MANUFACTURER'S GUIDE SPECIFICATIONS

SECTION 071353
ELASTOMERIC SHEET WATERPROOFING EPDM MEMBRANE

CARLISLE®
COATINGS & WATERPROOFING

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SECTION 07 13 53

ELASTOMERIC SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

Furnish and install Sure-Seal EPDM Membrane Waterproofing System for vertical and horizontal applications on concrete block, pargeted concrete block, cast-in-place concrete, wood, metal and compacted sand bed in accordance with drawings and specifications.

1.2 RELATED SECTIONS

A. Section 03 15 00 – Concrete Accessories/Expansion Joints
B. Section 03 30 00 - Cast-In-Place Concrete
C. Section 07 90 00 - Caulking and Sealants
D. Division 04 - Masonry
E. Division 20 – Mechanical/Floor Drains and Standpipes
F. Division 25 – Electrical/Conduit and other Electrical

1.3 REFERENCES

A. ASTM D 312 Specification for Asphalt Used in Roofing
B. ASTM D 412 Tests for Rubber Properties in Tension
C. ASTM D 471 Test Method for Rubber Property - Effect of Liquids
D. ASTM D 573 Test Method for Rubber Deterioration in an Air Oven
E. ASTM D 624 Test Method for Rubber Property - Tear Resistance
F. ASTM D 698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
G. ASTM D 746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
H. ASTM D 816 Method of Testing Rubber Cements
I. ASTM D 1149 Test Method for Rubber Deterioration, Ozone Resistance
J. ASTM D 1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
K. ASTM D 4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
L. ASTM D 6134 Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems
M. ASTM E-96(B) Water Vapor Transmission of Materials

1.4 SYSTEM DESCRIPTION

Product provided by this Section is a 0.060" thick EPDM Ethylene Propylene Diene Terpolymer based elastomeric homogenous membrane.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 01 30 00.
B. Product Data: Submit manufacturer's product literature and installation instructions.
C. Subcontractor's approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.
D. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.
E. Shop drawings: Shall include an outline of waterproofing area and type of penetrations, terminations, perimeter and special details.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane manufacturer.
B. Regulatory Requirements: Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).
C. Pre-Application Conference: Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.
D. Inspection: Upon completion conduct an inspection with owner and contractor to ascertain that the waterproofing system was installed according to specifications and details.
E. Flood Testing: Flood test with 1 to 2 inches of water for a 24 hour period prior to placement of protection board, insulation or drainage board.

1.7 WARRANTY

Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of 1 to 20 years.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.
    1. Name of material.
    2. Manufacturer's stock number and date of manufacture.
    3. Material safety data sheet.
B. Recommended storage and application temperature is 75F. Store materials in protected and well ventilated area.
C. Restore liquid adhesives and sealants to a minimum of 60F before use after exposure to lower temperature.
D. Protect waterproofing membrane and related materials in a manner to prevent damage and inclusion of foreign matter. All cartons of sealant and adhesive containers shall be protected from weather. Keep lids of adhesive cans securely fastened between use. In cold weather, materials must be stored in a heated area until the day of use.

1.9 PROJECT CONDITIONS

A. Do not install membrane onto low melting point asphalt (ASTM D 312, Type I and II) with a maximum softening point of 176 F.
B. Do not allow waste products (e.g., petroleum, grease, oil, solvents, vegetable, mineral oil or animal fat) or direct steam venting to come into contact with the waterproofing membrane.
C. Do not expose membrane and accessories to a constant temperature in excess of 180°F.
D. Prior to the use of any product, consult the Material Safety Data Sheet and Technical Data Bulletin for cautions and warnings. Cements, splice cleaners and bonding adhesives and their fumes are EXTREMELY FLAMMABLE; they contain solvents that may cause dangerous fire and explosion hazards when exposed to heat, flame, or sparks. Store and use away from all sources of heat, flame, or sparks. Post "NO SMOKING" signs. Do not use in a confined or unventilated area. Vapors are heavier than air and may travel along ground to a distant ignition source and flash back.
E. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear. Rubber gloves (available from membrane manufacturer) are required for hand protection when using Splice Cleaner. Glasses, goggles or face shield are recommended for eye protection when using adhesives and splice cleaner.
F. Cold temperatures will not restrict the installation of the Sure-Seal Waterproofing System. Follow specified precautions for storage of materials and expose only enough cements and adhesives to be used within a 4 hour period.
G. Splicing and bonding surfaces should be dry and clean.
H. Substrate shall be free of ponded water, ice or snow.
I. Coordinate waterproofing work with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the application and allow the membrane to cure adequately.

J. Protect adjoining surfaces not to be coated against damage or soiling. Protect plants, vegetation and animals which might be affected by waterproofing operations.
K. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Provide Sure-Seal Membrane Waterproofing System as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane, Wylie, Texas, 75098, phone (800) 527-7092, fax (972) 442-0076.

2.2 PRODUCTS

EPDM Membrane Waterproofing: Shall be Sure-Seal EPDM Membrane, sheet, minimum 0.060" thick, and shall meet or exceed the following requirements:

1. Tensile Strength: 1630 psi minimum, ASTM D 412
2. Ultimate Elongation: 520% minimum, ASTM D 412
3. Thickness Tolerance: +10%, ASTM D 412
4. Tear Resistance: 230 lbf/in minimum, ASTM D 624
5. Brittleness Temperature: -45 F maximum, ASTM D 746
6. Water Absorption: 2% maximum, ASTM D 471, 7d at 158F
7. Permeance: 0.05 Perm maximum, ASTM E-96 B
8. Factory Seam Strength: membrane rupture, ASTM D 816
9. Resistance to Heat Aging: Properties after 168 hrs. at 240F, ASTM D 573:
   Tensile Strength: 1600 psi minimum
   Ultimate Elongation: 310% minimum
   Linear Dimensional Change: -0.4 mass % maximum
10. Ozone Resistance: ASTM D 1149
    No cracks after 100 ppm ozone,
    168 hrs at 104F,
    50% strain
11. Meets ASTM D 6134 specification

2.3 ACCESSORY PRODUCTS

A. Sure-Seal Elastoform Flashing: .060 inches thick, furnished by membrane manufacturer.
B. Bonding Adhesive: A high-strength synthetic rubber adhesive used to bond membrane to compatible substrate, furnished by membrane manufacturer. DO NOT USE FOR SPLICES.
C. Weathered Membrane Cleaner: Cleans membrane surfaces before applying splicing cement and lap sealant, furnished by membrane manufacturer.
D. Pourable Sealer: A two-component polyurethane based material used to seal around difficult objects, furnished by membrane manufacturer.
E. Rubber Gloves: For application of Splice Cleaner and other adhesives, furnished by membrane manufacturer.
F. Insulation: Furnished by membrane manufacturer or other manufacturer, if required.
G. HP Protection Mat: A geotextile mat used for protecting the membrane splice on compacted sand surfaces, furnished by membrane manufacturer.
H. SecurTape: .030 inches thick, furnished by membrane manufacturer for American Railway Engineering Association splice system.
I. Protection Course: see Drainage Composite
J. Drainage Composite: Shall be CCW MiraDRAIN as recommended by the manufacturer for each condition.
K. Sure-Seal H.P. 250 Primer: Used to prime the membrane splice to SecurTAPE application.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.
B. A deck slope greater than 2":12" requires that the membrane be 100% adhered to the substrate.
C. Concrete shall be cured at least 7 days or pass ASTM D 4263.
D. Earth: remove all vegetation, rocks larger than 3/4", etc. Substrate shall be raked smooth, filling in depressions. Apply a 3" minimum sand bed compacted to 95% Modified Proctor in accordance with ASTM D 698 over earth substrate.

