

SECTION 075216.11 - SBS MODIFIED BITUMINOUS MEMBRANE ROOFING, FLUID ADHERED

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 – ROOF REPLACEMENT FOR BLDG. 40 [ADMINISTRATION]

A. Section Includes:

1. Styrene-butadiene-styrene (SBS) modified bituminous Cool Roof white coated membrane roofing system, insulated, on wood deck, including but not limited to:
 - a. Roof insulation. Attach ISO Insulation totalling 5 inches and ¼ inch primed Dens Deck with screws and plates. On front breeze way and side roof with evelator housing, set insulation in low rise foam adhesive.
 - b. Nailers: Installation of [n] wood nailers as insulation stops and for back nailing.
 - c. Roof membrane system consisting of base sheet, modified bitumen cap and membrane base flashings.
 - d. Installation of modified BUR system with White Cool Roof fire rated surfacing.
 - e. New gutters/downspouts as directed.
 - f. New flashings and terminations.
 - g. Walk pads at designated locations.

B. Related Sections:

1. Division 01732 Demolition Section
2. Division 06105 Carpentry section for wood deck repair, curbs, and blocking.
3. Division 07620 Section "Sheet Metal Flashing and Trim" for custom metal roof penetration flashings, flashings, and counterflashings.

1.2 DEFINITIONS

- A. Roofing Terminology: See 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. ENDURE BIO: Is a two [2] part urethane, 100 % solids, bio based, asbestos free, cold process membrane interply adhesive. Is a certified BIO based material approved by USDA. Approved to be used in MB and BUR systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work. Provide roof plan showing orientation and types of roof deck, orientation of membrane roofing, and fastening spacing's and patterns for mechanically fastened components.
 - 2. Base flashings and built-up terminations.
 - a. Indicate details meet requirements of NRCA and FMG required by this Section.
 - 3. Crickets, saddles, and tapered insulation, including slopes.
 - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples for Verification: For the following products:
 - 2. Sheet roofing materials, of color specified for exposed material.
 - 3. Dens Deck board primed.

1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 - 2. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 2. Submit evidence of compliance with performance requirements, including UL listing certificate.
 - 3. Indicate that proposed system components are compatible.

Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of built-up roofing.

- D. Warranties: Unexecuted sample copies of special warranties.
- E. Field Quality Control Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of ten [10] years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified. Contractor must have an established office/shop located within a fifty [50] miles radius of project to properly service project and leak response.
- B. Manufacturer Qualifications: Approved manufacturer with UL listed roofing systems comparable to those specified for this Project, with minimum ten [10] years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements. Roof system shall have a U.L. Class A fire rating for unlimited slope per products listed.

Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

- a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
 - e. Sample warranty, unexecuted with follow up inspections and dates indicated on warranty form.
 - f. Sample copy of weekly report
3. **Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements. Submittals by manufactures and marketing companies will not be allowed.**
4. **Request for substitution: Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with the requirements of contract documents. Schedule for submittal for Architect review and comment: Ten [10] days prior to date of bid. Give itemized comparison of proposed**

substitution with specified product, product by product, listing variations and reference to specifications. 3rd party independent test results are required with each product. Highlight all specified standards and limitations in both the specified product submittal and the substituted product request to make comparison direct and obvious. Submittals that are not complete, not highlighted and not clear shall be rejected upon receipt.

5. Provide same warranty for substitution as for specified system.
 6. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing 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. The Roofing Inspector shall be one of the following:
2. An authorized full-time technical employee of the manufacturer.
 3. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- D. Preinstallation Roofing Conference: Conduct conference at Project site.
2. Meet with Owner, Architect, 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.
 3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 6. Review structural loading limitations of roof deck during and after roofing.
 7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 8. Review governing regulations and requirements for insurance and certificates if applicable.

9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

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, approval or listing agency markings, 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 material from direct sunlight.
 2. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. 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 installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 2. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 3. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 4. Remove temporary plugs from roof drains at end of each day.
 5. Remove and discard temporary seals before beginning work on adjoining roofing.

1.8 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Manufacturer's Warranty: Manufacturer's standard or customized form, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 2. Manufacturer's warranty includes roofing membrane, base flashings, fasteners, roofing membrane accessories and other components of roofing system specified in this Section.
 - 3. Warranty Period: 20 years from date of Substantial Completion.
- C. Installer's Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
 - 2. Contractor Warranty: Provide a contractor's installation warranty for a period of two [2] years.
- D. Manufacturer Inspection and Preventive Maintenance Requirement: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's annual inspections and preventive maintenance is included in the Contract Sum.
 - 2. Inspections to occur in the following years subsequent to completion: 2, 5, 10 and 15 completing: Follow up inspections with reports to owner, preventative maintenance and housekeeping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon System/product performance, warranty coverage, Code compliance and performance requirements named in other Part 2 articles. Subject to compliance with requirements, provide product/system meeting requirements or an approved comparable product by one of the following:
 - 2. Owner Approved Equal based upon meeting:

Product/System requirements for complete system.

