

SECTION 07 52 16

SBS-MODIFIED BITUMEN MEMBRANE ROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation, supply, and installation of granule-surfaced, SBS-modified-bitumen membrane roofing (Alternate 2).
- B. Related Sections:
 - 1. Section 02 40 00 – Selective Demolition
 - 2. Section 06 10 00 - Rough Carpentry
 - 3. Section 07 62 00 - Sheet Metal Flashing and Trim
 - 4. Section 07 92 00 - Joint Sealants

1.2 REFERENCES

- A. Definitions:
 - 1. Square: 100 square feet.
- B. Reference Standards: Latest edition as of Specification date.
 - 1. American National Standards Institute (ANSI)/Single Ply Roofing Industry (SPRI):
 - a. ANSI/SPRI FX-1: Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
 - 2. American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI):
 - a. ASCE/SEI 7: Minimum Design Loads for Buildings and Other Structures.
 - 3. ASTM International:
 - a. D41/D41M: Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - b. D312: Standard Specification for Asphalt Used in Roofing.
 - c. D1668: Standard Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing.
 - d. D2178: Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - e. D3617: Standard Practice for Sampling and Analysis of Built-up Roof Systems During Application.
 - f. D4586: Standard Specification for Asphalt Roof Cement, Asbestos-Free.
 - g. D4601: Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
 - h. D4897/D4897M: Standard Specification for Asphalt-Coated Glass-Fiber Venting Base Sheet Used in Roofing.
 - i. E108: Standard Test Methods for Fire Tests of Roof Coverings.
 - 4. FM Global:
 - a. Class Number 4470: Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction.
 - b. [Approval Guide](#) (online resource).

5. National Roofing Contractors Association (NRCA)/ Asphalt Roofing Manufacturers Association (ARMA):
 - a. Quality Control Guidelines for Application of Polymer Modified Bitumen Roofing (Quality Control Guidelines).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate Work to ensure that new roofing materials and building interior are kept continuously dry; that continuous, watertight, new roofing system is provided; and that adjacent areas are not adversely affected. Coordinate:
 1. With Owner's Representative.
 2. With other trades:
 - a. To ensure that work done by other trades is complete and ready for roofing Work.
 - b. To avoid or minimize work on, or in immediate vicinity of, roofing Work in progress and completed new roofing.
 - c. To ensure that subsequent work will not adversely affect completed roofing.
- B. Pre-installation Meeting:
 1. Conduct meeting at Site.
 2. Review requirements for roofing system, including:
 - a. Construction schedule.
 - b. Availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Site use, access, staging, and set-up location limitations.
 - d. Forecast weather conditions.
 - e. Surface preparation and roof-deck condition and pretreatment.
 - f. Installation procedures.
 - g. Base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - h. Testing and inspection requirements.
 - i. Temporary protection and repair of roofing system.
 - j. Structural loading limitations of roof deck.
 - k. Governing regulations and requirements for insurance and certificates.
 3. Contractor's Site superintendent, roofing-system manufacturer's technical representative, roofing Installer's foreman, Owner's Representative, Architect/Engineer, and testing agency representative shall attend.

1.4 SUBMITTALS

- A. Product Data: Roofing-system manufacturer's literature, including written instructions for evaluating, preparing, and treating substrate; technical data including tested physical and performance properties; and application instructions.
 1. For membrane and base flashing materials, and roofing cement, primer, mastic sealant, and fasteners.
 2. Include temperature ranges for storage and application of materials, and special cold-weather application requirements or limitations.
 3. Include Safety Data Sheets (SDS) for information only; safety restrictions are sole responsibility of Contractor.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work; for details and fabrications not shown on Drawings.
 1. Membrane terminations and base flashings. Draw to scale.

