetrations and press in "cut-to-fit" collars of CCW MiraCLAY.
			6. Extend the installation of CCW MiraCLAY 12 inches (305 mm) up or beyond the perimeter slab forms.
			7. Inspect and repair any damaged material before concrete pour.
		8. Concrete Wall Application:
			1. Install CCW MiraCLAY with the white non-woven side out, facing the installer.
			2. Starting at the bottom of the wall, unroll CCW MiraCLAY and nail across top of panel one nail per 12 inches (305 mm) on center. Allow sheet to hang down nailing only as required to stabilize.
			3. Install adjacent membrane by overlapping edges a minimum of 4 inches (102 mm).
			4. Fasten membrane once every 18 inches (457 mm) on seams or as required to prevent blousing with 3/4 inch (19 mm) to 1 inch (25 mm) concrete nails with washers.
			5. Extend waterproofing membrane to 6 inches (152 mm) below grade and fasten membrane to the substrate to maintain constant compression using a 1/8 inch X 1 inch (3 X 25 mm) minimum termination bar. Trowel a 1/2 inch (13 mm) thick and 2 inches (51 mm) wide bead of CCW MiraCLAY Sealant at top edge of membrane and cover termination bar.
			6. Create a cant at any vertical to horizontal transition by applying a 1.5 inches to 2 inches (38 mm to 51 mm) cant of CCW MiraCLAY Granules or CCW MiraCLAY Sealant.
			7. Strip in all outside corners and transitions with a minimum 12 inches (305 mm)) piece of CCW MiraCLAY membrane to double cover these areas.
			8. Make a minimum 1 inch (25.4 mm) cant at all inside corners with CCW MiraCLAY Sealant.
			9. Backfill shall be compactible soils free of construction debris and shall be uniformly compacted to a minimum 85% Modified Proctor density on each lift.
		9. Concrete Caissons, Shotcrete or Gunite Application:
			1. Conform CCW MiraCLAY to the change in planes.
			2. Install CCW MiraCLAY with the white non-woven side out, facing the installer.
			3. Starting at the bottom of the wall, unroll CCW MiraCLAY and nail across top of panel one nail per 12 inches (305 mm) on center. Allow sheet to hang down nailing only as required to stabilize.
			4. Install adjacent membrane by overlapping edges a minimum of 4 inches (102 mm).
			5. Fasten membrane once every 12 inches (305 mm) on seams or as required to prevent blousing with 3/4 inch (19 mm) to 1 inch (25.4 mm) concrete nails with 1 inch (25.4 mm) washers.
	3. SHOTCRETE PLACEMENT
		1. Apply shotcrete in strict accordance with ACI 506.2-95 Specification for Shotcrete.
		2. Moisten the MiraCLAY non-woven surface to improve adhesion.
		3. Commence spraying from the bottom to the top at a pressure not to vibrate or move the CCW MiraCLAY.
		4. Install to the designed thickness in lifts not to exceed 4 feet (1.2 m).
		5. Protect adjacent CCW MiraCLAY from overspray and remove rebound and sand pockets.
	4. PROTECTION AND DRAINAGE
		1. Protect the geotextile/bentonite clay waterproofing membrane with CCW MiraDRAIN Drainage Composite.
		2. Install the CCW MiraDRAIN Drainage Composite according to the detailed drawings for the specific installation requirements of the project.
	5. BACKFILL
		1. Backfill with smooth and uniform material with no sharp projections or stones larger than 3/4 inch (19 mm). Compact backfill to an 85% Modified Proctor density. Ensure backfill material is not contaminated with salt or other materials that could prevent the CCW MiraCLAY from hydrating.

END OF SECTION