

MASTERSPEC
CONCRETE AND CMU WALLS

SECTION 07121 – COLD FLUID-APPLIED WATERPROOFING SYSTEM III
PLUS

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1. SUMMARY

- A. This Section includes the following:

1. Surface preparation and substrate treatment.
2. Waterproofing membrane.
3. Sheet flashing and accessories.
4. Protection course.
5. Drainage panels.

- A. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 3 Section "Cast-in-Place Concrete" for concrete placement, curing, and finishing.
2. Division 5 Section "Expansion Joint Cover Assemblies", for expansion-joint covers assemblies and installation.
3. Division 7 Section "Joint Sealant" for joint sealant materials and installation.

1. PERFORMANCE REQUIREMENTS

- A. General: Provide a waterproofing system that prevents the passage of liquid water under hydrostatic pressure and complies with physical requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current waterproofing formulations and system design.

1. SUBMITTALS

- A. Submit Product Data for each type of waterproofing specified, including manufacturer's printed instructions for evaluating, preparing, and treating the substrate, technical data, and tested physical and performance properties.
- B. Project Data - Submit Shop Drawings showing locations and extent of waterproofing, including details for substrate joints and cracks, sheet flashing, penetrations, and other termination conditions.
- C. Samples – Submit representative samples of the following for approval:
 - 1. Waterproof membrane material.
 - 2. Protection Course Material.
 - 3. Prefabricated Drainage Mat.
 - 4. Geo-textile and detailing sheet as required.
- A. Installer Certificates – Submit certificates signed by manufacturer certifying that Installers comply with requirements under the "Quality Assurance" Article.

1. QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who is certified in writing and approved by waterproofing manufacturer EPRO Services, Inc. for the installation of the SYSTEM III Plus Waterproofing System.
- B. Manufacturer Qualification: Obtain waterproofing materials and system components from a single manufacturer EPRO Services, Inc.
- C. Field Sample: Apply waterproofing system field sample to 100 sq./ft. (9.3 sq./m.) of deck or wall to demonstrate surface preparation, joint and crack treatment, thickness, texture, and standard of workmanship.
 - 1. Notify Architect one week in advance of the dates and times when field sample will be prepared.
 - 2. If Architect determines that field sample, does not meet requirements; reapply waterproofing until field sample is approved.
 - 3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed waterproofing. An undamaged field sample may become part of the completed Work.
- A. Pre-installation Conference: A pre-installation conference shall be held prior to application of the waterproofing system to assure proper substrate and installation conditions, to include contractor, applicator, architect/engineer and special inspector (if any).

1. DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site as specified by manufacturer labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.
- B. Store materials as specified by the waterproofing manufacturer in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.
- C. Remove and replace material that cannot be applied within its stated shelf life.

1. PROJECT CONDITIONS

- A. Protect all adjacent areas not to be waterproofed. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.
- B. Perform work only when existing and for-cast weather conditions are within manufacturer's recommendations for the material and application method used.
- C. Minimum clearance of 24 inches is required for application of product. For areas with less than 24-inch clearance, the product may be applied by hand using ECOLINE-R.
- D. Ambient temperature shall be within manufacturer's specifications. (Greater than +45°F/+7°C.)
- E. All plumbing, electrical, mechanical and structural items to be under or passing through the waterproof membrane shall be positively secured in their proper positions and appropriately protected prior to membrane application.
- F. Waterproof membrane shall be installed before placement of reinforcing steel. When not possible, all exposed reinforcing steel shall be masked by General Contractor prior to membrane application.

1. WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents, and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty signed by waterproofing manufacturer and Installer agreeing to repair or replace waterproofing that does not meet requirements or that does not remain watertight within the specified warranty period. Warranty

does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate that exceed 1/16 inch (1.6 mm) in width.

1. Warranty Period: 3 years after date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. SYSTEM III Plus; EPRO Services, Inc., Wichita, KS, 800-882-1896

1. Spray-Applied ECOLINE-S or roller-applied ECOLINE-R.
2. Protection ECOSHIELD-E10 or E-15.
3. Drainage mat ECODRAIN-E or ECODRAIN-S-6.

2.2 WATERPROOFING MATERIALS

- A. Fluid applied waterproofing system – ECOLINE-S; a single course, high build, polymer modified, asphalt emulsion. Waterborne and spray applied at ambient temperatures. A nominal thickness of 80 dry mils (60 mil minimum), unless specified otherwise. Non-toxic and odorless. ECOLINE-R has similar properties with greater viscosity and is roller or brush applied. Manufactured by EPRO Services, Inc.
- B. Fluid applied waterproofing physical properties.