2. Tapered insulation, including slopes.
 3. Crickets, saddles, and tapered edge strips, including slopes.
 4. Insulation fastening patterns.
 5. Proposed temporary, watertight, tie-off details for each substrate type.
- C. Manufacturer Certificate: Signed by roofing-system manufacturer, certifying that roofing system complies with specified requirements.
1. Written approval by roofing-system manufacturer for use and performance of membrane over specified board insulation, including that materials supplied for Project comply with requirements of cited ASTM standards. Approval should also indicate materials are suitable for ASTM E108, Class 1A roof and meet specified wind uplift classification.
 2. Evidence of meeting performance requirements.
 3. Certify that materials are free of asbestos.
- D. Installer Qualifications:
1. Certification from roofing-system manufacturer, certifying that Installer complies with manufacturer's requirements to install specified, warranted, roofing system.
 2. Evidence that Installer's *existing company* has minimum five years of continuous experience in similar roofing work; list of at least five representative, successfully completed projects of similar scope and size, including:
 - a. Project name.
 - b. Owner's name.
 - c. Owner's Representative name, address, and telephone number.
 - d. Description of work.
 - e. SBS-modified-bitumen materials used.
 - f. Project supervisor.
 - g. Total cost of roofing work and total cost of project.
 - h. Completion date.
- E. Sample Warranty: Copy of roofing-system manufacturer's warranty, stating obligations, remedies, limitations, and exclusions. Submitted with bid.
- F. Following completion of the Work:
1. Roofing-system manufacturer's inspection report of completed roofing installation.
 2. Completed warranty from roofing-system manufacturer.
 3. Completed warranty from Installer.
 4. Maintenance program recommended for roofing system.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced firm that has successfully completed roofing work similar in material, design, and extent to that indicated for Project; that is approved, authorized, or licensed by roofing-system manufacturer to install roofing-system products; and that is eligible to receive roofing-system warranty. Must have successful installations of specified materials in local area in use for minimum of five years.
1. Employ foreman with minimum five years of experience as foreman on similar projects, who is fluent in English, to be on Site at all times during Work. Do not change foremen during the course of the Project except for reasons beyond the control of the Installer; inform Architect/Engineer in advance of any changes.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials according to manufacturer's recommendations and in such a manner as to prevent damage to materials or structure.
- B. Deliver materials to Site in original containers and packaging with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, lot number, and directions for storing and mixing with other components.
- C. Keep materials dry and do not allow materials to be exposed to moisture during transportation, storage, handling, or installation. Reject and remove from Site new materials which exhibit evidence of moisture during application or which have been exposed to moisture.
- D. Store materials in original, undamaged containers in clean, dry, protected location on raised platforms with weather-protective coverings, within temperature range required by manufacturer. Use canvas tarps for protection of moisture-sensitive roofing materials. Protect stored materials from direct sunlight. Manufacturer's standard packaging and covering is not considered adequate weather protection.
- E. Store rolled materials on ends only, unless otherwise required by manufacturer's written instructions. Discard rolls that have been flattened, creased, or otherwise damaged.
- F. Do not store materials at locations where new roofing materials have been installed.
- G. Limit stored materials on structures to safe loading capacity of structure at time materials are stored, and to avoid permanent deflection of deck.
- H. Conspicuously mark wet or damaged materials and promptly remove from Site.
- I. Remove and replace materials that cannot be applied within stated shelf life

1.7 PROJECT CONDITIONS

- A. Verify existing dimensions and details prior to start of roofing Work. Notify Architect/Engineer of conditions found to be different than those indicated in the Contract Documents. Architect/Engineer will review situation and inform Contractor and Installer of changes.
- B. Comply with Owner's limitations and restrictions for Site use and accessibility.
- C. Protect existing roofing from damage from construction activities. Repair damage to existing roofing from construction activities that result in leakage.
- D. Ensure that drains are operational at the end of each workday or if precipitation is forecast.
- E. Environmental Limitations: Install roofing when existing and forecast weather conditions permit roofing system to be installed according to roofing-system manufacturer's written instructions and warranty requirements.
 - 1. Apply roofing when substrate temperature is falling, and when substrate and ambient temperatures are within range recommended by roofing-system manufacturer.
 - 2. Do not proceed with installation during inclement weather except for temporary work necessary to protect building interior and installed materials. Remove temporary work and Work that becomes moisture damaged.

- F. Handle and install materials in strict accordance with safety requirements required by roofing-system manufacturer; Safety Data Sheets (SDS); and local, state, and federal rules and regulations. Maintain Safety Data Sheets (SDS) with materials in storage area and available for ready reference at Site.
- G. Maintain adequate ventilation during preparation and application of roofing materials.

1.8 CHANGES IN WORK

- A. During rehabilitation work, existing conditions may be encountered which are not known or are at variance with the Contract Documents. Such conditions may interfere with the Work and may consist of damage or deterioration of the substrate or surrounding materials that could jeopardize the integrity or performance of the Work.
 - 1. Notify Architect/Engineer of conditions that may interfere with the proper execution of the Work or jeopardize the performance of the Work prior to proceeding with the Work.

1.9 WARRANTIES

- A. Manufacturer's Warranty:
 - 1. Written warranty signed by roofing-system manufacturer, including:
 - a. Repair or replace components of roofing system that do not comply with requirements; that do not remain watertight; that fail in adhesion, cohesion, or general durability; or that deteriorate in a manner not clearly specified by submitted roofing-system manufacturer's data as an inherent quality of the material for the application indicated.
 - b. Removal and replacement of roof-deck boards, base sheet, temporary roof/vapor retarder, insulation, cover boards, walkway products, and other components of roofing system.
 - c. Labor and materials to perform warranty Work.
 - 2. Warranty Period: Twenty (20) years from date of completion of roofing system.
- B. Roofing Installer's Warranty:
 - 1. Completed warranty form at the end of the Section, signed by Installer, including:
 - a. Repair or replace components of roofing system that do not comply with requirements; that do not remain watertight; that fail in adhesion, cohesion, or general durability; or that deteriorate in a manner not clearly specified by submitted roofing-system manufacturer's data as an inherent quality of the material for the application indicated. Warranty includes defects such as blisters, ridging, and excessive surfacing loss.
 - b. Removal and replacement of roof-deck boards, base sheets, temporary roof/vapor retarder, insulation, cover boards, walkway products, and other components of roofing system. Warranty includes replacing materials as necessary.
 - c. Labor and materials to perform warranty Work.
 - 2. Warranty Period: Two years from date of completion of roofing system.

PART 2 PRODUCTS

2.1 SBS-MODIFIED-BITUMEN MEMBRANE ROOFING SYSTEM

- A. General:

1. **Material Compatibility:** Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing-system manufacturer based on testing and field experience.
 2. **Asbestos-Containing Materials:** Install only asbestos-free materials. Immediately remove asbestos-containing materials inadvertently installed, in accordance with applicable regulations.
 3. **Source Limitations:** Obtain components for roofing system from or approved by roofing-system manufacturer.
- B. **SBS-Modified-Bitumen Membrane Roof Assemblies (cold-adhered, heat-welded laps):**
1. **Johns Manville Roofing Systems:**
 - a. **Bottom Ply:** DynaBase
 - b. **Cap Sheet:** DynaKap FR T1
 2. Or approved equal.
 3. Cap Sheet to be coated with granules. Granule color to be selected by Owner.
- C. **Base Flashing Systems:**
1. **Johns Manville Roofing Systems:**
 - a. **Backer Sheet:** DynaBase
 - b. **Flashing Sheet:** DynaFlex
 2. Or approved equal.
 3. Flashing sheet to be coated with granules. Granule color to match color of roofing membrane granules.
 4. **Glass-Fiber Fabric:** ASTM D1668, Type I, woven glass-fiber cloth treated with asphalt.
- D. **Asphalt Materials:**
1. **Asphalt Primer:** ASTM D41/D41M.
 2. **Roofing Asphalt:** ASTM D312, Type III or IV, as recommended by roofing-system manufacturer for application.

2.2 OTHER ROOFING-SYSTEM MATERIALS

- A. **Base Sheets:**
1. **Sheathing Paper:** Red-rosin type, minimum 3 pounds per square.
 2. **Base Sheets:** ASTM D4601, Type II, non-perforated, asphalt-impregnated and -coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides. Mechanically fastened.
 - a. **GlasBase Plus** as manufactured by Johns Manville

2.3 AUXILIARY MATERIALS

- A. **General:** Auxiliary materials recommended by roofing-system manufacturer for intended use and compatible with roofing membrane.
- B. **Asphalt Roofing Cement:** ASTM D4586, asbestos free, of consistency required by roofing-system manufacturer for application. Do not use unless specifically approved by roofing-system manufacturer. Do not use for sealing laps in membrane or base flashing, surface or stripping flashing at equipment penetrations and drains, or repairs to membrane or flashing.
- C. **Mastic Sealant:** Polyisobutylene, plain or modified bitumen, non-hardening, non-migrating, non-skinning, and non-drying.

- D. Termination Bars: Roofing-system manufacturer's standard; Type-304-stainless-steel or aluminum bars, approximately 1-inch wide by 1/8-inch thick; with predrilled holes 8 inches on center.
- E. Fasteners, General: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Global Class Number 4470 and acceptable to roofing-system manufacturer.
 - 1. Designed for fastening roofing membrane components to substrate and tested by roofing-system manufacturer for required pullout strength.
- F. Fasteners for Base Flashings:
 - 1. Wood and Plywood Substrates: 1-inch-minimum long, capped, galvanized-steel nails with ribbed shank of sufficient length to provide 1-inch-minimum embedment or pass through bottom side of wood or plywood. Use Square-Cap Nails-Steel Head with STORMGUARD double hot-dipped zinc coating manufactured by Maze Nails, or approved equal.
 - 2. Masonry Substrate: Stainless steel with hex washer head.
 - a. 410 Stainless Steel Tapcon manufactured by ITW Red Head, Inc.
 - b. 304 Stainless Steel Tapper, 1/4-inch diameter with hex washer head, manufactured by Powers Fasteners.
 - c. 1 3/4 inch minimum length, or as noted on details.
 - 3. Metal substrate: No. 12 x 1 1/2 inch, 410 stainless steel, self-drilling screws with 1-inch, stainless steel washers.
- G. Roofing Granules: Ceramic-coated roofing granules provided by roofing-system manufacturer, color to match roofing membrane.
- H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing-system manufacturer.
- H.I. Structural Roof Deck Panel: Easy-Ply Roof Deck (2-inch thick) as manufactured by Homasote or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer and roofing-system manufacturer's representative for compliance with requirements and for other conditions affecting installation or performance of roofing system.
 - 1. Perform testing according to ANSI/SPRI FX-1 to verify that fastener pull-out values meet or exceed those required by FM Global standards.
 - 2. Ensure that work done by other trades is complete and ready for roofing Work, including:
 - a. Roof openings and penetrations are in place and set and braced, and roof drains are securely clamped in place.
 - b. Wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and nailers match thicknesses of insulation.
 - c. Wood or plywood deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
 - 3. Verify that areas and conditions under which roofing Work is to be performed permit proper and timely completion of Work.

4. Notify Architect/Engineer in writing of conditions which may adversely affect installation or performance of roofing Work and recommend corrections.
5. Do not proceed with roofing Work until adverse conditions have been corrected and reviewed by Architect/Engineer.
6. Commencing roofing Work constitutes acceptance of Work surfaces and conditions.

3.2 PROTECTION

- A. Take precautions to ensure safety of people, including building users, passers-by, and workmen, and animals, and protection of property, including adjacent building elements, landscaping, and motor vehicles.
- B. Prevent construction debris and other materials from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
- C. Protect paving and sidewalks, and adjacent building areas from mechanical damage due to scaffolding and other equipment.
- D. Limit access to Work areas.
- E. Erect temporary protective canopies, as necessary, over walkways and at points of pedestrian and vehicular access that must remain in service during Work.
- F. Comply with roofing-system manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products.
- G. Cover adjacent surfaces with materials that are proven to resist roofing materials.
- H. Assume responsibility for injury to persons or damage to property due to Work, and remedy at no cost to Owner.

3.3 SURFACE PREPARATION

- A. Remove existing roofing system and other materials to expose substrate.
 1. Remove only as much of existing roofing as can be prepared and new temporary roof/vapor retarder or new roofing system installed in one day, unless provisions are implemented to maintain watertightness in interim or larger removal areas are approved by Owner's Representative.
 2. Provide temporary protection as needed if watertightness is compromised.
 3. Do not begin removal of existing roofing system when weather conditions are not conducive to maintaining watertightness or for application of new construction.
- 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. Repair or replace deteriorated sections of substrate.
- D. Clean and prepare wood substrate according to roofing-system manufacturer's written instructions. Provide clean, dust-free, and dry substrate for roofing application.
 1. Remove and replace wood that is damaged, that cannot easily be cleaned, or that does not meet the requirements of roofing-system manufacturer.

2. Verify that wood is fastened with non-projecting screws. If not, supplement existing fastening with new corrosion-resistant screws.
- E. Mask adjoining surfaces not receiving roofing system to prevent spillage or migration affecting other construction.
- F. Close off roof drains and other penetrations to prevent materials from entering and clogging drains and conductors, and from spilling or migrating onto adjacent surfaces. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- G. Installer and roofing-system manufacturer's representative shall examine substrate to ensure that it is properly prepared and ready to receive roofing system. Roofing-system manufacturer's representative shall report in writing to Installer and Architect/Engineer conditions which will adversely affect roofing-system installation or performance. Do not proceed with roofing-system installation until these conditions have been corrected and reviewed by Architect/Engineer.
- H. Proceed with installation only after unsatisfactory conditions have been corrected. Commencing installation constitutes acceptance of Work surfaces and conditions.

3.4 ROOFING-SYSTEM INSTALLATION, GENERAL

- A. Install roofing membrane and base flashings according to roofing-system manufacturer's written instructions and applicable recommendations of NRCA/ARMA Quality Control Guidelines for Application of Polymer Modified Bitumen Roofing.
- B. Install materials in strict accordance with safety requirements required by roofing-system manufacturer; Safety Data Sheets (SDS); and local, state, and federal rules and regulations.
 1. Follow safety procedures of OSHA and other applicable governing agencies. Assume responsibility for Work area safety at all times.
 2. Provide fully charged fire extinguishers, appropriately sized and rated, and water within 50 feet of hot-asphalt kettles.
 3. Torch Safety for areas where torches are approved for use by Owner' Representative and Architect/Engineer.
 - a. Do not use wood-fiber cant strips or insulation.
 - b. Install continuous, glass-fiber, base sheet over combustible substrates.
 - c. Install metal flashings at penetrations or protect with tight-fitting felt collar before torching.
 - d. Torches to have safety lever (pilot only or self-igniting). Do not use full-time torches.
 - e. Maintain fully charged fire extinguishers, appropriately sized and rated, within 50 feet of torch work locations.
 - f. Walk job every day at least one hour after torches are out for fire watch.
- C. Maintain adequate ventilation during installation of roofing materials. Notify Owner's Representative at least one week in advance of Work with materials with noxious vapors. Review application schedule and venting precautions with Owner's Representative prior to beginning application.
- D. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing-system components or adjacent building construction.

- E. Coordinate installing roofing-system components so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of workday or when rain is forecast.
 - 1. