SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Modified bituminous sheet waterproofing.

Modified bituminous deck-paving sheet waterproofing.

Protection board.

Molded-sheet drainage panels.

Insulation panels.

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.

Edit below if an assigned company field advisor is not required, but conference is.

Before the waterproofing Work is scheduled to commence, a conference will be called by the Director’s Representative. The conference shall be attended by the Contractor, the authorized waterproofing applicator and the on-site field supervisor, and the waterproofing membrane manufacturer’s Company Field Advisor.

Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
				5. Submittals Package: Submit the shop drawings, product data, and samples specified below at the same time as a package.
				6. Product Data: For each type of product.

Include construction details, material descriptions, and tested physical and performance properties of waterproofing.

Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

Revise the membrane manufacturer’s product data as necessary to suit the requirements of the Contract Documents. Manufacturer’s details are not to be used for the Work of this contract.

Unless approved otherwise in writing by the Director’s Representative, the requirements of the Contract Documents take precedence over the approved waterproofing manufacturer’s specifications and details.

Any materials, installation procedures, or details not included in the Contract Documents must be approved by the Director’s Representative.

* + - * 1. Sustainable Design Submittals:

Retain "Shop Drawings" paragraph below if justified by extent or complexity of waterproofing.

* + - * 1. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

Retain subparagraph below if using pedestal-supported concrete pavers on plaza decks over waterproofing.

Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

When there is a proposed deviation from the contract Documents, submit the revised detail, labeled as such for approval. The revised detail shall show existing conditions and shall be referenced directly to the related details on the Contract Drawings.

* + - * 1. Samples: For each exposed product and for each color and texture specified, including the following products:

8-inch square of waterproofing and flashing sheet.

4-inch square of drainage panel and protection board.

4-inch square of insulation.

* + - * 1. Quality Control Submittals:

Membrane Waterproofing Manufacturer’s Certification:

Submit a letter certifying that the manufacturer has been actively marketing the submitted system for a minimum of 3 years.

Submit the names and addresses of 10 previous waterproofing projects. Include the type and size of each project, and name and telephone number of a contact person at the project location.

Applicator’s Certification:

Submit a letter certifying that the applicator has been actively installing waterproofing and/or roofing systems for the past 5 years.

Submit the names and addresses of 5 previous waterproofing and/or roofing projects. Include the type and size of each project, the waterproofing and/or roofing manufacturer’s name, and the name and telephone number of a contact person at the project location.

Submit a letter certifying that the supervisor or foreman and the workers applying the waterproofing materials have at least 3 years’ experience in the application of waterproofing and/or roofing materials.

Delete subparagraph below when an assigned company field advisor is not required.

Company Field Advisor:

Submit the names, address, and telephone number of the Company Field Advisor who will be assigned to this project.

Research Reports: For modified bituminous sheet waterproofing/termite barrier, showing compliance with UNIFORM CODE AC380.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code.

Delete special warranties if not required.

* + - * 1. Sample Warranties: For warranties and special warranties.
			1. QUALITY ASSURANCE
				1. Membrane Manufacturer’s Qualifications:

The manufacturer must have been actively marketing a self-adhering rubberized asphalt sheet membrane waterproofing system in the United States for a minimum of 3 years.

The manufacturer’s rubberized asphalt sheet membrane must have previously been installed on a minimum of 10 waterproofing projects of comparable scope and complexity to the Work of this Section.

* + - * 1. Applicator’s Qualifications:

The waterproofing applicator must have been actively installing waterproofing and/or roofing systems for the past 5 years.

The waterproofing applicator must have previously installed and completed a minimum of 5 waterproofing and/or roofing projects of comparable scope and complexity to the Work of this Section.

The person supervising the Work of this Section and the workers applying the waterproofing materials shall have had at least 3 years of experience in the application of waterproofing and/or roofing materials.

* + - * 1. On Site Applicator Training:

Before the waterproofing work commences, and regardless of any previous experience, the person supervising the Work of this Section and the workers applying the waterproofing materials, must attend an “On Site Applicator Training Session” conducted in the presence of the Director’s Representative. The training session will be conducted by the waterproofing membrane manufacturer. The purpose of the training session is to:

Familiarize the applicator with the waterproofing materials.

Familiarize the applicator with the proper substrate conditions and priming that is required to install the waterproofing materials.

Instruct the applicator in the proper handling and installation procedures of the waterproofing materials.

Instruct the applicator on the proper installation of flashings, and other detail work, as required by the Contract Documents.

Paragraph below may be deleted on interior waterproofing, foundation waterproofing and on other small uncomplicated waterproofing projects. Include paragraph on all major or critical waterproofing projects. Delete below when an assigned manufacturer’s company field advisor is not required.

* + - * 1. Company Field Advisor:

The manufacturer must assign to the project a Company Field Advisor with expertise in the waterproofing field. The field advisor must also be well versed in the use and installation of the product. Personnel involved solely in sales do not qualify. The field advisor must be a full time employee of the membrane manufacturer. The field advisor will be required to:

Attend the pre-waterproofing conference.

Instruct the contractor at the job site in the proper handling and installation procedures of the membrane prior to commencement of the Work.

Immediately visit the job site if requested, to inspect the Work or to resolve questions or problems which may arise during the Work.

If requested by the Director’s Representative, submit recommendations in writing.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Delivery: Deliver materials to the site in the manufacturer’s labeled, unbroken containers. Membrane rolls must be packaged in rigid containers to prevent membrane distortion.
				2. Storage:

Do not double stack pallets of membrane.

Store materials on wooden platforms in a well-ventilated place.

Store insulation and protection board flat.

Cover materials on top and sides with tarpaulins allowing for adequate ventilation. Keep materials dry.

Store materials away from high heat, flames, and sparks.

* + - * 1. Handling:

Handle materials in a manner to prevent damage. Mark and remove damaged material from the site.

Do not smoke or use open flames near primer, mastics, or liquid membrane.

* + - 1. FIELD CONDITIONS

Use paragraph below on existing deck surfaces only.

* + - * 1. Do not install the waterproofing membrane until the prepared concrete surface has been inspected by the membrane manufacturer’s Company Field Advisor.
				2. Do not execute the Work of this Section unless the substrate is smooth, dry, and free of dirt, dust and debris.

Delete paragraph below on interior work.

* + - * 1. Unless approved otherwise by the Director’s Representative, do not execute the Work of this Section when the air or deck temperature is below 40 degrees F.

If cold weather application (between 40 degrees and 25 degrees F) is approved, use the membrane manufacturer’s primer, mastic, liquid membrane, and sheet membrane, that is specifically designed for use below 40 degrees F.

Do not apply waterproofing in snow, rain, fog, or mist.

Delete paragraph below for exterior work.

* + - * 1. Maintain adequate ventilation during preparation and application of waterproofing materials.

Delete paragraph below on new buildings.

* + - * 1. Limit the removal of existing waterproofing materials to areas that can be temporarily protected within the same day.
				2. Maintain the building in a watertight condition.
				3. Do not apply the waterproofing system in areas where dust is being generated from adjacent work areas. If necessary erect temporary dust barrier or screens to keep the area being waterproofed clean and free of dust and dirt.

Delete paragraph below on foundation walls.

* + - * 1. Membrane Protection: Cover installed membrane with protection board immediately as the membrane is being installed. Do not install the protection board until the membrane has been inspected by the Director’s Representative.

No traffic will be allowed on the completed membrane until the protection board has been installed.

* + - 1. WARRANTY

Include supplementary conditions - warranty extension with article below.

* + - * 1. Manufacturer's Warranty:

Waterproofing Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

Warranty Period: Five years from date of Substantial Completion.

* + - * 1. Warranty Extension:

The one year period required by Paragraph 9.8 of the General Conditions is extended to 5 years for the Work of this Section.

1. PRODUCTS
	* + 1. SYSTEM DESCRIPTION
				1. Waterproofing System: Self adhering rubberized asphalt sheet membrane fully adhered to the concrete substrate and covered with **[protection board], [drainage panels]**and **[insulation]**.
			2. MODIFIED BITUMINOUS SHEET WATERPROOFING

Use the next two paragraphs below. Use first paragraph below for all waterproofing except when hot asphalt concrete topping is used.

* + - * 1. Modified Bituminous Sheet Waterproofing: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side**[; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction]**.

Verify that products retained in subparagraphs above comply with requirements in "Physical Properties" Subparagraph below; revise to suit Project. Cited physical properties represent common values published by manufacturers. Insert other published properties or values if further limits are required and revise product list accordingly.

Physical Properties:

Tensile Strength, Membrane: 250 psi minimum; ASTM D412, Die C, modified.

Ultimate Elongation: 300 percent minimum; ASTM D412, Die C, modified.

Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970.

Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C836.

Puncture Resistance: 40 lbf minimum; ASTM E154.

Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.

Water Vapor Permeance: 0.05 perm maximum; ASTM E96, Water Method.

Revise option in "Hydrostatic-Head Resistance" Subparagraph below if applicable. Named products exceed 200 feet (60 m) except for York, which reports 150 feet (45 m).

Hydrostatic-Head Resistance: [200 feet] <Insert dimension> minimum; ASTM D5385.

Retain "Sheet Strips" Subparagraph below for concealed strip flashings. Modified bituminous waterproofing membrane cannot be used for exposed sheet flashings.

Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

Use paragraph below with hot asphalt concrete topping only.

* + - * 1. Modified Bituminous Sheet Waterproofing, Fabric Reinforced: Minimum 60-mil nominal thickness, self-adhering sheet consisting of rubberized-asphalt membrane with embedded fabric reinforcement, and with release liner on adhesive side.

Verify that products retained in subparagraphs above comply with requirements in "Physical Properties" Subparagraph below; revise to suit Project. Cited physical properties represent the few common values published by both manufacturers. Insert other published properties or values if further limits are required and revise product list accordingly.

Physical Properties:

Pliability: No cracks when bent 180 degrees over a 1-inch mandrel at minus 25 deg F; ASTM D146.

Puncture Resistance: 40 lbf minimum; ASTM E154.

Water Vapor Permeance: 0.05 perm maximum; ASTM E96, Water Method.

Retain "Sheet Strips" Subparagraph below for concealed strip flashings. Modified bituminous waterproofing membrane cannot be used for exposed sheet flashings.

Sheet Strips: Self-adhering, reinforced, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

* + - 1. AUXILIARY MATERIALS
				1. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

Insert specific VOC-limit values in subparagraph below if known; coordinate with products and revise to suit Project.

Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

Retain "Primer" or "Surface Conditioner" paragraph below, or both, to suit type(s) of waterproofing required.

* + - * 1. Primer: Liquid waterborne primer recommended for substrate by sheet waterproofing material manufacturer.
				2. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet waterproofing material manufacturer.
				3. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
				4. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
				5. Patching Mortar:

Acceptable Material:

Speed Crete Red Line by Euclid Chemical.

Approved equivalent.

* + - * 1. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

Retain protection board type from four paragraphs below if required; revise text or insert another product to suit Project. Delete paragraphs if molded-sheet drainage panels or insulation drainage panels replace protection board. Verify acceptability of protection board type with waterproofing manufacturer. Indicate locations, such as plaza deck and foundation walls, if more than one type of protection board is required.

Delete article below when hot asphalt concrete topping is used and on foundation walls with insulation placed over waterproofing membrane.

* + - * 1. Protection board, Asphaltic: ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

Thickness: Nominal 1/4 inch.

Acceptable Material:

Type PC-3, Heavy Duty Protection Course by W.R. Meadows, Inc.

Approved equivalent.

Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for protection board type.

* + - 1. MOLDED-SHEET DRAINAGE PANELS

Retain this article if molded-sheet drainage panels are required.

Retain one or more molded-sheet drainage panel paragraphs below if specifying drainage panels in this Section; revise to suit Project. If not indicated on Drawings, insert thickness requirement only after coordinating required thickness with required flow rate.

Retain "Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel without Polymeric Film" paragraph below if specifying nonwoven-geotextile-faced drainage panels, usually for foundation walls.

* + - * 1. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel without Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core, without a polymeric film bonded to the other side; and with a vertical flow rate through the core of **[9 to 21 gpm per ft.] <Insert values>**.

Retain "Woven-Geotextile-Faced, Molded-Sheet Drainage Panel without Polymeric Film" paragraph below if specifying woven-geotextile-faced drainage panels, usually for plaza decks.

* + - * 1. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel without Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 sieve, laminated to one side of the core, without a polymeric film bonded to the other side; and with a horizontal flow rate through the core of not less than **[2.8 gpm per ft.] <Insert value>**.

Retain "Molded-Sheet Collector-Panel System with Polymeric Film" or "Molded-Sheet Collector-Panel System Wrapped with Geotextile" paragraph below if required in lieu of piped subdrainage collection, usually for foundation walls or the perimeter of an on-grade slab where molded-sheet drainage panels are required. Before retaining, consult Project's geotechnical engineer to determine required horizontal flow rate to subdrainage piping, and consult manufacturers for the horizontal flow rate capability of manufacturers' systems.

* + - * 1. Molded-Sheet Collector-Panel System with Polymeric Film: Composite subsurface collector-panel system by same manufacturer as primary molded-sheet drainage panels; consisting of a high-profile, studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven-geotextile facing with an apparent opening size not exceeding No. 40 sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of **[9 to 17 gpm per ft.] <Insert values>** and a minimum horizontal, in-plane flow rate **[as indicated on Drawings] <Insert requirement>**. Provide system with manufacturer's outlets, connectors, tapes, and other accessories to connect primary molded-sheet drainage panels with piped subdrainage system.
				2. Molded-Sheet Collector-Panel System Wrapped with Geotextile: Composite subsurface collector-panel system by same manufacturer as primary molded-sheet drainage panels; consisting of a high-profile, studded, nonbiodegradable, molded-plastic-sheet drainage core; wrapped with a nonwoven-geotextile facing with an apparent opening size not exceeding No. 40 sieve; and with a vertical flow rate through the core of **[21 to 97 gpm per ft.] <Insert values>** and a minimum horizontal, in-plane flow rate **[as indicated on Drawings] [of 21 gpm per ft.]** **<Insert requirement>**. Provide system with manufacturer's outlets, connectors, tapes, and other accessories to connect primary molded-sheet drainage panels with piped subdrainage system.
			1. INSULATION PANELS

Retain this article if insulation panels are required. Verify acceptability of type of drainage panel with waterproofing manufacturer.\

Use paragraph below for Deck Insulation.

* + - * 1. Closed cell extruded polystyrene foam boards, chamfered on edges of one side to facilitate drainage.

Physical Properties:

Compressive strength, ASTM D1621: 60 psi min.

Thickness / R-Value, ASTM C518:

1-inch / R5.0

1-1/2-inch / R7.5

2-inch / R10.0

3-inch / R15.0

3-1/2-inch / 17.5

Acceptable products, subject to compliance with required physical properties:

Styrofoam by Dupont

Foamular 600 by Owens Corning.

Approved equivalent.

Use paragraph below for foundation walls.

* + - * 1. Closed cell extruded polystyrene foam boards.

Physical Properties:

Compressive strength, ASTM D1621: 25 psi min.

Thickness / R-Value, ASTM C518:

1-inch / R5.0

1-1/2-inch / R7.5

2-inch / R10.0

Acceptable products, subject to compliance with required physical properties:

Perimate Styrofoam by Dupont

Foamular 250 by Owens Corning.

Approved equivalent.

* + - * 1. Insulation Adhesive:

Quick setting adhesive as recommended by the insulation manufacturer, and compatible with the waterproofing membrane.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.

Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.

Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.

* + - * 1. Proceed with installation only after unsatisfactory conditions have been corrected.
				2. Testing Existing Drain System:

Before commencing with the Work, water test existing deck drains and conductor pipes. Submit a written report to the Director indicating which drains or conductors, if any, are not operating at full capacity.

