



Amphitheater Public Schools Painted Sky Elementary School Building A Roof Replacement

BG Project No: 17.14.38

Request for Bid No: 07-11-2019A

AMENDMENT ONE – Date: July 2, 2019

TO ALL BIDDERS:

The following Amendment shall be incorporated in the Contract Documents of the above project, and all requirements herein are fully a part of the Contract Documents.

All Bidders are reminded to acknowledge receipt of Amendment One in the space provided on the Bid Form.

DOCUMENTS ISSUED:

Section 075216.

SPECIFICATIONS:

1. Section 075216 SBS Modified Bituminous Membrane Roofing, replace Section.

DRAWINGS:

1. None.

PRE-BID QUESTIONS:

Below are questions/answers and additional information for the above referenced RFB. All other terms and conditions remain the same.

1. None.

GENERAL COMMENTS / CLARIFICATIONS:

1. The bid date and time has been extended. Sealed bids will be received up to and before 2:00 P.M. local time on Thursday, August 8, 2019.
2. The total area of the roof in this scope is approximately 4,362 SF.
3. The District has one pallet of matching clay roof tile that may be utilized for this project.
4. A ShareFile site has been set up with as-built drawings:
<https://breckenridgegrouparchitectsplanners.sharefile.com/d-s05b91f27e674504a>



Breckenridge
Group
Architects/
Planners

Amendment



REGISTRATION EXPIRATION DATE: 3/31/2020

END OF AMENDMENT ONE FOR RFB 07-11-2019A

SECTION 075216
STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
2. Roof insulation.
3. Cover board.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck Installer, 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 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 affects 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.
9. Review roof observation and repair procedures after roofing installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane terminations.
3. Flashing details at penetrations.
4. Tapered insulation, including slopes.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
6. Crickets, saddles, and tapered edge strips, including slopes.
7. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

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- C. Wind Uplift Resistance Submittal: For roofing system indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates:

- 1. Performance Requirement Certificate: Signed by roof membrane manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of complying with performance requirements.
- 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

- B. Product Test Reports: For roof membrane and insulation, tests performed by a qualified testing agency, indicating compliance with specified requirements.

- 1. Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Membranes must meet or exceed all performance characteristics including tensile strengths, tear strengths, elongation and recycled content. Testing must be performed at 73.4 deg. F. Tests at 0 deg. F will not be considered.

- C. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

- D. Sample Warranties: For manufacturer's special 20-year NDL warranty and installer's sample 5-year warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 PRODUCT INFORMATION REQUIRED WITH BID SUBMITTAL AND DUE AT BID OPENING

- A. Required Product Information to be submitted with bid:

- 1. Product Identification: Include manufacturer's current literature and manufacturer's name and address.
- 2. Test Reports: Provide independent test data for all modified surfacing sheets. Certification must be from an accredited independent testing laboratory comparing the physical and performance characteristics of the proposed material with those of the specified materials. Test results must be dated, notarized, and on testing laboratory stationary.

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3. Manufacturer's Fire Compliance Certificate: Certify that the roofing system furnished is approved by Factory Mutual (FM), Underwriters Laboratories (UL), Warnock Hersey (WH), or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
4. List of at least five projects, where the proposed material was used under similar climate conditions. These projects must be available for inspection by the Architect.
5. Statement from the roofing system manufacturer stating that all Bid Documents have been reviewed and approved, the site conditions are acceptable for the roofing assembly being installed, and the roofing system manufacturer will provide field inspections during construction which shall occur as appropriate to the complexity and progress of the work, but no less than once per week, and until all construction work is completed and accepted by the Owner and Architect. Inspections shall be performed by a full-time employee of the manufacturer. Manufacturer's representative shall send to Architect electronically a written summary of details of inspection with photo documentation.

B. Products will not be considered if:

1. Product or method of major waterproofing field components to be considered does not have a minimum of five years of successful performance in roofing and reroofing applications in the United States.
2. Independent test data from an independent testing agency is not provided with the Bid Documents.
3. The independent test data does not meet or exceed the minimum performance standards specified.
4. Acceptance will require substantial revision of Contract Documents.
5. Architect/Owner reserves the right to be the final authority on the acceptance or rejection of any and all products.

1.8 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the roofing system manufacturer will provide the following:

1. Report progress and quality of the work as observed.
2. Provide periodic job site inspections no less than once per week followed by emailed photo reports documenting the inspection on those days.
3. Report to the Owner and Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.9 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.
- C. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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

1.10 FIELD 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. Do not apply roofing materials or membrane to damp deck surface.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty without monetary limit (NDL) that includes roofing membrane, base flashings, fasteners, cover boards, substrate boards, roofing accessories, and other components of roofing system.
 - 2. Warranty Period: 20 years minimum from date of Substantial Completion.
- 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 all components of roofing system such as roofing membrane, base flashing, fasteners, cover boards, and substrate boards, for the following warranty period:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
- B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
 - 1. Zone 1 (Roof Area Field): 20 lbf/sq. ft.
 - 2. Zone 2 (Roof Area Perimeter): 33.6 lbf/sq. ft.

