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075423 - TPO Roofing

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SECTION 07 5423 - TPO ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. The work under this Section consists of furnishing and installing all roofing and waterproofing related items as indicated on the drawings and specified herein for a Rhino bond, mechanically attached, reinforced Thermoplastic roof system and includes, but is not limited to, the following:
 - 1. Contractor is to do all roofing work necessary to accommodate all structural, mechanical, plumbing, and electrical penetrations.
 - 2. The installation of all related flashing work to accommodate the new membrane. All flashings shall be installed permanently and concurrently with the roof membrane in order to maintain a water-tight condition as the work progresses. Temporary flashings are not allowed.
 - 3. The drawings indicate and show the limits of construction for this project. The specifications specify materials and work requirements for this project. Both are complimentary to each other and both shall be followed to complete the work.

1.2 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 for definition of terms related to roofing work not otherwise defined in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet membrane roofing and base flashing that are watertight; will not permit the passage of liquid water; and will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.
- C. FM Listing: Provide sheet membrane, base flashings, and component materials that meet requirements of FM 4450 and FM 4470 as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
 - 1. Roofing system shall comply with the following:
 - a. Fire/Windstorm Classification: Class I 60.

1.4 SUBMITTALS

- A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.
- B. Shop Drawings: Include plans, sections, and details of the following:
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes (if applicable).
- C. Samples for Verification: Of the following products:
 - 1. 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. 12-by-12-inch (300-by-300-mm) square of walkway pads.
 - 3. 12-inch (300-mm) length of metal termination bars.
 - 4. 12-inch (300-mm) length of battens.
 - 5. 6 insulation fasteners of each type, length, and finish.
 - 6. 6 roof cover fasteners of each type, length, and finish.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that the roofing system complies with requirements. Upon request, submit evidence of meeting requirements.
- F. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of components of roofing system with requirements based on comprehensive testing of current product compositions.
- G. Research/Evaluation Reports: Evidence of roofing system's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- H. Maintenance Data: For roofing system to include in the maintenance manuals.
- I. Warranty:
 - 1. Manufacturer: 15 year labor and material, System Warranty.
 - 2. Contractor: 2 year from date of substantial completion.
- J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- K. Installation/Membrane fastener layout to conform with FM 1-60, provided by manufacturer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing roofing similar to that required for this Project and who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product.
- B. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and slopes indicated.
- C. Preconstruction Meeting: Before installing roofing system, conduct conference at Project site to comply with requirements. Notify participants at least 5 working days before conference.
 - 1. Meet with Owner; Owner's representative; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review loading limitations of deck during and after roofing.
 - 4. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
 - 5. Review governing regulations and requirements for insurance, certificates, and inspection and testing, if applicable.
 - 6. Review temporary protection requirements for roofing system during and after installation.
 - 7. Review roof observation and repair procedures after roofing installation.
 - 8. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.
 - 9. Discuss coordination with local fire department, if applicable.
 - 10. Discuss compliance with owner's safety procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and 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 containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid materials from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

1.8 WARRANTY

- A. Standard Roofing Manufacturer's Warranty: 15 year labor and material, System Warranty.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including membrane roofing, sheet flashing, and fasteners for the following warranty period:
1. Warranty Period: 2 years from date of Substantial Completion.

1.9 MANUFACTURER'S REPRESENTATIVE

- A. A manufacturer's technical representative shall visit the sites at the initial application of his product and as often as required by the Contractor and Owner's Representative to ensure the specifications and recommendation are followed.
- B. At the completion of the job, the contractor and manufacturer shall each submit their guarantees to the owner. Additionally, they shall submit an Inspection and Maintenance Schedule to the owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. PVC Sheet:
 - a. Sarnafil Inc.
 2. Membrane, insulation and accessories shall be purchased through the primary membrane manufacturer.
 3. TPO Sheet:

- a. Firestone.
- b. Carlisle.

2.2 ROOF MEMBRANE

- A. PVC Sheet: Uniform, flexible sheet formed from polyvinyl chloride with plasticizers and modifiers, complying with ASTM D 4434, of the following type, grade, thickness, and exposed face color:
 1. Sarnafil:
 - a. Field Sheet: S327 .060, mechanically attached.
 - b. Flashing Sheet: G459.
 - c. Exposed Face Color: White (Energy White).
- B. TPO Sheet:
 - a. Field Sheet: .060, mechanically attached sheet.
 - b. Flashing Sheet: .060 TPO.
 - c. Exposed Face Color: White (Energy White).
 - d. Sika plan may be used, if approved.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing material.
 1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, thickness, and color as sheet membrane.
- C. Bonding Adhesive:
 1. Manufacturer's approved solvent based adhesive.
- D. Metal Termination Bars: Manufacturer's standard aluminum bars, approximately 1 inch (25 mm) wide, roll formed and prepunched.
- E. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1-inch (25 mm) wide by 0.05 inch (1.3 mm) thick, prepunched.
- F. Fasteners: Factory-coated steel fasteners.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, seam caulk, termination reglets, and other accessories recommended by roofing system manufacturer for intended use.

2.4 WALKWAYS

- A. Manufacturer's walkway pad.
- B. Install around four (4) sides of all serviceable equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.
- B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.
- D. Contractor is responsible for using sheet roofing which will not be contaminated by coal tar or asphalt residue. Provide protective ship sheets if required. Contractor will be required to replace membrane damaged by coal tar or asphalt.

3.2 PREPARATION

- A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of the roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 THERMOPLASTIC SHEET INSTALLATION

- A. Install reinforced thermoplastic sheet over area to receive roofing according to roofing system manufacturer's written instructions. Unroll sheet and allow to relax for a minimum of 30 minutes.
- B. Start installation of sheet in presence of roofing system manufacturer's technical personnel.
- C. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

- D. Mechanically fasten sheet securely at terminations and perimeter of roofing.
- E. Apply roofing sheet with side laps shingled with slope of roof deck where possible.
- F. Spread sealant bed over deck drain flange at deck drains and securely seal roofing sheet in place with clamping ring.
- G. Install adhered thermoplastic sheet and auxiliary materials to tie in to existing roofing
- H. Contractor shall make extensive efforts to protect finished membrane from dirt dust and smudge marks by tarping or covering finished sections while demolition operations. Workers should change footwear and/or wear protective “booties” while installing new sheet. Contractor shall clean new membrane at completion of work.

3.4 SEAM INSTALLATION

- A. Clean seam areas, overlap sheets, and weld side and end laps of sheets and flashings according to manufacturer's written instructions to ensure a watertight seam installation. Weld seam as follows:
 - 1. Weld Method: Hot air.
- B. Test lap edges with probe to verify seam weld continuity. Apply seam caulk to seal cut edges of sheet membrane.
- C. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.5 FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrate according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of flashing sheet at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing as recommended by manufacturer.
- D. Clean seam areas, overlap sheets, and firmly roll flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Test lap edges with probe to verify seam weld continuity. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- F. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- G. All base flashings are to be fully adhered to underlying substrates with no loose or wrinkled sections. This requirement extends beyond the manufacturers level of acceptance.

3.6 WALKWAY INSTALLATION

- A. Walkways: Install walkway pads in locations indicated. Heat weld and adhere walkway pads to substrate with compatible adhesive according to roofing system manufacturer's written instructions.
- B. Install around all serviceable equipment (4) sides.

3.7 FIELD QUALITY CONTROL

- A. Verify field strength of seams a minimum of twice daily, according to manufacturer's written instructions, and repair seam sample areas.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Owner's Representative or Owner 48 hours in advance of the date and time of inspection.

3.8 PROTECTING AND CLEANING

- A. Protect sheet membrane roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair sheet flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures required by manufacturer of affected construction.

END OF SECTION 07 5423