

SECTION 07 14 16 – COLD FLUID-APPLIED WATERPROOFING

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold fluid-applied waterproofing, vertical and horizontal deck applications.
2. [Protection course] [Drainage panels] [Insulation] [Insulation drainage panels].

1.2 RELATED REQUIREMENTS

1. Section 03 31 00 "Cast-in-Place Concrete" for moisture curing of concrete waterproofing substrate.
2. Section 04 20 00 "Unit Masonry" for compatibility with flashing components.
3. Division 07 air barrier section for wall waterproofing and interface coordination.
4. Section 07 72 73 "Membrane Leak Detection System" for requirements for EFVM leak detection system installation and membrane leak testing.
5. Section 07 76 13 "Roof Pavers" for requirements for roof ballast and roof decking pavers and support pedestal systems.
6. Section 07 92 00 "Joint Sealants" for joint sealants and accessories and joint preparation.
7. Section 07 95 00 "Expansion Control" for expansion joint systems.
8. Section 32 97 00 "Vegetated Roof Assemblies" for growing media, plantings, filter fabrics, root barriers, and related components.
9. Section 33 46 00 "Subdrainage" for drainage pipe and conduits, drainage panels, and filter fabrics.

1.3 REFERENCES

A. References, General: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section.

B. ASTM International (ASTM): www.astm.org:

1. ASTM C 836 – Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
3. ASTM D 4258 - Standard Practice for Surface Cleaning Concrete for Coating
4. ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
5. ASTM D 4716 - Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
6. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
7. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials

C. U. S. Environmental Protection Agency (EPA): www.epa.gov:

1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Conference: Conduct conference at Project Site.
 - 1. Review requirements for waterproofing products and installation, including surface preparation, substrate conditions, project and manufacturer's details, installation procedures, mockups, testing and inspection requirements, protection and repairs, and coordination and sequencing of waterproofing work with work of other Sections.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of waterproofing product specified, including:
 - 1. Technical data indicating compliance with requirements.
 - 2. Substrate preparation instructions and recommendations.
- B. Shop Drawings: Show locations for waterproofing system components. Show details for each type of substrate, joints, corners, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer[, and waterproofing Inspector].
 - 1. Certification of manufacturer's approval of Installer.
- B. Product Test Reports: Test data for waterproofing products and waterproofing system, by qualified testing agency, indicating proposed waterproofing meets performance requirements, when requested by Architect.
- C. Warranty: Sample of unexecuted manufacturer and installer special warranties.
- D. Field quality control reports.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A manufacturer-approved firm with minimum [three] years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of [three] years experience installing similar work, and able to communicate verbally with Contractor[, Architect,] and employees.
- B. Manufacturer Qualifications: A qualified manufacturer [listed in this Section] with minimum 10 years experience in manufacture of waterproofing as one of its principal products.
 - 1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least five years.
 - 2. Approval of Manufacturers and Comparable Products: [Submit] [Prime bidder must submit] the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Completed and signed Substitution Request form.
 - b. Product data, including certified independent test data indicating compliance with requirements.
 - c. Sample shop drawings from similar project.

- d. Project references: Minimum of five installations of similar system not less than five years old, with Owner and Architect contact information.
 - e. Name and resume of proposed qualified Inspector.
 - f. Sample warranty.
 - C. Waterproofing Inspector Qualifications: An independent party certified as a waterproofing inspector by the SWRI or other certifying organization acceptable to Architect, retained by the Owner and experienced in the installation and maintenance of the specified waterproofing system, qualified to perform observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification.
 - D. Testing Agency Qualifications: Qualified independent agency experienced in the installation of the specified waterproofing system, and qualified to perform observation and inspection specified in Field Quality Control Article to determine Installer's compliance with the requirements of this Project, acceptable to Architect, retained by the Contractor.
 - E. Mockups: Provide waterproofing mockup application within mockups required in other sections, or if not specified, in an area of not less than **150 sq. ft.** of surface where directed by Architect for each type of substrate condition. Include examples of surface preparation, crack and joint treatment, waterproofing application, and flashing, transition, and termination conditions, to set quality standards for execution.
 - 1. Include intersection of deck waterproofing with adjacent vertical waterproofing and moisture control system.
- 1.8 DELIVERY, STORAGE AND HANDLING
- A. Accept materials on site in manufacturer's unopened original packaging.
 - B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by waterproofing manufacturer.
 - C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Division 01 Section ["Construction Waste Management"] ["Temporary Facilities and Controls."]
- 1.9 ENVIRONMENTAL REQUIREMENTS
- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer.
 - 1. Protect substrates from environmental conditions that affect waterproofing performance.
 - 2. Do not apply waterproofing during snow, rain, fog, or mist.
- 1.10 SCHEDULING
- A. Coordinate installation of waterproofing with completion of roofing and other work requiring interface with waterproofing.
 - B. Schedule work so waterproofing applications may be inspected prior to concealment.
 - C. Ensure waterproofing materials are cured before covering with other materials.