ECOLINE-S – TYPICAL CURED PROPERTIES (MEMBRANE ONLY)

Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	4140%
Resistance to Decay	ASTM E 154 Section 13	4% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/sq. ft. /hr.
Hydrostatic Water Pressure	ASTM D 751	26 psi
Perm rating	ASTM E 96 (US Perms)	0.21
Methane transmission rate	ASTM D 1434	0
Adhesion to Concrete & Masonry	ASTM C 836 & ASTM C 704	11 lbf./inch
Hardness	ASTM C 836	80
Crack Bridging	ASTM C 836	No Cracking
Low Temp. Flexibility	ASTM C 836-00	No Cracking at -20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

ECOLINE-R – TYPICAL CURED PROPERTIES

Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	3860%
Resistance to Decay	ASTM E 154	9% Perm Loss
	Section 13	
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/sq. ft. /hr.
Hydrostatic Water Pressure	ASTM D 751	28 psi
Perm rating (US Perms)	ASTM E 96	0.17
Methane transmission rate	ASTM D 1434	0
Adhesion to Concrete & Masonry	ASTM C 836	7 lbf./inch
Hardness	ASTM C 836	85
Crack Bridging	ASTM C 836	No Cracking
Low Temp. Flexibility	ASTM C 836-00	No Cracking at -20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

2.3 AUXILIARY MATERIALS

- A. Sheet Flashing: 60-mil reinforced modified asphalt sheet good with double-sided adhesive.
- B. Reinforcing Strip: Manufacturer's recommended polypropylene and polyester fabric.
- C. Joint Detailing Sealant Mastic: ECOLINE-T, a high viscosity polymer modified water based asphalt material.

1. Back Rod: Closed-cell polyethylene foam.

2.4 PROTECTION COURSE

- A. Protection Course Usage
 1. On vertical surfaces, use ECOSHIELD-E10 protection course or other protection as approved by the manufacturer.
 2. On horizontal surfaces, use ECOSHIELD-E15; 30# roofing cap sheet; or other protection as approved by the manufacturer.

A. ECOSHIELD physical properties.

		8-mil	10-mil	15-mil
Puncture Resistance	ASTM D 1709	475 g.	1593 g.	1898 g.
Tensile Strength	ASTM E 154	24.59 lbs. MD	34.6 lbs. MD	39.7 lbs. MD
Tear Resistance	ASTM E 96	N/A	5.98 lbs.	8.74 lbs.
Low Temperature Impact	ASTM D 1790	Resistant to -105 C	Resistant to -105 C	Resistant to -105 C
Water Vapor Trans. Rate	ASTM E 96	.00711 g./ft./hr.	.00621 g./ft./hr.	.00585 g./ft./hr.
Perm Rating	ASTM E 96	0.0143	0.0133	0.0123
Chemical or Environmental Resistance	ASTM	Excellent	Excellent	Excellent
Methane Gas Modified	ASTM D 1434	0	0	0

2.5 MOLDED-SHEET DRAINAGE PANEL

A. For vertical structures of 30 feet or less.

1. ECODRAIN-E, a HDPE composite drainage panel, 3-diminsional, non-biodegradable with a permeable geo-textile heat bonded to drainage core.
2. ECODRAIN-E Specification Table.

Color		Brown
CORE		
Compressive Strength	ASTM D 1621	5,200 lbs/ft2
Thickness	ASTM D 1777	.31 in.
FABRIC		
Elongation	ASTM D 4632	130 lbs.
Mullen Burst	ASTM D 4751	140 psi.
Permittivity	ASTM D 4491	0.7 sec.
Apparent Opening Size	ASTM D 4751	70 sieve size
Water Flow Rate	ASTM D 4491	55 gpm/ft2
Grab Tensile Strength	ASTM D 4632	130 lbs.
Puncture Resistance	ASTM D 4833	40 lbs.
Trapezoid Tear Strength	ASTM D 4533	60 lbs.
COMPOSITE SYSTEM		
Water Flow Rate	ASTM D 4716	5.1 gpm/ft2

A. For vertical structures of over 30 feet.

1. ECODRAIN-S-6, a polystyrene composite drainage panel, 3-diminsional, non-biodegradable with a permeable geo-textile heat bonded to drainage core.
2. ECODRAIN-S-6 Specification Table.