Warranty coverage/ language, project monitoring and listed in most current edition of the CRRC listings.

UL Class A fire ratings for slope and wind uplift requirements.

Project monitoring provided by full time employee factory trained for said system, not engaged in the sale of products.

- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.
 - 2. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 3. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Flashings and Fastening: Comply with requirements of Division 07 Sections "Sheet Metal Flashing and Trim" and "Roof Specialties." Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 - 2. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 - 3. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- D. Exterior Fire-Test Exposure: ASTM E 108, UL 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.
- E. 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.
- F. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

- G. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- H. FM requirements: Comply with FM requirements for wind uplift based on I-90 fastening pattern.

2.3 ROOFING MEMBRANE MATERIALS

A. Base sheet:

- 2. Base Sheet: ASTM D 6162 Type III Grade S heavy-duty base sheet.
 - a. Basis of design product: Heavy Duty base sheet, fiberglass reinforcement based upon testing/performance criteria as listed, or equal.
 - b. Tear strength, ASTM D 5147 220 lbf/in MD and 240 lbf/in XMD
 - c. Tensile Strength, ASTM 5147 220 lbf/in MD and 190lbf/in XMD
 - d. Thickness: 3.0 mm

B. SBS Modified Bituminous Cap Sheet:

- 2. **Roof finishing sheet:** ASTM D 6163 Type I Grade G SBS-modified asphalt-coated glass-fiber-reinforced sheet, granular surfaced with a factory applied reflective granule.
 - a. Basis of design product: Granulated Modified bitumen sheet, based upon testing performance criteria as listed, or equal.
 - b. Exterior Fire-Test Exposure, ASTM E 108: Class A.
 - c. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 205 lbf/in (12.0 kN/m); Cross machine direction 220 lbf/in (8.8 kN/m).

Tear Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction, 325 lbf (400 N); Cross machine direction 325 lbf (400 N).
 - d. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 5 percent; Cross machine direction 5 percent.
 - e. Low Temperature Flex, maximum, ASTM D 5147: -10 deg. F (-23 deg. C).
 - f. Thickness, minimum, ASTM D 5147: 130 mils (3.3 mm).

C. Base Flashing Backer Sheet:

- 2. ASTM D 6162 Type III Grade S heavy-duty base sheet, or equal

- a. Basis of design product: Heavy Duty base sheet, fiberglass reinforcement based upon testing/performance criteria as listed, or equal.
- b. Tear strength, ASTM D 5147 220 lbf/in/MD and 240 lbf/in XMD
- c. Tensile Strength, ASTM 5147 220 lbf/in MD and 190 lbf/in XMD
- d. Thickness: 3.0 mm

D. Base Flashing Sheet: for walls and curbs

- 2. ASTM D 6163 Type I Grade G SBS-modified asphalt-coated glass-fiber-reinforced sheet, granular surfaced with a factory applied reflective granule.
 - a. Basis of design product: Granulated Modified Bitume sheet, based testing/performance criteria, or equal
 - b. Exterior Fire-Test Exposure, ASTM E 108: Class A.
 - c. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 205 lbf/in (12.0 kN/m); Cross machine direction 220 lbf/in (8.8 kN/m).
 - d. Tear Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction, 325 lbf (400 N); Cross machine direction 325 lbf (400 N).
 - e. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 5 percent; Cross machine direction 5 percent.
 - f. Low Temperature Flex, maximum, ASTM D 5147: -10 deg. F (-23 deg. C).
 - g. Thickness, minimum, ASTM D 5147: 0.157 inch (4 mm).
 - h. Solar Reflectance Index (SRI), ASTM E 1980: 88.

E. Glass-Fiber Fabric: Woven glass-fiber cloth treated with asphalt, ASTM D 1668 Type I.

2.4 FLUID APPLIED MATERIALS

A. BIO Adhesive

- 2. Basis of design product: BIO based, USDA approved fluid adhesive, or equal.
- 3. Bio base content: ASTM D6866 71%
- 4. Density ASTM D1475 11.1lbs./gal
- 5. Volume solids ASTM D2697 100%

- 6. Weight solids ASTM D1644 100%
- B. Asphalt primer, water-based, polymer modified.
 - 2. Basis of design product: Water based primer.
 - 3. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 2 g/L.
- C. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- D. Fire rated roof coating for surfacing: Is an intumescent, fire retardant, styrenated acrylic latex roof coating. Coating is highly reflective, elastomeric, and Asbestos free.