3.2 SURFACE PREPARATION

1. The concrete surface must be free from laitance, loose aggregate, sharp projections, grease, oil, dirt, curing compounds or other contaminants.
2. Provide a smooth, even substrate on precast decks. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non-shrink grout or ground to match the unprepared areas.
3. Repair joints and cracks wider than 1/4" with Sure-Seal Pourable Sealer.

3.3 APPLICATION

A. Horizontal Attachment: The membrane can be installed by two different methods.
THE SPECIFIER SHALL DETERMINE METHOD OF ATTACHMENT
1. Recommended installation is to completely adhere membrane to the substrate.
a. Position .060 inch membrane over approved substrate without stretching.
b. Allow membrane to relax approximately 1/2 hour prior to bonding.
c. Fold back half the sheet. Fold sheet without wrinkles or buckles.
d. Apply Bonding Adhesive evenly, without globs or puddles, with a 9 inch plastic core medium nap paint roller, to the sheet and substrate at a coverage rate of 60 square feet per gallon. DO NOT APPLY BONDING ADHESIVE TO THE SPLICE AREA.
e. Allow adhesive to dry until it is tacky, but will not string or stick to a dry finger touch.
f. Roll the coated membrane into the coated substrate while avoiding wrinkles.
g. Brush down bonded half of the sheet with a brush to achieve maximum contact.
h. Fold back the unbonded half of the sheet and repeat the bonding procedure.
i. Install adjoining sheets in the same manner, lapping edges a minimum of 6 inches. Stagger end laps a minimum of 12 inches.
2. Loose lay the membrane over a grid of Water Cut-Off Mastic as shown in detail B-8.

B. Vertical Attachment: The membrane can be installed by two different methods.
THE SPECIFIER SHALL DETERMINE METHOD OF ATTACHMENT
1. Recommended installation is to completely adhere the membrane to the substrate.
a. Unroll membrane and allow to relax approximately 1/2 hour prior to bonding.
b. Apply Bonding Adhesive evenly, without globs or puddles, with a 9 inch plastic core, medium nap paint roller, to the sheet and substrate at a coverage rate of 60 square feet per gallon. DO NOT APPLY BONDING ADHESIVE TO THE SPLICE AREA.
c. Allow adhesive to dry until it is tacky, but will not string or stick to a dry finger touch.
d. Roll the coated membrane into the coated substrate while avoiding wrinkles.
e. Brush down bonded sheet with a brush to achieve maximum contact.
f. Install adjoining sheets in the same manner, lapping edges a minimum of 6 inches. Stagger end laps a minimum of 12 inches.
2. Adhere the membrane to the substrate by bonding the top 25% of the membrane length and 18 inches at the membrane's perimeters.

C. Membrane Splicing – EP-95 Splicing Cement
1. Membrane splices must be a minimum of 6 inches wide.
2. Mark the edge of overlapping sheet with Weathered Membrane Cleaner and fold top sheet back for cleaning and EP-95 Splicing Cement application.