Color		Black
Compressive Yield Strength	ASTM D 1621	15,100 psf
Grab Tensile	ASTM D 4632	110 lbs.
Trapezoidal Tear	ASTM D 4533	50 lbs.
Puncture Strength	ASTM D 4833	65 lbs.
AOS Typical	ASTM D 4751	70 sieve size
Water Flow	ASTM D 4491	140 gpm/ft ²
Water Flow Rate	ASTM D 4716	HORIZONTAL VERTICAL
		3.2 gpm/ft ² 18 gpm/ft ²

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which waterproofing systems will be applied, with Installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean and prepare substrate according to manufacturer's recommendations. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage or over spray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, form release agents, paints, and other penetrating contaminants from concrete.
- E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, grout joints, tie holes, and other voids with ECOLINE-T, hydraulic cement, or rapid-set grout.

3.3 PREPARATIONS AND TREATMENT AT TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at terminations, at penetrations through waterproofing material, and at expansion joints, drains, and sleeves according to ASTM C 898 and manufacturer's recommendations.
 - B. Apply two coats of ECOLINE-T (30 mil each) and embed a joint reinforcing strip in preparation coat and apply a second coat over embedded joint reinforcing strip ensuring its complete saturation and covering. (See detail drawing B).
1. Terminations should be treated 6 inches up vertical and 6 inches on horizontal.
 2. Penetrations should be treated in a 6-inch radius around penetration and 3 inches onto penetrating object.

3.4 PREPARATIONS AND TREATMENT OF JOINTS AND CRACKS

- A. Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 898 and waterproofing manufacturer's recommendations. Remove dust and dirt from joints and cracks complying with ASTM D 4258 prior to coating surfaces.
- B. Vertical - Apply two coats of ECOLINE-T waterproofing, 6 inches on each side of joint and embed a joint reinforcing strip in preparation coat and apply a second coat over embedded joint reinforcing strip ensuring to complete saturation and covering.

(See detail drawing C & D)

- C. Horizontal - Install sheet flashing over reinforced ECOLINE-T joint to deck and wall substrates where indicated or required according to waterproofing manufacturer's recommendations.

(See detail drawing C & D)

3.5 WATERPROOFING APPLICATION

- A. Set up spray equipment according to manufacturer's instructions.
- B. Mix materials according to manufacturer's instructions.
- C. Start installing waterproofing in presence of manufacturer's technical representative.
- D. Apply waterproofing, according to manufacturer's recommendations, by spray (ECOLINE-S) or roller (ECOLINE-R).
- E. Apply one spray coat of ECOLINE-S or four roller coats of ECOLINE-R waterproofing to obtain a seamless membrane free of entrapped gases, with an average dry film thickness of 80 mils (1.5 mm) and a minimum dry film thickness of 60 mils (1.3 mm) at any point.

- F. Apply waterproofing to prepared wall terminations and vertical surfaces to heights indicated according to manufacturer's recommendations and details.
- G. Verify film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).

3.6 PROTECTION COURSE INSTALLATION

- A. Install ECOSHIELD-E10 protection course with overlapped seams over nominally cured membrane no later than recommended by manufacturer and before starting subsequent construction operations.
- B. Secure ECOSHIELD-E10 protection course seams with ECOSHIELD Tape and attach to adhesive strips (sheet flashing that does not penetrate waterproofing) as recommended by manufacturer.

3.7 DRAINAGE PANEL INSTALLATION

- A. Place and secure drainage panels to substrate according to manufacturer's written instructions. Use adhesives and adhesive strips (sheet flashing that does not penetrate waterproofing) as recommended by manufacturer. Overlap edges of dimpled core and ends of geo-textile to maintain continuity. Protect installed panels during subsequent construction.

3.8 FIELD QUALITY CONTROL

- A. Membrane may be checked for coverage with a lightly oiled, needle nose depth gauge, taking four (4) readings over a one square inch area, every 500 square feet. Record the minimum reading. Mark the test area for repair.
- B. Test areas are to be patched over with ECOLINE-S to an 80 mil minimum dry thickness, extending a minimum of one inch (1") beyond the test perimeter.

3.9 CURING, PROTECTING, AND CLEANING

- A. Cure waterproofing according to manufacturer's recommendations, taking care to prevent contamination and damage during application stages and curing.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.