

SECTION 07 14 16 - COLD FLUID APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cold fluid applied waterproofing systems **WPS-01** and supplementary items necessary for installation.
- B. Related Work:
 - 1. Refer to Owner Building Enclosure Commissioning Plan for Field Observations and Performance Testing Activities.
 - 2. Division 07, Section 07 21 00 "Thermal Insulation" for board insulation requirements.
 - 3. Division 07, Section 07 13 26 "Sheet Waterproofing" for horizontal waterproofing requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
 - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings: Show locations and extent of waterproofing and details for each condition encountered in Work.
 - 1. Include substrate joints and crack treatments, flashing sheets, penetrations, inside and outside corners, vertical intersections, slope, expansion joints, tie-ins with adjoining waterproofing, transitions, and other membrane terminations.
 - 2. Show transitions to sheet waterproofing membrane and detail requirements for warranty of waterproofed structures.
 - 3. Include waterproofing manufacturer written approval of shop drawings prior to submission.
- C. Samples for Verification: For each of the following components, 12 by 12 inches (300 by 300 mm) or manufacturer's standard size:
 - 1. Membrane: Cured membrane on solid backing layered to indicate various components, including reinforcing.
 - 2. Rigid and flexible protection boards.
 - 3. Prefabricated drainage course.
 - 4. Extruded board insulation.
 - 5. Drainage panel.
- D. Sustainable Design Submittals:
 - 1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
 - a. Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
 - b. Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
 - 1) Include statement indicating costs for each product having recycled content.

- c. Regional Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.
 - 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.
 - 1. Submit the following certifications prior to installation:
 - a. Concrete Substrate: Manufacturer shall certify that concrete substrate condition and corrections, if necessary, comply with waterproofing manufacturer installation guidelines.
- B. Field quality-control reports: Written report of testing and inspection required by "Field Quality Control".
- C. Warranties: Provide manufacturer's written warranty covering materials and installation (labor) stating obligations, remedies, limitations, and exclusions.
- D. Sustainable Design Submittals:
 - 1. Building Product Disclosure and Optimization - Environmental Product Declarations
 - a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
 - 2. Building Product Disclosure and Optimization - Material Ingredients
 - a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000ppm) with at least one of the following:
 - 1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
 - 2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
 - 3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
 - 4) Living Product Challenge
 - 5) Product Lens Certification
 - 6) USGBC approved program.
 - b. Material Ingredient Optimization: Submit documentation confirming chemical inventory of products to at least 0.01 % (100ppm) and/or that has a compliant material ingredient optimization report with at least one of the following:
 - 1) Submit GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
 - 2) Submit third-party verified documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
 - 3) Submit third-party verified Cradle to Cradle v3 Material Health certificate at the Bronze Level or better
 - 4) Submit third-party verified Declare product label indicating that all ingredients have been disclosed down to 100 ppm
 - 5) Submit third-party verified documentation that product is Living Product Challenge certified with a Red List Free or LBC Red List Free Declare label.

- 6) Submit documentation that product has a manufacturer prepared action plan with material inventory to at least 1000 ppm.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.
 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar in scope of this Project.
 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar in scope of this Project.
 3. Manufacturer Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer to install products.
- B. Quality Standards:
 1. Unless otherwise recommended by waterproofing system manufacturer, provide waterproofing system in accordance with recommendations of the NRCA "Roofing and Waterproofing Manual" for waterproofing type indicated.
- C. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate qualities of materials and execution. Build mock-up using materials indicated for the completed Work.
 1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect.
 - a. Size: 100 sq. ft. (9.3 sq. m) in area.
 - b. Description: Each type of wall installation.
 2. Include accessories and demonstrate surface preparation, sealing at penetrations, crack and joint treatments, inside and outside corner treatments, and protection.
 - a. Include adhesion testing on mock up area.
 3. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
 4. Obtain Architect's acceptance of mock-ups before starting fabrication or installation.
 5. Acceptance of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - a. If Architect determines mock-up does not comply with requirements, reconstruct mock-ups until accepted.
 6. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.

1.6 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.
 1. Participants:
 - a. Architect.
 - b. Contractor, including superintendent.

- c. Installer, including project manager and supervisor.
- d. If requested, Manufacturer's qualified technical representative.
- e. Installers of other construction interfaced with Work.
- f. Testing agency.
- 2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
 - a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
 - b. Review Contract Document requirements.
 - c. Review approved submittals.
 - d. Review inspection and testing requirements.
 - 1) Review field quality control requirements for adhesion testing and water testing.
 - e. Review environmental conditions and procedures for coping with unfavorable conditions.
 - f. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.
 - g. Review deck substrate requirements for conditions and finishes, including presence of moisture.
 - 1) Review curing compounds, form release agents and concrete mix design for compatibility with membrane manufacturer.
 - h. Review base flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affects system.
 - i. Review governing regulations and requirements for insurance and certificates if applicable.
 - j. Review temporary protection requirements for waterproofing during and after installation.
 - k. Review observation and repair procedures after installation.
- 3. Record discussions, including decisions and agreements, and prepare report.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.
- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- D. Store rolls according to manufacturer's written instructions.
- E. Protect stored materials from direct sunlight.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.

- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.9 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

1.10 WARRANTY

- A. Manufacturer Warranty: Furnish manufacturer's written "Total System" warranty signed by an authorized representative using manufacturer standard form, without monetary limitation (NDL), agreeing to provide materials and labor required to repair or replace Work which exhibits defects in materials or workmanship within specified warranty period. "Defects" is defined to include, but not limited to, deterioration or failure to perform as required.
 - 1. Warranty Period: Manufacturer shall warrant the products to be free from material and labor Defects for a period of 15 years from date of Substantial Completion.
 - a. Warranty includes removing and reinstalling waterproofing, flashings, counter-flashings, insulation, accessories, other components of waterproofing system.
 - b. Warranty includes interfacing with integral with waterproofing system specified in Division 07, Section 07 13 26 "Sheet Waterproofing".
- B. Installer Warranty: Furnish installer written warranty signed by an authorized representative using installer standard form agreeing to provide materials and labor required to repair or replace Work which exhibit defects in materials or workmanship within specified warranty period. "Defects" is defined to include, but not limited to, deterioration or failure to perform as required.
 - 1. Warranty Period: Installer shall warrant the installation to be free from workmanship Defects for a period of 2 years from date of Substantial Completion.
 - a. Warranty includes removing and reinstalling waterproofing, flashings, counter-flashings, insulation, accessories, other components of waterproofing system.
 - b. Warranty includes interfacing with integral with waterproofing system specified in Division 07, Section 07 13 26 "Sheet Waterproofing".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, manufacturers offering products that may be incorporated into the Work include, but are not limited to, those listed.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.
 - 1. Provide waterproofing materials, protection course, and molded-sheet drainage panels from single source from single manufacturer.
 - 2. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

- B. Material Compatibility: Provide waterproofing materials that are compatible with one another under conditions of service and application required, as demonstrated by manufacturer based on testing and field experience.

2.3 PERFORMANCE REQUIREMENTS

- A. General: Provide cold fluid applied waterproofing systems that prevent the passage of liquid water. Waterproofing shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without deterioration.

2.4 COLD FLUID APPLIED WATERPROOFING MEMBRANE

- A. Two Component Elastomeric Waterproofing Membrane **WPS-01**:
1. Description:
 - a. Two (2) component, self-curing, 100% solids monolithic elastomer membrane, ASTM C836/C836M, minimum 0.060 inches (1.5 mm) DFT thickness with the following physical properties.

Property	Test Method	Typical Value
Solids Content	ASTM D1644	100 percent minus 3%
Flexibility (Pliability),	ASTM D1970 or ASTM C836	Unaffected
Elongation	ASTM D412	350 percent minimum
Peel Adhesion to Concrete	ASTM D903 Modified*	Approximately 880 N/m (5 lbs./in.) plus or minus 5%

2. Manufacturer and Product:
 - a. Carlisle Coatings & Waterproofing MiraSeal
 - b. GCP Applied Technologies; Procor
 - c. Henry CM100
 - d. W.R. Meadows Inc Hydralastic 836
 - e. Or approved equal.
- B. Membrane-Reinforcing Fabric: Manufacturer's recommended fiberglass mesh or polyester fabric, manufacturer's standard weight.
- C. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.

2.5 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing.
1. Substrate Repair Materials: As recommended by waterproofing manufacturer.
 2. When required by waterproofing manufacturer, obtain Engineer of Record's approval to use manufacturer's recommended waterstops to meet warranty requirements.
- B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated

- C. Elastomeric Flashing Sheet: 60 mils (1.5 mm) minimum thickness, non-staining, uncured sheet neoprene.
- D. Termination Bars: ASTM A 666, Type 304 formed stainless-steel bars; 2 types, one flat and one flat with upper flange shaped to receive sealant, locations as indicated; 1 in by 1/8 in (25 mm by 3 mm) thick; predrilled at 8 in (200 mm) centers; with stainless steel fasteners. Aluminum or plastic bars not allowed.
- E. Sealants and Accessories: Waterproofing manufacturer's recommended sealants and accessories.
- F. Miscellaneous Accessories: Provide preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, stainless steel draw bands and other accessories required for complete installation.

2.6 MOLDED-SHEET DRAINAGE PANELS

- A. Molded-Sheet Drainage Panel with Polymeric Film, Vertical Applications: 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 laminated to one side of the core and a polymeric film bonded to the other side (facing waterproofing).
 - 1. Drainage Core: Three-dimensional, non-biodegradable, molded polypropylene or polystyrene.
 - a. Minimum Compressive Strength: 15,000 lbf/sf (718 kPa) according to ASTM D 1621.
 - b. Minimum In-Plane Flow Rate: 15 gpm/ft (188 L/min per m) of unit width at hydraulic gradient of 1.0 and compressive stress of 25 psi (172 kPa) according to ASTM D 4716
 - 2. Manufacturers and Products:
 - a. Carlisle Coatings & Waterproofings; CCW MiraDRAIN 6200.
 - b. GCP Applied Technologies; Hydroduct 220.
 - c. Tremco, Inc.; TREMDrain 2000.
- B. Adhesive for Bonding Drainage Panels: Product compatible with drainage panels being bonded and with demonstrated capability to bond securely to substrates indicated without damaging substrates.

2.7 BOARD INSULATION

- A. Extruded Polystyrene Board Insulation: As specified in Division 07, Section 07 21 00 "Thermal Insulation".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner

complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

1. Verify that openings and penetrations are in place and set and braced and that drains are securely clamped in place.
2. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
3. 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 or as recommended by manufacturer.
4. Verify that concrete curing compounds and form oils that will impair adhesion of waterproofing components to substrate have been removed.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
1. Respective manufacturer's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Dewatering: Verify that the waterproofing application area is dry and free of standing and uncontrolled water. Should the dewatering system fail at any time during application of waterproofing system, the materials shall be completely removed, and work shall start over with new materials once the area is dry and free of water again.
- C. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- D. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- E. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- F. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
1. When recommended by waterproofing manufacturer, abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D4258.
 - a. Adhesion Testing: Prior to installation of membrane, test adhesion to substrate using manufacturer's recommended test procedure.

- G. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

3.4 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

- A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C898/C898M and ASTM C1471/C1471M.
- B. Waterproofing Tie-Ins: Install waterproofing and accessories to tie into adjacent waterproofing to ensure watertight installation.
- C. Termination and Penetration Treatment: Prepare vertical and horizontal surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, and sleeves.
 - 1. Unless indicated otherwise, terminate top edges of sheets under metal counterflashings or with metal termination bars and sealants.
- D. Flexible Flashings: Install elastomeric flashing sheet at all inside and outside corners and transitions in plane, extending a minimum 6 in (150 mm) onto deck and minimum 8 in (200 mm) onto wall and parapet substrates.
- E. Metal Termination Bars: Install and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of waterproofing.

3.5 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C898/C898M and ASTM C1471/C1471M. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D4258.
 - 1. Comply with ASTM C1193 for joint-sealant installation.
- B. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's written instructions.
 - 1. Extend sheet flashings onto perpendicular surfaces and items penetrating substrate as recommended by waterproofing manufacturer.

3.6 INSTALLATION OF WATERPROOFING

- A. Apply waterproofing according to manufacturer's written instructions and to recommendations in ASTM C898/C898M and ASTM C1471/C1471M.
- B. Primer: Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.
- C. Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.
 - 1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes.
 - 2. Apply waterproofing to prepared wall terminations and vertical surfaces.

3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).
- D. Reinforced Waterproofing Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.
 1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes.
 2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.
 3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).
- E. Cure waterproofing, taking care to prevent contamination and damage during application and curing.
- F. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
 1. Molded-sheet drainage panels or insulation panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.
- G. Damaged Waterproofing: Repair waterproofing not complying with requirements.
 1. Repair damaged waterproofing in accordance with the manufacturer's written repair procedures.

3.7 BOARD INSULATION INSTALLATION

- A. Install board insulation over waterproofed area designated on the Drawings in accordance with Division 07, Section 07 21 00 "Thermal Insulation".
- B. Install air layer between board insulation and concrete toppings or reinforced mortar setting beds. Overlap geotextile fabric with adjacent sheets as recommended by manufacturer.

3.8 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Manufacturer's qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.
 1. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.
- B. Testing Agency: The Owner may employ and pay a qualified independent testing agency to perform field quality control. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor expense.
 1. Refer to Owner's Building Enclosure Commissioning Plan for Field Observations and Performance Testing Activities.

- C. Adhesion Testing: Perform adhesion testing at designated locations or one test per 1000 sq ft. Contractor, manufacturer's technical representative, Architect and Waterproofing Consultant shall mutually agree upon adhesion test methods during pre-construction meeting.
 - 1. Repair membrane damage resulting from testing per manufacturer recommendations.
- D. Correction of Deficiencies: Waterproofing will be considered defective if it does not pass tests and inspections.
 - 1. Correct deficiencies in or remove waterproofing that does not comply with requirements: repair substrates, reapply waterproofing, and repair flashing until waterproofing installation is watertight.
 - 2. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be performed at Contractor's expense.
- E. Final Inspection: Arrange for waterproofing system manufacturer's qualified technical representative to inspect waterproofing installation on completion of waterproofing membrane and flashing. Notify Architect and Owner 48 hours in advance of date and time of final inspection.
- F. Prepare test and inspection reports.

3.9 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed insulation 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.
- D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION