SECTION 075423 - THERMOPLASTIC MEMBRANE ROOFING

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.

1.2 SUMMARY

A. This Section includes the following:
   1. Mechanically fastened TPO membrane roofing system.
   2. Roof insulation related to TPO membrane roofing.
   3. Cover board.
   4. Roof accessories and walkway pads.

B. Related Sections include the following:
   1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Division 07 Section "Building Insulation" for insulation beneath the roof deck.
   3. Division 07 Section "Fluid-Applied Air/Vapor Barrier System" for tie-in with roof system.
   4. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
   5. Division 22 Sections for roof drains.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

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

C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
   1. Corner Uplift Pressure: 74 lbf/sq. ft..
   2. Perimeter Uplift Pressure: 50 lbf/sq. ft..
   3. Field-of-Roof Uplift Pressure: 36 lbf/sq. ft..

D. Roof flashing details shall be consistent with those shown on Drawings. Where cap flashing is shown, a standard manufacturer's bar anchor only detail is not acceptable. Membrane manufacturer's recommended flashing detail may be considered by the Architect when no detail is provided.

1.5 SUBMITTALS

A. Submit in accordance with Division 01 Section "Submittal Procedures."

B. Product Data: For each type of product indicated. Provide installation instructions and general recommendations from manufacturer of thermoplastic membrane roofing system for types of roofing materials required.

C. Shop Drawings: Submit shop drawings for roofing system approved by the manufacturer showing roof configuration, sheet layout, seam locations, colors (as applicable), details at perimeter, penetration and flashing details, attachments to adjacent Work, and special conditions. Customized detail sheets shall be prepared by manufacturer, showing each condition and approved installation method conforming with the construction drawing constraints and details.
   1. Base flashings and membrane terminations.
   2. Layout of tapered insulation and cricket materials, including slopes.
   3. Roof flashing details shall be consistent with those shown on Drawings. Where cap flashing is shown, a standard manufacturer's bar anchor only detail is not acceptable. Membrane manufacturer's recommended flashing detail may be considered by the Architect when no detail is provided.

D. Samples for Verification: For the following products:
   1. 12-by-12-inch square of sheet roofing, of color specified.
   2. Blank sample of manufacturer's warranty forms.

E. Installer Qualification Data: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

F. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of meeting performance requirements.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
   1. Insulation Test Reports: Evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

H. Maintenance Data: For roofing system to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is factory trained and licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty. Contractor shall have a minimum of 5 years experience installing specified system, shall have installed a minimum of 500,000 square feet, and shall employ personnel experienced and skilled in application of manufacturer's roofing system.
   1. Work associated with thermoplastic membrane roofing including, but not limited to, insulation, flashing, and membrane sheet joint sealers, shall be performed by Installer of this Work.

B. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.

C. Source Limitations for Roofing Products: Obtain components for membrane roofing system from or approved by roofing membrane manufacturer.

D. Source Limitations for Insulation Products: Obtain each type of roof insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
   1. Insulation shall be approved by roofing manufacturer for use with roofing system for a total system warranty.

E. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Insulation Fire Performance Characteristics: Provide insulation and related materials with fire-test- response characteristics specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
   1. Surface Burning Characteristic: ASTM E 84.
   2. Fire Resistance Ratings: ASTME E 119.
   3. Combustion Characteristics: ASTM E 136.

H. Roofing work shall be applied in strict accordance with provisions of specification criteria. No deviations shall be permitted without written consent from the Architect. Should a conflict between this specification and manufacturer's requirements arise, the most restrictive provision as determined by the Architect shall govern.

I. Inspection Report: Upon completion of installation, an inspection shall be made by system manufacturer to ascertain that roofing system has been installed according to applicable

manufacturer's specifications and details. No "early bird" warranty will be accepted. Results of the warranty inspection shall be submitted in writing to the Owner and Architect for their review and records.

J. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
   1. Meet with Owner, Architect, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories, skylights, and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   5. Review structural loading limitations of roof deck during and after roofing.
   6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   7. Review governing regulations and requirements for insurance and certificates if applicable.
   8. Review temporary protection requirements for roofing system during and after installation of sloped roof framing and roof installation.
      a. Review staging, material placement, construction activity and pedestrian traffic protection requirements for work areas and access paths to areas where work will occur on completed membrane roofing.
   9. Review roof observation and repair procedures after roofing installation.
      a. Establish monitoring procedures for construction activities and recording of damage by sub-trades.
   10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
   11. Provide 5 business days minimum advance notice to participants prior to convening preinstallation conference.

1.7 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, shelf life, approval or listing agency markings, and directions for storing and mixing with other components. Comply with manufacturer's written instructions for proper material storage.

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 material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life. Replace discarded materials at no additional cost to Owner.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location on pallets at least 4 inches off the ground protected from direct sunlight. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
   1. Insulation and cover board shall be stored on pallets, not less than 4 inches off ground, tightly covered with waterproof, "breathable" materials. Protect insulation from direct sunlight.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

E. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat, and cold by covering, patching and sealing, enclosing, ventilation, cooling and/or heat.