3. Remove dirt and excess dust from the mating surfaces of the overlapping membrane sheets by wiping with Sure-Seal HP Splice Wipes or a clean rag. To remove accumulated dirt, footprints, etc., scrub the membrane sheets with warm soapy water and rinse with clean water.
4. Clean the dry splice area of both membrane sheets by scrubbing with Sure-Seal HP Splice Wipes or clean natural fiber rags using Weathered Membrane Cleaner. Extra cleaning is required along a factory seam with intersects a splice area. Sponges, sponge mops, squeegees, brushes, paint rollers, etc. MUST NOT BE USED.
5. Check the membrane surfaces to verify adequate cleaning procedures are maintained by both mating surfaces solid black in color.
6. Stir Splicing Cement thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended) to obtain a solid black appearance with no heavier black material remaining on the bottom or sides of can.
7. Apply Splicing Cement at 85 lineal feet per gallon to both mating surfaces with the 3 inch wide 1/2 inch medium nap roller (provided in each carton of Splicing Cement). Apply cement smoothly, continuously and relatively even to achieve a medium coat.
8. Do not allow the cement to glob or puddle.
9. In lieu of a 3 inch wide 1/2 inch medium nap roller, a 3 or 4 inch x 1/2 inch thick paint brush may be used to apply Splicing Cement; however, the Splicing Cement must be applied to achieve a smooth surface without brush marks.
10. FOR CURED-TO-CURED MEMBRANE SPLICES ONLY:
    a. While the Splicing Cement is drying, apply a bead of In-Seam Sealant no less than 1/8 inch and no more than 1/4 inch wide within 1/2 inch of the inside edge of the bottom membrane sheet.
    b. Maintain a continuous bead of In-Seam Sealant on all membrane splices.
    c. During splice cleaning procedures, Sure-Seal HP Splice Wipes contaminated with In-Seam Sealant cannot be reused for the application of Weathered Membrane Cleaner.
11. Allow the cement to dry until it is tacky but will not string or stick to a dry finger touch and will not move when pushed with a dry finger. Do not allow the Splicing Cement to over dry before mating the two surfaces. Over dried Splicing Cement will not be tacky. Carlisle recommends using a minimum two-man installation procedure for any splice which is longer than 10 feet.
12. Roll the top membrane toward the bottom membrane and firmly mate together by applying firm hand pressure perpendicular to the length of the splice. Take care not to stretch or winkle the membrane sheet to avoid a fishmouth in the field splice.
13. Immediately roll the splice with a 2 inch wide steel roller, using positive pressure, toward the outer edge of the splice. DO NOT ROLL PARALLEL TO THE SPLICE EDGE. On a completed splice, the In-Seam Sealant must remain evident and must be sensitive to the touch.
14. Wait a minimum of 2 hours before applying Lap Sealant.
15. Clean splice edge with Weathered Membrane Cleaner extending 1 inch onto top and bottom membrane.
16. Apply a 1/4 inch bead of Lap Sealant at the rate specified on the container label, completely covering the splice edge. Feather Lap Sealant with feathering tool. Complete Lap Sealant application to splices each day.

D. Membrane Splicing – Sure-Seal H.P. 250 Primer and SureTAPE

1. Mark the edge of overlapping sheet with Sure-Seal Weathered Membrane Cleaner and fold top sheet back 12 inches for cleaning and H.P. 250 Primer application.
2. Remove dirt, foreign material and excess dust from splice area by brooming or wiping with a Carlisle Sure-Seal HP Splice Wipe. If necessary, scrub the sheet with warm, soapy water, and rinse with clean water.
3. Thoroughly clean splice area with Weathered Membrane Cleaner to achieve a solid black color.
4. Apply H.P. 250 with Splice Wipes in a circular motion to a thin even film uniformed in color. Allow H.P. Primer to dry until it does not transfer to a dry finger touch. Immediately apply the SecurTAPE.
5. Unroll approximately 3 feer (1 m) of SecurTAPE. Align the tape with a marked line and press tape down sheet using firm even hand pressure. Continue for the length of the slice. Tape roll ends should be overlapped 1 inch (24 mm). Allow top sheet to rest on

poly backing after application. A minimum of 1/8 inch (3 mm) of tape must be extended beyond the splice edge. A continuous piece of SecurTAPE must be used at all field and factory splice intersections.

6. Roll the SecurTAPE with a steel OR rubber hand roller after application to the primed substrate will significantly reduce the frequency of air bubbles in the completed field seam.
7. Pull the poly backing from the SecurTAPE beneath the top sheet and allowthe top sheet to fall freely onto the exposed tape.
8. Press the top sheet onto the tape using firm hand pressure across the splice towards the splice edge.
9. Immediately roll the splice with a 2 inch (50 mm) wide steel roller using positive pressure. Roll across the edge, not parallel to it.
10. The use of Lap Sealant with SecurTAPE splices is optional except at cut edges of reinforced membranes (exposed scrim reinforcement), where Lap Sealant must be utilized. Lap Sealant may be applied immediately following the completion of a SecurTAPE splice.
11. Install Elastoform Flashing over all field splice intersections and tape end overlaps. Lap seal according to the detail.