Repair of drains and conductors is not included in the Work but may at the State’s option be repaired by an Order On Contract.

* + - 1. PREPARATION
				1. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

Use paragraph below on new work and when installing concrete on existing work.

* + - * 1. Allow concrete to cure a minimum of 7 days before application of waterproofing membrane.

Remaining paragraphs in this article apply to each type of waterproofing.

* + - * 1. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
				2. Repair concrete as required to provide a suitable surface for the waterproofing membrane. A clean, dry, smooth monolithic surface is required. A “broom” textured finish is not acceptable. The overall texture of the concrete shall closely resemble that of “steel troweled” concrete.

Patch the following defects with patching mortar finished flush with the surrounding surface; holes and voids larger than 1/4 inch deep and 1/2 inch long, spalled areas, and cracks wider than 1/16 inch.

Patch misaligned concrete, such as at construction joints, with patching mortar finished to a feathered edge.

At intersections between horizontal and vertical surfaces install a 1 x 1 inch cant formed with patching mortar.

Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

Remove fins, ridges, mortar, and other projections.

If necessary, grind the surface of the concrete to achieve a smooth finish and to remove sharp projections.

Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.

Retain subparagraph below if sheet waterproofing covers nonmoving joints and cracks. Consult manufacturers because recommendations vary. Consistent with ACI terminology, the term "contraction joint" is used in place of "control joint." Usually retain the smaller joint width option. Some manufacturers of modified bituminous deck-paving waterproofing permit a joint width of 1/8 inch (3 mm) before requiring strip reinforcement.

Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of **[1/16 inch] [or] [1/8 inch for modified bituminous deck-paving waterproofing]**.

Retain first paragraph below for treatment at expansion, isolation, and other discontinuous joints. Verify, with written instructions of sheet waterproofing manufacturers, that paragraph applies to Project for self-adhered sheet waterproofing; revise to suit Project. Besides a primary architectural expansion joint, building expansion joints may need a continuous sheet waterproofing covering. Coordinate expansion-joint treatment with expansion-joint assemblies that interface with waterproofing. Specialty manufacturers such as Situra also produce membrane-type waterproofing expansion joints.

* + - * 1. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.

Description in subparagraph below is based on a detail from GCP Applied Technology, Inc.

Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.

Retain "Corners" paragraph below if modified bituminous sheet waterproofing is required.

* + - * 1. Corners: Prepare, prime, and treat inside and outside corners in accordance with manufacturer's instructions.

Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.

* + - * 1. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions.
			1. PRIMING SUBSTRATES
				1. Do not proceed with the application of the primer until the Director’s Representative has inspected the prepared surface.
				2. Testing for Surface Dryness: Before applying primer on the area to be waterproofed, apply small sections (2 x 2 feet) of primer on areas suspected of being wet or damp. If the primer does not dry, can be removed, or rolled off the concrete with finger pressure, the area is not suitable to receive the waterproofing membrane. Dry out wet or damp areas before proceeding with the application of the primer and waterproofing membrane.
				3. Immediately before applying primer, thoroughly vacuum the surface to remove dust.
				4. Apply primer to areas to receive waterproofing membrane, including flashings. Uniformly apply the primer by roller, spray, or brush at the rate recommended by the manufacturer. Allow the primer to dry tack free before installing the waterproofing membrane. Sufficient primer must be used to condition the surface to a dust free state.

Re-prime areas exposed for more than 24 hours.

* + - 1. INSTALLATION OF MODIFIED BITUMINOUS SHEET WATERPROOFING
				1. General:

The finished membrane shall be free of wrinkles, blisters, fish mouths, and other defects which would impair the waterproofing qualities of the membrane. The membrane must be fully bonded to the substrate.

Wrinkles: Minor wrinkles in the sheet membrane, such as small wrinkles which result from the manufacturing process are acceptable. Wrinkles which are the result of poor installation procedures, such as wrinkles which can be pinched between the fingers will not be allowed.

Immediately after installing each sheet of membrane or flashing, roll the entire surface to insure full contact with the substrate. Where a roller is not practical, use heavy hand pressure to firmly adhere the membrane.

Horizontal Surfaces: The roller shall be a maximum of 30 inches wide and weigh a minimum of 150 lbs. Cover the roller with a resilient material, such as, indoor/outdoor carpet to prevent damage to the membrane and to allow for minor surface irregularities.

Vertical Surfaces: Use small handheld steel rollers.

Forming Membrane At Corners: At the intersection of inside and outside corners with horizontal surfaces, make a diagonal cut at the base of the cant to allow the membrane or flashing to conform to the contour of the corner and to eliminate wrinkles and bridging. Do not stretch the membrane.

Thoroughly work the surface of the membrane with heavy finger pressure at areas that are inaccessible to the roller.

Use next three paragraphs below; use first paragraph below for plaza decks.

* + - * 1. Deck Waterproofing: The waterproofing membrane shall consist of 2 layers of rubberized asphalt sheet membrane laid “shingle fashion” with 2 inch head laps.

If possible, start at low point of deck and work toward the high point. Lap the sheets so the flow of water is not against the edges of the sheet.

Start laying the membrane using split sheets if necessary, to secure a two-ply application. After the first full width sheet has been installed, lay the edges of each succeeding sheet to chalk lines snapped at one half the width of the sheet plus 2 inches (i.e., 36 inch wide sheets, snap line 20 inches from edge; 48 inch wide sheets, snap line 26 inches from edge). Lap ends a minimum of 6 inches and stagger end laps.

Lay the membrane true to the chalk lines to insure a two-ply application on the deck. Cut and reposition the membrane if it wanders from the chalk line.

At end lap joints apply a trowel coat of mastic over the end of the installed membrane before installing the succeeding roll.

At the end of each workday apply a trowel coat of mastic over “T” joints, and at lap joints within 12 inches of corners.

Use paragraph below for floor slab waterproofing.

* + - * 1. Floor Slab Waterproofing: The waterproofing membrane shall consist of one layer of rubberized asphalt sheet membrane.

After the first sheet of membrane has been installed, lay the edges of each succeeding sheet to the factory applied lap lines. In no case shall the edges be lapped less than 2-1/2 inches. Lap ends a minimum of 6 inches and stagger end laps.

At the end of each workday apply a trowel coat of mastic over “T” joints and at lap joints within 12 inches of corners.

Use paragraph below for foundation walls.

* + - * 1. Foundation Wall Waterproofing: The waterproofing membrane shall consist of one layer of rubberized asphalt sheet membrane.

Before installing the waterproofing membrane reinforce inside and outside corners of the foundation wall with a 6 inch wide strip of sheet membrane. Lap the reinforcing strip 3 inches onto each intersecting wall surface and 3 inches onto the footing.

Install the membrane over the top of the footing. Lap the membrane 3 inches up onto the foundation wall and 3 inches over the edge of the footing.

Install the membrane on the foundation wall vertically, in lengths not to exceed 8 feet.

After the first sheet of membrane has been installed, lay the edges of each succeeding sheet to the factory applied lap lines. In no case shall the edges be lapped less than 2-1/2 inches. Lap ends a minimum of 6 inches and stagger end laps.

At the end of each workday apply a trowel coat of mastic over “T” joints, and at lap joints within 12 inches of corners. Seal the edges of the membrane on the footing and at the top of the wall with a trowel coat of mastic.

* + - * 1. Installing Base Flashings:

Before the waterproofing membrane is installed, apply 90 mils of liquid membrane. Apply the membrane over the concrete cant and extend the membrane 6 inches up the vertical wall surface and 6 inches onto the deck surface.

Inside and Outside Corners:

Extend the liquid membrane up the vertical surface to the height of the cap flashing or other termination detail. Lap the membrane 6 inches onto each intersecting wall surface.

Allow the liquid membrane to completely cure.

Over the liquid membrane apply a 4-inch-wide strip of flashing. Extend the flashing up the vertical surface to the height of the cap flashing or other termination detail and 4 inches onto the deck surface. Lap the flashing strip 2 inches onto each intersecting wall surface. Press the flashing tightly to the substrate to avoid wrinkles and bridging.

Over the liquid membrane install two layers of sheet membrane flashing. Extend the first layer 6 inches up the vertical wall surface and 12 inches onto the deck surface. Extend the second layer up the vertical surface to the height of the cap flashing or other termination detail, and 6 inches onto the deck surface. Do not install the second layer until the deck waterproofing membrane has been installed.

Install the flashing in maximum lengths of 6 feet. Lap edges 2-1/2 inches.

Work the flashings so there are no voids or bridges between mating surfaces.

At inside and outside corners lap the flashings 2 inches onto each intersecting wall surface.

Apply 90 mils of liquid membrane at inside and outside corners. Extend the liquid membrane 6 inches onto each intersecting wall surface and 12 inches onto the deck surface.

Apply liquid membrane over exposed edges and ends of the sheet flashing.

* + - * 1. Flashing Round Projections (Field Formed):

Clean surfaces of the projection to receive flashing, removing dirt, dust, and foreign material.

Apply primer to surfaces to receive flashing.

Apply liquid membrane extending 7 inches out from the base of the projection. Install the roofing membrane to within 1/4 inch of the projection or install a rubberized asphalt sheet to within 1/4 inch of the projection and extending 6 inches out from the projection.

Apply liquid membrane around the base of the projection extending 4 inches out from the projection and up the projection to one inch beyond the height of the flashing cap sheet. Form a 1/4 inch fillet at the base of the projection with liquid membrane.

Wrap the projection with a minimum 8 inch high flashing cap sheet starting 1/4 inch above the roofing membrane.

Apply liquid membrane around the base of the projection extending 4 inches out from the projection and 4 inches up the projection. Form a 1/2 inch fillet at the base of the projection with liquid membrane.

Install a compression clamp 1/4 inch from the top of the flashing cap sheet.

Apply a bead of liquid membrane over the top edge of the flashing cap sheet.

* + - * 1. Flashing Deck Drains:

Use subparagraph below on existing drains only.

Grind surfaces of the drain body that will be in contact with the waterproofing down to bare metal. Remove dirt, dust, debris and foreign matter.

Apply primer to metal surfaces that will be in contact with the waterproofing. Allow the primer to completely dry.

Apply 90 mils of liquid membrane. Extend the liquid membrane one inch into the drain body and onto the deck surface a minimum of one foot. Allow the membrane to completely cure.

Over the liquid membrane install one 3 x 3 feet reinforcing sheet of waterproofing membrane. Turn the sheet into the drain body one inch. Roll the surface to insure full contact with the substrate.

Extend the deck waterproofing membrane to the edge of the clamping ring.

* + - * 1. Installing Expansion Joint Thru Field Of Deck:

Install preformed compressible joint filler.

Centered over the expansion joint, install a 6 inch wide strip of sheet membrane waterproofing. Install the membrane “upside down” with the polyethylene side against the deck surface.

Temporarily hold the membrane in position with occasional dabs of mastic. Do not fully adhere the membrane to the concrete.

Centered over the 6 inch wide strip, install an 18 inch wide strip of sheet membrane waterproofing. Install the membrane “right side up”.

Roll the entire surface to insure an intimate contact with the substrate.

At intersecting walls, extend both strips of membrane up the vertical surface to the height of the cap flashing or other termination detail.

* + - * 1. Installing Expansion Joint At Intersecting Building Wall:

Install preformed compressible joint filler.

Install a 9 inch wide strip of sheet membrane waterproofing. Extend the membrane 6 inches onto the deck surface and 3 inches up the vertical surface. Install the membrane “upside down” with the polyethylene side against the deck and wall surface.

Temporarily hold the membrane in position with occasional dabs of mastic. Do not fully adhere the membrane to the concrete, or to the wall surface.

Over the 9 inch wide strip install an 18 inch wide strip of sheet membrane waterproofing. Install the membrane “right side up”. Extend the membrane 12 inches onto the deck surface and 6 inches up the vertical wall surface.

Press the membrane tightly to the substrate to avoid wrinkles or bridging.

At inside and outside corners install a 4 inch wide strip of flashing. Extend the flashing up the vertical surface to the height of the cap flashing or other termination detail and 4 inches onto the deck surface. Lap the flashing strip 2 inches onto each intersecting wall surface. Press the flashing tightly to the substrate to avoid wrinkles or bridging.

After the deck waterproofing membrane has been installed, install one layer of sheet membrane flashing. Extend the membrane up the vertical surface to the cap flashing or other termination detail and 6 inches onto the deck surface.

Install the flashing in maximum lengths of 6 feet. Lap ends a minimum of 2-1/2 inches.

Work the flashing so there are no voids or bridges between mating surfaces.

At inside and outside corners lap the flashing 2 inches onto each intersecting wall surface.

Apply 90 mils of liquid membrane at inside and outside corners. Extend the liquid membrane 6 inches onto each intersecting wall surface and 12 inches onto the deck surface.

Apply liquid membrane over exposed edges and ends of the sheet flashing.

* + - 1. INSTALLATION OF PROTECTION BOARD
				1. Before installing protection board, remove dirt and debris.
				2. Install the protection board over membrane waterproofing and flashing.
				3. Butt edges and ends.
				4. Cut and fit the protection board to the contour of flashings. Do not cut the protection board directly on the membrane to avoid damaging the membrane.
				5. Adhere the protection board to the membrane with occasionally placed 6 inch long strips of the membrane manufacturer’s mastic. Apply the mastic strips in sufficient quantity to hold the board securely to the membrane.
			2. INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS
				1. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

Retain subparagraph below if installing board insulation or protection board before installing molded-sheet drainage panels.

For vertical applications, install **[board insulation] [protection board]** before installing drainage panels.

Delete Article below when no insulation is desired.

* + - 1. INSTALLATION OF INSULATION
				1. Before installing insulation, board remove dirt, and debris.

Use below on deck waterproofing.

* + - * 1. Install the insulation with the notched edges down against the membrane. Lay the boards dry with joints aligned and tightly butted together.

Use below for insulation on foundation walls.

* + - * 1. Lay the boards with joints aligned and tightly butted together.
				2. Adhere the insulation board to the membrane with occasionally placed 6 inch long strips of the insulation manufacturer’s adhesive. Apply the mastic strips in sufficient quantity to hold the board securely to the membrane.
			1. FIELD QUALITY CONTROL
				1. Inspection and Repair:

Before the protection board is installed, inspect the membrane in the presence of the Director’s Representative. Repair defects which would impair the waterproofing qualities of the membrane. Defects requiring repairs include, but are not limited to, blisters, wrinkles, fishmouths, cuts, punctures, bridging at corners, insufficient laps at edges and ends, and unadhered membrane.

Cut out and patch defects. Extend the patch a minimum of 6 inches beyond the defect in every direction. Apply a trowel coat of mastic around edges of patch.

Delete paragraph below on foundation walls.

* + - * 1. Before installing insulation conduct a leak test as follows:

Plug drains.

If necessary, block off the leak test area with temporary curbs to restrict the flow of water to the test area.

Form the curbs with lumber flashed with waterproofing membrane.

Completely flood the deck with water to a depth of one inch at the highest point and allow to stand for 36 hours.

Check inside of building for leaks.

If leaks develop, make necessary repairs and repeat the flood test.

At completion of test unplug drains and remove temporary curbs.

* + - * 1. Waterproofing will be considered defective if it does not pass tests and inspections.
			1. PROTECTION, REPAIR, AND CLEANING

Retain first paragraph below for horizontal applications except for modified bituminous deck-paving sheet waterproofing.

* + - * 1. Do not permit foot or vehicular traffic on unprotected membrane.
				2. Protect waterproofing from damage and wear during remainder of construction period.

Retain first paragraph below if insulation drainage panels are required and may be exposed for a period of time.

* + - * 1. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
				2. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
				3. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326