2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
 - 2. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Cold-Applied Adhesive:
 - 2. Roof Cement, Asphalt-Based: ASTM D 4586, Type II, Class I, fibrated roof cement formulated for use in installation and repair of asphalt ply and modified bitumen roofing plies and flashings; UL-classified for fire resistance.
 - a. Basis of design product: Fibrated, asphalt based mastic, compatible with system installed.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 190 g/L.
 - c. Non-Volatile Matter, ASTM D 4586: 85 percent.
- C. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
 - 2. Joint Sealant, Polyurethane: ASTM C 920, Type S, Grade NS, Class 25 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints..
 - a. Basis of design product: One [1] part urethane compatible with system installed.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 85 g/L.
 - c. Hardness, Shore A, ASTM C 661: 40.

d. Color: White.

- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- E. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
- F. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.
- G. Fluid applied membrane for roof restoration: Fluid applied reinforced membrane for pipes, penetrations and projections: Two [2] part Bio based fluid applied membrane by roof systems manufacture.

2.6 ROOF INSULATION

- A. Roof Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
 - 2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes at backside of curbs.

B. Roof Board Primed Dens Deck:

1. Dens Deck: ASTM C 1177 1/4 inch primed Dens Deck

C. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

D. Cant Strips: ASTM C 208, Type II, Grade I, cellulosic –fiber.

E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

F. Substrate Joint Tape: Minimum 6 inch (150 mm) wide, coated, glass-fiber joint tape.

G. Field of the roof insulation: ASTM C 209 Polyisocyanurate: Thickness as specified.

2.7 SURFACING MATERIALS

- A. Acrylic Roof Coating, Fire-Retardant Elastomeric: Intumescent and solar reflectant, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant, formulated for use on bituminous roof surfaces.

2. Basis of design product: Cool roof white, fire rated coating tested in conjunction with total system under UL Class A approval, or equal.
3. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: Not more than 30 g/L.
4. Reflectance, minimum, ASTM C 1549: 82 percent.
5. 4. Solar Reflectance Index (SRI), ASTM E 1980: 103.

2.8 WALKWAYS

- A. Walkway pads, ceramic-granule-surfaced reinforced asphaltic composition slip-resisting pads, manufactured as a traffic pad for foot traffic, 1/2-inch (13 mm) thick minimum.
 2. Basis of design product: 3' x 4' fiberglass reinforced, granulated pad.
 3. Flexural Strength at max. load, minimum, ASTM C 203: 210 psi (1.5 kPa).
 4. Granule adhesion (weight loss), maximum, ASTM D 4977: 1.1 gram.
 5. Impact Resistance at 77 deg. F (25 deg. C), ASTM D 3746: No Damage to Roof.
 6. Pad Size: 36 by 48 inch (914 by 1220 mm).

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:
 2. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 3. Wood Roof Deck: Verify that wood deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, 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.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's recommendations.
- B. Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations, as applicable; modify as required to comply with requirements of FM Global references above:
 - 2. Base Flashing for Wall-supported Deck: Plates MB-5 and MB-5S.
 - 3. Base and Surface-mounted Counterflashing: Plates MB-4 and MB-4S..
 - 4. Embedded Edge Metal Flashing Edge (Gravel-stop): Plates MB-3 and MB-3S.
 - 5. Gutter at Draining Edge: Plates MB-22 and MB-22S.
 - 6. Equipment Support Curb: Plates MB-9 and MB-9S.
 - 7. Raised Curb Detail at Rooftop HVAC Units (Job site constructed wood curb): Plates MB-13 and MB-13S and Division 06 Section "Miscellaneous Rough Carpentry."
 - 8. Penetration, Structural Member through Roof Deck: Plates MB-15 and MB-15S.
 - 9. Penetration, Isolated Stack Flashing: Plates MB-17 and MB-17S.
 - 10. Penetration, Plumbing Vent: Plates MB-18 and MB-18S.
 - 11. Stucco stop detail at building walls from lower to upper roof.

3.4 INSULATION INSTALLATION

- A. Comply with built-up roofing manufacturer's written instructions for installing roof insulation.
- B. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- C. 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 (6 mm) with insulation.
 - 2. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- E. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

- F. Mechanically Fastened Insulation: Install layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 2. Fasten first layer of insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification. Requirements based upon FM I-90 wind uplift fastening pattern.
 - 3. Set cants and tapered edge and secondary layers in low rise foam application.
 - 4. On sloped roof section, set cover board in Low rise foam adhesive. Install per manufactures requirements.