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- a. Location: From roof edge to 7 ft. 4 in. inside roof edge.
- 3. Zone 3 (Roof Area Corners): 50.5 lbf/sq. ft.
 - a. Location: 7 ft. 4 in. in each direction from each building corner.
- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
 - 1. Fire/Windstorm Classification: Class 1A-90.
- E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency.
 - 1. Identify products with appropriate markings of applicable testing agency.
- G. In a multi-ply BUR assembly, not to exceed three layers, the sum/composite of all layers must meet or exceed 1200 lbf of tear strength and 800 lbf/in of tensile strength in both machine direction (MD) and cross machine direction (XD) when tested per ASTM D5147 at 73.4 +/- 3.6 deg. F, with no single layer being of less than 500 lbf of tear strength and 340 lbf/in of tensile strength in both machine direction (MD) and cross machine direction (XD) when tested per ASTM D5147 at 73.4 +/- 3.6 deg. F.

2.2 MANUFACTURERS

- A. It is the intent of this specification to set standards based performance. Performance criteria were based on product performance, specification requirements, financial stability to stand behind a provided warranty, system compatibility, and single source responsibility, service and design criteria.
- B. Source Limitations: Obtain components including roof insulation, fasteners, coatings, mastics, sealants, and roof accessories for roofing system from roof membrane manufacturer or manufacturer approved by roof membrane manufacturer.
- C. Substitutions: Products proposed as comparable to the products specified in this Section shall be submitted prior to bid in accordance with Bidding Requirements and Division 01 provisions.
 - 1. Substitutions shall only be considered prior to bid.
 - 2. Include a list of three projects of similar type and extent, located within a one-hundred-mile radius from the location of the project. In addition, the three projects must be at least five years old and be available for inspection by the Architect, Owner or Owner's Representative.
 - 3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
 - 4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

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2.3 BASE SHEET MATERIALS

- A. SBS-Modified Bitumen Polyester and Fiberglass Mat Base Sheet: ASTM D6162/D6162M, Type III, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester and fiberglass fabric, smooth surfaced, suitable for cold adhesive application method.
1. Thickness: 80 mils.
 2. Tensile Strength, ASTM D5147:
 - a. MD 340 lbf./in. XD 340 lbf./in., 2 in./min @ 73.4 +/- 3.6 deg. F.
 3. Tear Strength, ASTM D5147:
 - a. MD 500 lbf. XD 500 lbf., 2 in./min. @ 73.4 +/- 3.6 deg. F.

2.4 STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS CAP SHEET

- A. Smooth-Surfaced Roofing Cap Sheet: ASTM D6162/D6162M, Type III, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester and fiberglass fabric, suitable for cold adhesive application method
1. Thickness: 115 mils.
 2. Tensile Strength, ASTM D5147:
 - a. MD 340 lbf./in. XD 340 lbf./in., 2 in./min. @ 73.4 +/- 3.6 deg. F.
 3. Tear Strength, ASTM D5147:
 - a. MD 500 lbf. XD 500 lbf., 2 in./min. @ 73.4 +/- 3.6 deg. F.

2.5 BASE FLASHING SHEET MATERIALS

- A. Backer Sheet: ASTM D6162/D6162M, Type III, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester and fiberglass fabric, smooth surfaced; suitable for application method specified.
1. Thickness: 80 mils.
 2. Tensile Strength, ASTM D5147:
 - a. MD 340 lbf./in. XD 340 lbf./in., 2 in./min. @ 73.4 +/- 3.6 deg. F.
 3. Tear Strength, ASTM D5147:
 - a. MD 500 lbf. XD 500 lbf., 2 in./min. @ 73.4 +/- 3.6 deg. F.
- B. Flashing Cap Sheet: ASTM D 6754, ketone ethylene ester (KEE) thermoplastic membrane; suitable for application method specified.
1. Thickness: 60 mils.
- C. Liquid Flashing System: Roof membrane manufacturer's standard one- or two-part moisture curing resin with low solvent content, consisting of a primer, flashing cement, and scrim.

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2.6 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with roofing.
 - 1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- C. Cold-Applied Polymer-Modified Asphalt Adhesive: Roof membrane manufacturer's standard, solvent-and asbestos-free, low VOC, cold-applied adhesive, specially formulated for compatibility and use with roofing membrane in the field.
- D. Flashing Backer Sheet Adhesive: Roof membrane manufacturer's standard asbestos-free, VOC compliant, cold-applied adhesive, specially formulated for compatibility and use with base flashings.
- E. Flashing Cap Sheet Adhesive: Roofing manufacturer's recommended adhesive specially formulated for compatibility and use with base flashings.
- F. Mastic Sealant: White, polyether, trowel grade, flashing mastic for cold-applied applications.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- H. Flood Coat: highly reflective, aliphatic polyurea liquid-applied waterproofing membrane designed to maintain, restore and upgrade the performance of existing membranes; suitable for application method specified. For use in drains, scuppers, and waterways.
- I. Surface Coating: ENERGY STAR qualified, highly reflective, aliphatic urethane liquid-applied waterproofing membrane; suitable for application method specified.
- J. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.7 ROOF INSULATION

- A. Preformed insulation boards approved by roofing system manufacturer, selected from manufacturer's standard sizes suitable for application, and of thickness required to achieve specified R-value.
- B. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Match roof insulation.
 - 2. Minimum Thickness: 1/4 inch.
 - 3. Slope:
 - a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

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2.8 INSULATION ACCESSORIES

- A. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- C. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- D. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M, fiber-reinforced gypsum board.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Georgia-Pacific Gypsum LLC; DensDeck Prime.
 - b. USG Corporation; Securock Gypsum-Fiber Roof Board.
 - 2. Thickness: 1/2 inch.
 - 3. Surface Finish: Factory primed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation (if specified).
 - 3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 4. Any substrate found to be unsound shall be removed and replaced or repaired prior to the start of the roof installation.
- 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.

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3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. 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.
 - 1. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.
- D. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 - 1. Install base layer of insulation with end joints staggered not less than 12 inches in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation, so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch with insulation.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - g. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 2. Install upper layers of insulation and tapered insulation, with joints of each layer offset not less than 12 inches from previous layer of insulation.

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- a. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
- b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
- d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation, so that water flow is unrestricted.
- e. Fill gaps exceeding 1/4 inch with insulation.
- f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- g. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines, with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
 - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board, so that water flow is unrestricted.
 - 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF ROOFING MEMBRANE, GENERAL

- A. Install roofing 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."
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

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1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.7 INSTALLATION OF BASE SHEET

- A. Before installing, unroll base sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature.
- B. Installation of SBS-Modified Bitumen Polyester and Fiberglass-Mat Base Sheet:
 1. Install base sheet according to roofing manufacturer's written instructions, starting at low point of roofing system.
 2. Extend roofing sheets over and terminate above cants.
 3. Install base sheet in a shingle fashion.
 4. Adhere to substrate in a uniform coating of cold-applied adhesive.
 5. Install base sheet without wrinkles, tears, and free from air pockets.
 6. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.
 - a. Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches
 - b. Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches.
 - c. Stagger end laps not less than 18 inches.
 - d. Completely bond and seal laps, leaving no voids.
 - e. Roll laps with a 20-pound roller.
 7. Repair tears and voids in laps and lapped seams not completely sealed.
 8. Apply pressure to the body of the base sheet according to manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

3.8 INSTALLATION OF SBS-MODIFIED BITUMINOUS CAP SHEET

- A. Before installing, unroll cap sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature at which cap sheet will be installed.
- B. Install modified bituminous roofing cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system.
 1. Extend cap sheet over and terminate above cants.
 2. Install cap sheet in a shingle fashion.
 3. Adhere to substrate in cold-applied adhesive.
 4. Install base sheet without wrinkles, tears, and free from air pockets.
 5. Install cap sheet, so side and end laps shed water.
- C. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.

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1. Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches.
 2. Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches.
 3. Stagger end laps not less than 18 inches.
 4. Completely bond and seal laps, leaving no voids.
 5. Roll laps with a 20-pound roller.
 6. Repair tears and voids in laps and lapped seams not completely sealed.
- D. Apply pressure to the body of the cap sheet according to manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.
- E. Flood Coat:
1. Install after cap sheets and modified flashing, tests, repairs and corrective actions have been completed and approved.
 2. Apply flood coat materials in the quantities recommended by the manufacturer.
- F. Surface Coatings: Apply roof coatings in strict conformance with the manufacturer's recommended procedures.

3.9 INSTALLATION OF FLASHING AND STRIPPING

- A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
1. Prime substrates with asphalt primer if required by roofing system manufacturer.
 2. Flashing-Sheet Application: Adhere flashing sheet to substrate in cold applied adhesive at rate required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
1. Seal top termination of base flashing with a strip of glass-fiber fabric set in asphalt roofing cement.
 2. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches o.c. to achieve constant compression. Provide suitable, sealant at the top edge if required.
- D. Install liquid flashing system according to manufacturer's recommendations.
1. Extend liquid flashing not less than 3 inches in all directions from edges of item being flashed.
 2. Embed granules, matching color of roof membrane, into wet compound.
- E. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.
- F. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the cap ply.

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1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches o.c. from the finished roof at all vertical surfaces.
4. Coordinate counterflashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
6. All stripping shall be installed prior to flashing cap sheet installation.
7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counterflashing.

3.10 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations three days per week.
1. Warranty shall be issued upon manufacturer's acceptance of the installation.
 2. Field observations shall be performed by a Technical Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 3. Provide observation reports from the Technical Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 4. Provide a final report from the Technical Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
 2. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
 3. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
 4. Notify the Owner and Architect upon completion of corrections.
 5. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
- C. Roofing system will be considered defective if it does not pass inspections.
1. Additional inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

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3.11 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
 - 1. When remaining construction does 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.

END OF SECTION