F. Materials, which are damaged, shall be removed and replaced at Installer's expense.

G. Materials shall be delivered in sufficient quantity to allow continuity of Work.

H. Do not overload any portion of the building, new or existing, either by use of or placement of equipment, storage of debris, or storage of materials. Construction loads shall not exceed 25 pounds per square foot.

I. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat, and cold by covering, patching and sealing, enclosing, ventilation, cooling and/or heat.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Upon completion of sloped roof framing and roofing, membrane roofing shall be inspected for possible damage from installation of sloped roofing.

C. Substrate Conditions: Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition. All surfaces shall be smooth, dry, clean, free of fins or sharp edges, loose or foreign materials, oil or grease. No work shall proceed when moisture is present on roof or in substrate materials.

D. Temporary waterstops shall be installed at end of each workday and shall be removed before proceeding with next day's work.

E. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.

F. Take precautions to prevent drains from clogging during roofing application. Remove debris at completion of each day's work and clean drains, if required. At completion, test drains to ensure system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.

G. If exterior walls are not erected at time of membrane installation, envelope flutes of metal deck to prevent moisture intrusion and wind damage.

H. Coordinate work with that of other trades effecting or effected by Work of this Section. Cooperate with such trades to ensure steady progress of all work under this contract.

1.9 WARRANTY

A. General: Special Warranties specified in this Section shall not deprive Owner of other rights Owner may have under other provisions of Contract Documents and will be in addition to and run concurrent with other warranties made by Contractor under requirements of Contract Documents.

B. Special Warranty: Roofing Contractor shall furnish to Owner the manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks. The maximum wind speed coverage shall be peak gusts of 72 mph measured at 10 meters above ground level. Warrantor shall be the manufacturer of the roofing membrane. Warranty shall be written to building Owner.
1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, walkway products, and other components of membrane roofing system.
2. Warranty Period: 15 years from date of Project Substantial Completion.

C. When the Warrantor is notified that there is a problem (leak or damage) with warranted roofing system and/or accessories by telephone, and/or in writing (fax or mail), the response time to physically start repairs shall be within twenty-four hours from time of telephone or date of written notification.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet (TPO): ASTM C 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet, and as follows:
1. Products:
a. Sure-Weld Roofing System; Carlisle SynTec Incorporated.
b. UltraPly TPO Roofing System; Firestone Building Products Company.
c. VersiWeld; Versico Inc.
2. Thickness: 60 mils, nominal.
3. Exposed Face Color: Gray.
4. Physical Properties:

a. Breaking Strength: 225 lbf; ASTM D 751, grab method.
b. Elongation at Break: 15 percent; ASTM D 751.
c. Tearing Strength: 55 lbf minimum; ASTM D 751, Procedure B.
d. Brittleness Point: Minus 22 deg F.
e. Ozone Resistance: No cracks after sample, wrapped around a 3-inch- diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F and an ozone level of 100 pphm; ASTM D 1149.
f. Resistance to Heat Aging: 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 166 hours at 240 deg F; ASTM D 573.
g. Water Absorption: Less than 4 percent mass change after 166 hours' immersion at 158 deg F; ASTM D 471.
h. Linear Dimension Change: Plus or minus 2 percent; ASTM D 1204.

2.3 AUXILIARY MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard bonding adhesive for membrane and base flashings. Provide adhesives that will withstand Project wind uplift requirements.

D. Crickets and Flashing Accessories: Types recommended by membrane manufacturer, including adhesive tapes, flashing cements, and sealants.
1. Crickets: Johns Manville tapered factory pre-cut crickets, extending to roof drain sumps.

E. Fasteners: Factory-coated steel or stainless steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

F. Adhesives and Cleaners: Provide bonding adhesive, edge sealant, water cut-off mastic, splicing cement, sealer, and membrane cleaner specifically formulated by the roofing manufacturer for the intended purpose and as required for a complete roof system. Provide adhesives that comply with project requirements to withstand specified uplift pressures.

G. Pipe Flashing: Provide membrane manufacturer's standard pre-moldeded flashing boot for flashing around pipe and conduit roof penetrations. Provide cone shaped flashing boot, heat welded to membrane with stainless steel clamping ring. Field-formed pipe flashing not allowed.

H. Expansion Joint Bulb: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible, closed-cell polyethylene foam, nonabsorbent to liquid water and gas; size as needed to meet expansion joint conditions.

I. Roof walkways shall be pre-molded walkways as supplied by the membrane manufacturer.

J. Miscellaneous Accessories: Provide preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces, CAN/ULC S770, Grade 2, 20 psi minimum, LTTR R-values. Provide 2 equal layers of insulation for a total thickness indicated, except as noted otherwise.
   1. Products:
      a. Polyiso HP-H; Carlisle SynTec Incorporated.
      b. Hy-Therm AP; Celotex Corporation.
      c. ISO 95+; Firestone Building Products Company.
      d. E'nrg'y 2; Johns Manville International, Inc.
   2. Provide roofing manufacturer's required insulation for total system warranty.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.
   1. Tapered insulation shall meet requirements specified for board roof insulation. Provide tapered boards where indicated.
   2. Tapered insulation at roof drains shall slope 1/2 inch per 12 inches, unless otherwise indicated.
   3. Tapered insulation shall be manufactured by same manufacturer of board roof insulation.

D. Provide preformed crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.5 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel or stainless steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Cover Board: High-density, closed-cell polyisocyanurate foam core laminated to coated glass-mat, water-resistant facer; 1/2-inch thick.
   1. Compressive Strength: ASTM D 1621, minimum 100 psi.
   2. Water Absorption: ASTM C 209, less than 3 percent volume.
   3. Products:
      a. Carlisle SynTec Incorporated; Securshield HD Cover Board Insulation.
      b. Firestone Building Products Company; Isogard HD.
      c. Versico Roofing Systems; Securshield HD Cover Board Insulation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."

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

3.2 PREPARATION

A. General: Comply with manufacturer's instructions to prepare substrate to receive TPO membrane roof system.

B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

C. 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.

D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of 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 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated, or if not indicated, as required for positive drainage to roof drains.

D. Install insulation in two layers under area of roofing to achieve required thickness. Install layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 12 inches in each direction with no gaps, to form a complete thermal envelope.
1. Install tapered insulation and crickets to provide positive slope to drains without ponding of water.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Install cover board over insulation with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows, and joints offset from insulation joints below. Tightly butt cover boards together.

H. Mechanically Fastened Insulation: Install insulation, tapered insulation, and cover board and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type to deck type.
   1. Fasten insulation according to resist ASCE 7 uplift pressures, but in no case, provide less than one anchor per 4 sq. ft. of surface area (8 fasteners per 4 x 8 foot board).
      a. In no case shall there be less than 2 fasteners per piece of board.
   2. Fasten to resist specified uplift pressure at corners, perimeter, and field of roof.
   3. Screws shall be installed utilizing automatic, positive clutch disengaged and adjustable nosepiece.
   4. Install tapered edge strips at edges of tapered insulation to provide smooth transition to flat areas, free of gaps and voids.

I. Do not install more insulation in a day than can be covered with membrane before end of day or before start of inclement weather.

3.4 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

A. Mechanically fasten membrane roofing over area to receive roofing according to roofing system manufacturer's written instructions and approved Shop Drawings. Unroll roofing membrane without stretching and allow to relax before installing.
   1. Install sheet according to ASTM D 5082.
   2. In areas where underside of metal deck will remain exposed, locate fasteners so they penetrate high flutes only.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps. Position sheets to accommodate contours of the roof deck to avoid bucking water.

D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane per manufacturer's requirements.
   2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
   3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
      a. Cut out and repair membrane defects at the end of each day's work.

G. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.

I. Perimeter membrane areas left exposed prior to fascia installation shall either be fully adhered to the vertical face or retained by a continuous cleat. Membrane shall extend down wall at least 1 inch past bottom of the wood nailer, lapping over the wall finish, but not exposed below the flashing.

3.5 BASE FLASHING INSTALLATION

A. Flashing of parapets, curbs, and other parts of the roof shall be performed using TPO reinforced membrane. TPO non-reinforced membrane can be used for flashing pipe penetrations and scuppers, as well as inside and outside corners, when the use of pre-fabricated accessories is not feasible. Sealant pockets are not permitted.

B. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions and approved Shop Drawings flashing details.

C. At roof edges, flashing shall run under metal flashing full length and width. Membrane shall extend down wall at least 1-inch past bottom of wood nailer, lapping over wall finish, but not exposed below the flashing.

D. Flash all projections including pipes, conduits, and curbs passing through the membrane.
1. Flash pipes and conduits with pre-molded cone type flashing boots. Do not field fabricate pipe flashing.

E. Base Flashing: Tops of elastomeric base flashing shall be secured with a continuous aluminum termination bar and counterflashed.

F. All vertical flashings and membranes shall be adhered to substrates regardless of height.

G. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

H. Flash penetrations and field-formed inside and outside corners with sheet flashing conforming to manufacturer's requirements. A minimum overlap of 3-inches is required.

I. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

3.6 WALKWAY INSTALLATION

A. Roof Walkways: Install roof walkways according to manufacturer's written instructions, in locations indicated. Install roof-paver walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.), all locations as identified on Drawings and as required by manufacturer for obtaining warranty.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to the Architect.
   1. Notify Architect or Owner 5 business days in advance of date and time of inspection.

B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect membrane roofing system 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 the Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423