3.5 FLUID ADHERED ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
 - 2. Deck Type: Wood deck and concrete decks.
 - 3. Base Sheet: One.
 - a. Adhering Method: Fluid applied.
 - 4. Granular-Surfaced SBS-Modified Asphalt Cap Sheet:
 - a. Adhering Method: Fluid applied.
- B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cooperate with testing agencies engaged or required to perform services for installing roofing system.
- D. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 2. Provide tie-offs at end of each day's work configured as recommended by NRCA Roofing Manual Appendix: Quality Control Guidelines - Insulation to protect new [and existing] roofing.
 - 3. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 4. Remove temporary plugs from roof drains at end of each day.

5. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Fluid applied mixing: Mix Part A [base] for 1 minute before adding Part B [curative]. After adding part B, mix the combined materials for a minimum of two [2] minutes. Make sure to mix areas around the side walls and bottom of pail.
 2. Apply fluid applied adhesive at the rate of two [2] gallons per 100 square feet, interply.
- F. Substrate-Joint Penetrations: Prevent adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.6 BASE-SHEET INSTALLATION

- A. Install lapped base-sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows:
 2. Adhere to insulation in a solid application of fluid applied adhesive @ the rate of two [2] gallons per 100 square feet.
 3. Press base sheet into adhesive with weighted roller.

3.7 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

- A. Install modified bituminous roofing membrane [basesheet] cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
 2. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer. Back nail as required for slope.
 3. Adhere to base sheet in a continuous application of fluid applied adhesive at the rate of two [2] gallons per 100 square feet.
 4. Press membrane into adhesive using a weighted roll. Side laps 4 inches and end laps 6 inches. Heat weld all laps
- B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Install roofing membrane sheets so side and end laps shed water. Completely bond and seal laps, leaving no voids.
 2. Repair tears and voids in laps and lapped seams not completely sealed.
 3. Heat weld all laps.

3.8 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions, and as follows:
 - 2. Prime substrates with asphalt primer if required by roofing system manufacturer.
 - 3. Backer Sheet Application: Install backer sheet and adhere to substrate in a continuous application of fluid applied adhesive.
 - 4. Flashing Sheet Application: Adhere flashing sheet to substrate in a continuous application of fluid applied adhesive at the rate of two [2] gallons per 100 square feet.
- B. Extend base flashing up walls or parapets a minimum of 12 inches (300 mm) above built-up roofing and 6 inches (150 mm) onto field of roof membrane.
- C. Flashing Sheet Top Termination: Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 - 2. Seal top termination of base flashing with a metal termination bar and joint sealant.
- D. Flashing Sheet Bottom Termination: Adhere flashing sheet to roof membrane sheet continuously along bottom of flashing sheet.
- E. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.
- F. Pipes/penetrations/projections: Clean prime and coat all pipes/penetrations and projections with AG Bio base @ the rate of two [2] gallons per 100 square feet. While base is wet, embed Perma fab reinforcement around projection, allow to cure and top coat with AG top coat @ the rate of one [1] gallon per 100 square feet. Extend onto the field of the roof and square off neatly.
- G. Gravelstop: After installation of new cool roof cap, furnish and install a bead of Geo guard coating at the intersection of the [n] cool roof cap and gravelstop rise. Cover adhesive completely.
- H. Baseflashing @ corners: Apply BIO to all corners from field sheet up to counterflashing.

3.9 SURFACING AND COATING INSTALLATION

- A. Apply Coating at the rate of one [1] per 100 square feet over a clean, dry surface. Apply 2nd coat at same rate, cross hatching the application for complete coverage.

3.10 WALKWAY INSTALLATION

- A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions. Set two [2] walk pads at each unit.
 - 2. Set walkway pads in cold-applied adhesive.

3.11 FIELD QUALITY CONTROL

- A. Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.
- B. Roofing Inspector: Contractor shall engage a qualified roofing inspector for a minimum of 6 full-time days on site to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.
 - 2. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- D. Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.
 - 2. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect 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 Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall 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.

3.14 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner:
2. Address:
3. Building Name/Type:
4. Address:
5. Area of Work:
6. Acceptance Date:
7. Warranty Period:
8. Expiration Date:

- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 74 mph (33 m/s);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use

or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed by:

1. Authorized Signature:
2. Name:
3. Date:

F.

END OF SECTION 075216.11