

University of Houston Master Specification

<Insert Project Name>
<Insert U of H Proj #>

<Insert Issue Name>
<Insert Issue Date>

SECTION 07 1413 - HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING

Maintain Section format, including the UH master spec designation and version date in **bold** in the center columns of the header and footer. Complete the header and footer with Project information.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
 - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

1.2 SUMMARY

- A. Section Includes:
 - 1. Rubberized-asphalt waterproofing membrane, reinforced.
 - 2. Molded-sheet drainage panels.
 - 3. Insulation.
 - 4. Plaza deck pavers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions. Show layout (including colors and patterns), sizes, sections, profiles, and joint details of concrete pavers with paver support assemblies.
- C. Samples:
 - 1. 12-inch-by-12-inch square of prefabricated drainage composite.
 - 2. Concrete paver, full sized, in each color and texture required.
 - 3. Paver pedestal assembly.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports: From qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.
- B. Sample warranties: Copies of
 1. Waterproofing manufacturer's warranty;
 2. Waterproofing installer's warranty; and
 3. Contractor's warranty,

all stating obligations, remedies, limitations, and exclusions. All to be submitted with Bid.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is approved or licensed by manufacturer for installation of waterproofing required for this Project and is eligible to receive special warranties specified.
- B. Preinstallation Conference: Conduct conference at Project site.
- C. Mockups: Install approximately 10-foot-by-10-foot area of pavers and paver supports to demonstrate aesthetic affects and quality of materials and execution.
 1. If Architect/Engineer determines mockup does not comply with requirements, modify mockup or construct new mockup until mockup is approved.
 2. Approved mockup will be standard for judging completed Work.
 3. Approved mockup may become part of completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate, or when temperature is below 0 deg F.
- B. Verify existing dimensions and details prior to start of waterproofing Work. Notify Architect/Engineer of conditions found to be different than those indicated in the Contract Documents. Architect/Engineer will review situation and inform Contractor and Waterproofing Installer of changes.
- C. Protect existing waterproofing from damage from construction activities. Repair damage to existing waterproofing from construction activities that result in leakage.
- D. Ensure that drains are operational at the end of each workday or if precipitation is forecast.
- E. Handle and install materials in strict accordance with safety requirements required by waterproofing manufacturer; Safety Data Sheets (SDS); and local, state, and federal rules and regulations. Maintain Safety Data Sheets (SDS) with materials in storage area and available for ready reference on Site.

- F. Maintain adequate ventilation during application and curing of waterproofing materials.
 - 1. Locate kettles away from flammable materials and mechanical air intake systems. Observe fire, safety, and pollution regulations of governing authorities.
 - 2. Adhesives contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near open fire. Do not use in confined areas without adequate ventilation. Consult container and packaging labels and Safety Data Sheets for specific safety information.

1.7 WARRANTY

- A. Special Warranty: Waterproofing manufacturer's standard form in which manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WATERPROOFING MEMBRANE

- A. Source Limitations: Obtain materials through one source from single waterproofing manufacturer, or from sources approved by waterproofing manufacturer.
- B. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include the following:
 - a. American Hydrotech, Inc.; Monolithic Membrane 6125
 - b. Tremco, Inc.: Tremproof 6100

2.2 FLASHING SHEET MATERIALS

- A. Elastomeric Flashing Sheet: 50-mil- minimum, uncured sheet neoprene as follows:
 - 1. Tensile Strength: 1400 psi minimum; ASTM D 412, Die C.
 - 2. Elongation: 300 percent minimum; ASTM D 412.
 - 3. Tear Resistance: 125 psi minimum; ASTM D 624, Die C.
 - 4. Brittleness: Does not break at minus 30 deg F; ASTM D 2137.
- B. Modified-Bituminous Flashing Sheet: SBS-modified bituminous sheet; 160-mil thick; woven-or-non-woven, polyester-or-glass-fiber reinforced; suitable for application method specified; granular surfaced.
 - 1. Color as selected by Architect/Engineer.
 - 2. Detail and fasten as shown on Drawings.

2.3 AUXILIARY MATERIALS

- A. Primer: ASTM D 41, asphaltic primer.
- B. Elastomeric Sheet: 50-mil- minimum, uncured sheet neoprene as follows:
 - 1. Tensile Strength: 1400 psi minimum; ASTM D 412, Die C.
 - 2. Elongation: 300 percent minimum; ASTM D 412.
 - 3. Tear Resistance: 125 psi minimum; ASTM D 624, Die C.
 - 4. Brittleness: Does not break at minus 30 deg F; ASTM D 2137.
 - 5. Splicing Cement (used to bond elastomeric flashing sheets together): As recommended by waterproofing manufacturer for type of elastomeric flashing sheet.
 - 6. Lap Sealant (used to seal edges of elastomeric flashing sheet splices): As recommended by waterproofing manufacturer for type of elastomeric flashing sheet.
 - 7. Bonding Adhesive (used to bond elastomeric flashing sheets to an approved substrate: As recommended by waterproofing manufacturer for type of flashing sheet.
- C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum termination bars; approximately 1 by 1/8 inch thick; with anchors.
- D. Sealants and Accessories: Manufacturer's recommended sealants and accessories.
- E. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.
- F. Protection Course: Manufacturer's standard, 80- to 90-mil- thick, fiberglass-reinforced rubberized asphalt or modified bituminous sheet.
 - 1. Protection Course Adhesive: As recommended by waterproofing manufacturer for type of protection course.

2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a woven-geotextile facing with an apparent opening size not exceeding No. 40 sieve, laminated to one side without a polymeric film bonded to the other side of a studded, non-biodegradable, molded-plastic-sheet drainage core, with a horizontal flow rate not less than 2.8 gpm/ft.

2.5 INSULATION

- A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578, square edged.
 - 1. Type VII, 60-psi minimum compressive strength.
 - 2. Type V, 100-psi minimum compressive strength.

2.6 FILTER FABRIC

- A. Non-woven Geotextile: Non-woven needle-punched geotextile, manufactured for subsurface drainage, made from polyolefins or polyesters.

1. Grab Strength: ASTM D4632 - 82 pounds minimum.
2. Puncture Strength: ASTM D4833 - 45 pounds minimum.
3. Elongation: ASTM D4632 - 50 percent minimum.
4. Permittivity: ASTM D4491 - 0.5 per second minimum.
5. Water Flow Rate: ASTM D4491 - 140 gallons per minute per square foot minimum.
6. Apparent Opening Size: ASTM D4751 - No. 70 sieve minimum.

2.7 PLAZA DECK PAVERS

- A. Plaza Deck Pavers: Heavyweight, hydraulically pressed, concrete units, square edged, manufactured for use as plaza deck pavers; minimum compressive strength 6500 psi, ASTM C 140; absorption not greater than 5 percent, ASTM C 140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance according to ASTM C 67.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
 - a. American Hydrotech, Inc.
 - b. Hanover Architectural Products.
 - c. Wausau Tile, Inc.; Terra-Paving Division.
 - d. Westile Roofing Products.
 2. Thickness 2 inches.
 3. Face Size: As indicated.
 4. Color: As selected by Architect from manufacturer's full range.
- B. Paver Supports: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including adjustable pedestals, shims, and spacer tabs for joint spacing of 3/16 inch.
1. Concrete Fill: ACI 301, compressive strength of 5,000 pounds per square inch at 28 days and air content of six percent

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with waterproofing installer and waterproofing manufacturer's representative for compliance with requirements and other conditions affecting installation or performance of waterproofing.
1. Ensure that work done by other trades is complete and ready for waterproofing Work.
 2. Verify that areas and conditions under which waterproofing Work is to be performed permit proper and timely completion of Work.
 3. Notify Architect/Engineer in writing of conditions that may adversely affect installation or performance waterproofing and recommend corrections.
 4. Do not proceed with waterproofing Work until adverse conditions have been corrected and reviewed by Architect/Engineer.
 5. Commencing waterproofing Work constitutes acceptance of Work surfaces and conditions.

3.2 PREPARATION

- A. Clean and prepare substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
 - 1. Test for moisture on new concrete decks by pouring one pint of hot, fluid-applied, rubberized asphalt on deck at start of each day's Work and at start of each roof area or plane. Do not proceed with waterproofing Work if test sample foams or can be easily and cleanly stripped after cooling.
 - 2. If necessary, test for moisture vapor emission by plastic sheet method according to ASTM D4263.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray 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, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.
- F. Verify that concrete curbs, expansion joints, and transitions from one surface plane to another (inside and outside corners) are cleanly formed and free of broken edges and excess concrete.
- G. Shot-blast or scarify concrete to provide clean surface, free of laitance, dirt, and other loose or foreign material.
- H. Uniformly clean concrete surfaces by abrasive blast, according to ASTM D4259, to expose top surface of fine aggregate and provide sound surface, free of laitance, dirt, and other loose or foreign material. Use self-contained, recirculating, blast-cleaning apparatus. Remove remaining loose material and clean surfaces according to ASTM D4258. Produce surface texture equal to CSP 3 or 4 from ICRI Guide for Selecting and Specifying Concrete Surface Preparation.
- I. Waterproofing installer and waterproofing manufacturer's representative shall examine substrate to ensure that it is properly prepared and ready to receive waterproofing. Waterproofing manufacturer's representative shall report in writing to Waterproofing Installer and Architect/Engineer conditions which will adversely affect waterproofing system installation or performance. Do not proceed with waterproofing installation until these conditions have been corrected and reviewed by Architect/Engineer.
- J. Proceed with installation only after unsatisfactory conditions have been corrected. Commencing installation constitutes acceptance of Work surfaces and conditions.

3.3 JOINTS, CRACKS, AND TERMINATIONS

- A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, deck drains, corners, and penetrations according to manufacturer's written instructions.
 - 1. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch thick, and beyond deck drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.
 - 2. Embed strip of reinforcing fabric into a layer of hot rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches on each side of nonmoving joints and cracks not exceeding 1/8 inch thick, and beyond roof drains and penetrations.
- B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches on each side of joints and adhere to substrates in a layer of hot rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.4 FLASHING INSTALLATION

- A. Install elastomeric flashing sheets at terminations of waterproofing membrane according to manufacturer's written instructions.
- B. Begin flashing installation only when weather conditions are conducive to installation of materials. Do not apply in environmental conditions exceeding recommendations of waterproofing manufacturer.
- C. Install flashing according to manufacturer's written instructions at the following:
 - 1. Non-moving cracks and joints.
 - 2. Expansion joints, discontinuous deck to wall, and deck to deck joints.
 - 3. Drains.
 - 4. Penetration at pipes, supports, and vents.
 - 5. Parapet walls, and curbs.

3.5 MEMBRANE APPLICATION

- A. Apply primer, at manufacturer's recommended rate and environmental conditions, over prepared substrate and allow to dry.
 - 1. Do not spray primer onto previously-installed waterproofing.
 - 2. Allow sufficient time for primer to thoroughly dry prior to waterproofing application. Waterproofing will not bond to primer which has not dried.
 - 3. Primer should "tan" concrete surface, not blacken it.
- B. Heat and apply rubberized asphalt according to manufacturer's written instructions.
 - 1. Do not apply in environmental conditions exceeding recommendations of waterproofing manufacturer.