1.11 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which waterproofing manufacturer agrees to furnish waterproofing material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.
 - 1. Access for Repair: Owner shall provide unimpeded access to the Project and the waterproofing system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding and overburden materials upon completion of repair.
 - 2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
 - 3. Warranty Period: 5 years date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of waterproofing materials from the following:
 - 1. Movement of the structure caused by structural settlement or stresses on the waterproofing exceeding manufacturer's written specifications for elongation.
 - 2. Mechanical damage caused by outside agents.

PRODUCTS

1.12 MANUFACTURERS

- A. Basis-of-Design Products: Provide waterproofing products manufactured by **AVM Industries, www.avmindustries.com**, [or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements].
- B. Source Limitations: Provide waterproofing system materials and accessory products from single source from single manufacturer.

1.13 PERFORMANCE REQUIREMENTS

- A. General: Waterproofing system shall be capable of performing as a continuous watertight installation and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Waterproofing shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without resultant moisture deterioration.
- B. Compatibility: Provide waterproofing system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by waterproofing manufacturer based on testing and field experience.

1.14 WATERPROOFING MEMBRANE

- A. Cold Fluid-Applied Waterproofing: Single component, high solids, polyurethane, formulated for application to damp and green concrete.
 - 1. Basis of Design Product: **AVM Industries 520**.
 - 2. VOC Content: Less than 75 g/L,
 - 3. Low Temperature Flexibility and Crack Bridging, ASTM C 1305: Pass.
 - 4. Service Temperature: -25°F - 177°F
 - 5. Application Temperature: 40°F - 100°F
 - 6. Tensile Strength (MPa): ≥ 2.79

7. Elongation at Break: 726%
8. Tearing Strength: 15 (N/mm)
9. Solid Content: +95%

1.15 ACCESSORY MATERIALS

- A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete waterproofing system meeting performance requirements, and compatible with waterproofing material and adjacent materials.
- B. Substrate Patching Material: Waterproofing manufacturer's standard trowel-grade filler material.
- C. Primer: As needed, note manufacturer standard installation instructions
- D. Reinforced polyester fabric.
 1. Basis of Design Product: **AVM Mat 800**
- E. Metal Termination Bars: Waterproofing manufacturer's standard aluminum or stainless steel termination bar, with stainless steel fasteners.
- F. Joint Sealant: high performance, UV-stable, non-sag polyurethane sealant approved by waterproofing manufacturer for adhesion and compatibility with waterproofing and accessories.

1.16 PROTECTION COURSE

- A. Protection Course: [Waterproofing manufacturer's standard protection course material recommended for application.] [Provide the following:]
 1. Manufacturer approved Asphaltic Panels

1.17 DRAINAGE PANELS

- A. Drainage Mat: Composite mat with drainage core, filter fabric, and protective polymeric film[, recommended by waterproofing manufacturer for application.] [. Provide the following:]
 1. Dimple Board with Fabric with a minimum compressive strength, ASTM D-1621 of 15,000 PSF
 2. Minimum thickness of 0.4 inches
 - a. Basis of Design: **AVM Drain Board 6000**

1.18 INSULATION

Specifier: Retain "Insulation, General" Paragraph below if specifying insulation in another Section.

- A. Insulation, General: Comply with Section 07 21 00 "Thermal Insulation."

Specifier: Retain "Board Insulation" Paragraph below if board insulation is required over waterproofing and is not specified in another Section. If not indicated on Drawings, insert thickness requirement.

- B. Board Insulation: Extruded-polystyrene board insulation according to ASTM C 578, square or shiplap edged.

Specifier: Type IV and Type VI insulations in first two subparagraphs below are usually limited to vertical applications. Type VII and Type V insulations, with higher compressive strengths, are used on plaza decks.

1. Type VI, 40-psi (276-kPa) minimum compressive strength.
2. Type VII, 60-psi (414-kPa) minimum compressive strength.
3. Type V, 100-psi (690-kPa) minimum compressive strength.

1.19 INSULATION DRAINAGE PANELS

Retain "Unfaced, Wall-Insulation Drainage Panels" paragraph below if required for foundation-wall applications.

- A. Unfaced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation, ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; with shiplap or channel edges and with one side having grooved drainage channels.

Retain "Geotextile-Faced, Wall-Insulation Drainage Panels" paragraph below if required for foundation-wall applications.

- B. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation, ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; with tongue-and-groove edges and with one side having grooved drainage channels faced with a nonwoven-geotextile filter fabric.

Retain "Unfaced, Plaza-Deck, Insulation Drainage Panels" paragraph below if required for horizontal use.

- C. Unfaced, Plaza-Deck, Insulation Drainage Panels: Extruded-polystyrene board insulation, ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength; unfaced; with shiplapped or channel edges and with one side having ribbed drainage channels.

Retain "Geotextile-Faced, Plaza-Deck, Insulation Drainage Panels" Paragraph below if required for horizontal use.

- D. Geotextile-Faced, Plaza-Deck, Insulation Drainage Panels: Extruded-polystyrene board insulation, ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength; with tongue-and-groove edges, with one side having grooved drainage channels, and faced with manufacturer's standard, nonwoven-geotextile filter fabric.

EXECUTION

1.20 EXAMINATION

- A. Surface Condition: Before applying waterproofing materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.

1. Verify concrete and masonry surfaces are free from release agents, curing agents, laitance, and other contaminants. Test for waterproofing adhesion per manufacturer's recommended method. Notify Architect of unsatisfactory conditions.
2. Verify masonry joints are filled with mortar and struck flush.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.21 INTERFACE WITH OTHER WORK

- A. Sequencing of Work: Coordinate sequencing of waterproofing work with work of other sections that form portions of building envelope moisture control to ensure that flashings and transition materials can be properly installed and inspected.
- B. Subsequent Work: Coordinate waterproofing work with work of other sections installed subsequent to waterproofing to ensure complete inspection of installed waterproofing and sealing of waterproofing penetrations necessitated by subsequent work.

1.22 PREPARATION

- A. Clean, prepare, and treat substrates in accordance with waterproofing manufacturer's written instructions.
 1. Mask adjacent finished surfaces.
 2. Remove contaminants and film-forming coatings from substrates.
 3. Remove projections and excess materials and fill voids with substrate patching material.
 4. Prepare and treat joints and cracks in substrate per ASTM D 4258 and waterproofing manufacturer's written instructions.
- B. Detail Preparation: Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations, drains, and changes in plane in accordance with waterproofing manufacturer's written instructions and details, using accessory materials specified. The following are two acceptable options for detail preparation:
 1. Adhere strips of elastomeric sheet to moving expansion joints on both sides in conjunction with a metal termination bar embedded in a layer of cold fluid-applied waterproofing and overlay with coat of cold fluid-applied waterproofing.
 2. Apply single-component urethane within moving expansion joints and overlay with a coat of cold fluid-applied waterproofing.

1.23 WATERPROOFING INSTALLATION

- A. General: Apply waterproofing material to achieve a continuous waterproofing membrane according to waterproofing manufacturer's written instructions. Apply waterproofing material within manufacturer's recommended application temperature ranges.
- B. Start application with manufacturer's authorized representative present.
- C. Cold Fluid-Applied Waterproofing: Apply waterproofing in total wet film thickness and with methods recommended in writing by waterproofing manufacturer.

Specifier: Retain one or more "Application" paragraphs below corresponding to Project requirements.

- D. Standard Application: Vertical or Horizontal:

1. Apply using roller or squeegee or brush or spray.
2. Apply in single pass at minimum thickness of 60 mils (1.5 mm) wet.

E. High-Build Application: Horizontal:

1. Apply using roller or squeegee.
2. Apply in single pass at minimum thickness of 120 mils (3.1 mm) wet.

F. High-Build Application: Vertical:

1. Apply using roller.
2. Apply in two passes at minimum thickness of 90 mils (2.3 mm) wet.

G. Multi-Lift Application:

1. Apply using roller or squeegee.
2. Apply first coat at minimum 60 mils (1.5 mm) wet.
3. Second coat must be installed within 48 hours, while existing film is still tacky.
4. Apply second coat of minimum 60 mils (1.5 mm) wet, for minimum total thickness of 120 mils (3.1 mm) wet.

H. Multi-Lift Application, High-Build:

1. Apply using roller or squeegee.
2. Apply first coat at minimum 90 mils (2.3 mm) wet.

Specifier: Retain "Reinforced Application" subparagraph when recommended by manufacturer for application.

3. Second coat must be installed within 48 hours, while existing film is still tacky.
4. Apply second coat of minimum 125 mils (3.18 mm) wet, for minimum total thickness of 215 mils (5.46 mm) wet.

I. Terminations: Install terminations of waterproofing membrane in accordance with ASTM C 898 Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Separate Wearing Course and ASTM C 1471 Standard Guide for Use of High Solids Content Cold Liquid-Applied Elastomeric Waterproofing Membrane on Vertical Surfaces, as applicable to application, at not less than minimum height recommended by waterproofing manufacturer.

J. Coordination of Testing:

1. Coordinate application of waterproofing membrane with installation of membrane leak detection system specified in Section 07 72 73 "Membrane Leak Detection System."
2. Do not cover waterproofing until it has been tested and inspected by Owner's testing agency.

K. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates and reapply waterproofing components.

1.24 PROTECTION INSTALLATION

Specifier: Retain "Protection Course" or "Drainage Panel" Paragraph as applicable to Project. Coordinate with related work in Section 32 97 00 "Vegetated Roof Assemblies" and Section 33 46 00 "Subdrainage" where applicable.

- A. Protection Course: Cover waterproofing with protection course following curing of waterproofing and prior to backfilling or subjecting installation to traffic. Overlap protection course joints.
- B. Drainage Panel: Place and secure drainage panels using methods that do not penetrate waterproofing. Face geotextile away from deck substrate. Lap edges or abut ends of geotextile.
- C. Insulation: Install one or more layers of board insulation as required, staggering joints. Fit within **1/2 inch (12 mm)** of projections and penetrations.
 - 1. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1.25 FIELD QUALITY CONTROL

- A. Contractor's Inspector: Contractor shall engage manufacturer's qualified Inspector full-time during the Work to perform tests and inspections, including documenting of waterproofing prior to concealment.
 - 1. Contractor's Inspector shall measure membrane thickness with a wet film gauge during the application process at least once for every **100 sq. ft. (10 sq. m)**.
 - 2. Provide written report of tests and inspections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

Retain "Testing Agency" Paragraph below if applicable to Project, and edit to identify party retaining independent agency to perform tests and inspections.

- C. Testing Agency: **[Owner will engage] [Engage]** a qualified testing agency to inspect substrate conditions, surface preparation, waterproofing application, protection, and drainage components, and to furnish reports to Architect.
 - 1. Testing includes EFVM inspection prior to concealing deck waterproof membrane as specified in Section 07 72 73 "Membrane Leak Detection System."
- D. Coordination of Inspection: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
 - 1. Do not cover Work until testing and inspection is completed and accepted.
- E. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.
- F. Correction of Work: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

1.26 CLEANING AND PROTECTING

- A. Clean spills, stains, and overspray resulting from application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.
- B. Protect waterproofing from damage from subsequent work. Protect waterproofing materials from exposure to UV light for period in excess of that acceptable to waterproofing manufacturer; replace overexposed materials and retest.

END OF SECTION