E. Membrane Splicing - American Railway Engineering Association (A.R.E.A.)

1. Mark the edge of overlapping sheet with Weathered Membrane Cleaner and fold top sheet back 12 inches for cleaning and EP-95 application.
2. Remove dirt, foreign material and excess dust from splice area by brooming or wiping with a Carlisle Sure-Seal HP Splice Wipe. If necessary scrub the sheet with warm soapy water and rinse with clean water.
3. Thoroughly clean splice area with Weathered Membrane Cleaner to achieve a solid black color.
4. Apply EP-95 Splicing Cement at the rate specified on the container label to both surfaces using a 3 inch wide 1/2 inch medium nap roller or a 3 or 4 inch X 1/2 inch thick paint brush. The cement area should be 1 inch wider than the 6 inch wide SecurTape. Do not allow to glob or puddle. Allow cement to dry until it is tacky but will not string or stick to a dry finger touch and will not move when pushed with a dry finger.
5. Apply SecurTape to extend a minimum of 1/8 inch to a maximum of ½ inch past edge of top sheet. Roll or press tape parallel to its length to prevent trapped air.
6. Remove polyethylene backing from the tape and allow top sheet to fall freely into place without stretching or wrinkling sheet.
7. Roll the top membrane toward the bottom membrane and firmly mate together by applying firm hand pressure perpendicular to the length of splice.
8. Roll splice with a 2 inch wide steel roller, using positive pressure, toward outer edge of splice.
9. Wait a minimum of 2 hours before applying Lap Sealant.
10. Clean splice edge, extending 1 inch onto top and bottom membranes with Weathered Membrane Cleaner.
11. Apply 1/4 inch bead of Lap Sealant completely covering the splice edge. Feather with feathering tool. Complete Lap Sealant application to splices each day.

F. Perimeter Attachment

Terminate membrane by Carlisle standard B-9 membrane termination details.

G. Flashing

Flash penetrations (pipes, conduits, etc.)passing through the membrane with Carlisle standard field fabricated pipe seal detail B-14

H. Pipe Clusters

Seal clusters of pipes and unusual shaped penetrations with a 1 inch minimum depth of Sure-Seal Pourable Sealer as shown in Carlisle standard detail B-16.

I. Deck Drains

1. Provide a smooth transition from deck surface to drain clamping ring.

2. Seal between membrane and drain base with Water Cut-Off Mastic as shown in Carlisle standard B-6 double drain detail.

J. Surface Splice
1. Correct splices, tears, etc., by splicing a membrane section over damaged area.
2. Select repair material which is the same material as that to be repaired.
3. Extend repair material section at least 6 inches in every direction from splice, tear, etc., to be corrected.
4. Follow appropriate splicing procedures found in 3.3.C or D.

K. Daily Seal
1. Temporarily seal loose edge of membrane with Sure-Seal Pourable Sealer.
2. Apply Pourable Sealer at a rate of 100 lineal feet per gallon. Use a trowel to spread material to achieve complete seal 12 inches back from sheet edge onto exposed substrate.
3. Embed membrane in Pourable Sealer, checking for continuous contact. Provide continuous pressure over cut off.
4. Resume work by pulling sheet free.

3.4 FLOOD TEST
A. After sheet membrane has been in place at least 24 hours, plug drains and provide barriers necessary to contain flood water.
B. Flood surface with 2" head of water for 24 hours. Inspect for leaks and repair membrane if leaks are found. Retest after making repairs.

3.5 PROTECTION COURSE
A. Install CCW MiraDRAIN 6200 Drainage Composite within 24 hours on vertical surfaces.

B. Install CCW MiraDRAIN 9000 or 9900 Drainage Composite immediately after flood testing on horizontal surfaces. If flood testing is delayed, install a temporary covering to protect the membrane from damage by other trades.