2. Install components of waterproofing system in sequence and in such quantities that entire waterproofing system in Work area is completed by the end of the da
- C. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 90 mils; embed reinforcing fabric, overlapping sheets 2 inches; spread another 125-mil- thick layer to provide a uniform, reinforced, seamless membrane 215 mils thick.
- D. Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.
- E. Cover waterproofing with protection course with overlapped joints while waterproofing is still warm to ensure good bond is achieved.
- F. Provide water cut-offs where and when danger of moisture getting under new waterproofing exists. Install water cut-offs at the end of each workday and completely remove prior to beginning new waterproofing installation Work on next workday. Use materials and methods in accordance with waterproofing manufacturer's written instructions.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Install protection course with ends butted tightly together, before starting subsequent construction activities.
- B. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate according to manufacturer's written instructions. Use methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 1. For vertical applications, install protection course before installing drainage panels.

3.7 INSULATION INSTALLATION

- A. Install insulation over waterproofed surfaces according to manufacturer's written instructions.

3.8 FILTER FABRIC

- A. Install filter fabric in accordance with waterproofing manufacturer's written instructions.
 1. Overlap edges at least 12 inches.
 2. Install filter fabric so that no joints will exist between sheets parallel to and within 6 feet of perimeter.
 3. Extend filter fabric to 3 inches above insulation at perimeter and penetrations.
 4. Install filter fabric at other locations shown on Drawings.

3.9 PLAZA DECK PAVER INSTALLATION

- A. Install concrete pavers in locations indicated according to manufacturer's written instructions.

- B. Accurately install adjustable-height paver pedestals and accessories in locations and to elevations required. Adjust for final level and slope with shims.
- C. Loosely lay pavers on pedestals, maintaining a uniform open joint width. Tightly seat pavers against spacers to eliminate lateral movement or drift of paving assembly. Align joint patterns parallel in each direction.
- D. Install pavers to not vary more than 1/16 inch in elevation between adjacent pavers or more than 1/16 inch from surface plane elevation of individual paver.
- E. Maintain tolerances of paving installation within 1/4 inch in 10 feet of surface plane in any direction.

3.10 FIELD QUALITY CONTROL

- A. Site visits by waterproofing manufacturer's representative. Waterproofing manufacturer's representative shall visit Site at the following times.
 - 1. At beginning of waterproofing installation to establish standard of quality to be used for remainder of waterproofing Work.
 - 2. Periodically during Work at critical times and as required to meet provisions of waterproofing manufacturer's warranty.
 - 3. Submit written report with observations, field decisions, and request for design changes to Architect/Engineer for each Site visit.
 - 4. Coordinate Site visits with Architect/Engineer.
- B. Electric Field Vector Mapping (EFVM).
 - 1. Provide EFVM leak detection in accordance with ASTM D7877 *Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes* for testing of capillary defects and/or breaches in the membrane. Testing, including a written report of the testing results, is to be administered by a qualified testing agency.
 - 2. Test the entire membrane on an area-by-area basis.
 - 3. Wet the entire membrane test area with water prior to the start of each test and maintain wet for the duration of testing. Verify integrity of the membrane at drains and penetrations by localized testing.
 - 4. If a breach is detected, the Applicator shall make repairs according to the follow guidelines:
 - a. Open wet area and allow deck to dry.
 - b. Dry out or replace wet leveling layer.
 - c. Seal membrane, thoroughly probe hot-air welds, and conduct new water test.
 - 5. All costs associated with the re-work shall be borne by the Applicator.
- C. Notify Architect/Engineer 48 hours in advance of testing. Architect/Engineer will observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.

3.11 CLEANING AND PROTECTION

- A. Protect waterproofing from damage and wear during remainder of construction period. Do not permit foot or vehicular traffic on unprotected waterproofing.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction. Exercise care to avoid scratching or damage to surfaces.
- C. Repair surfaces stained, marred, or otherwise damaged during waterproofing Work.
- D. Protect installed board insulation or insulation drainage panels from damage due to ultraviolet light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 1413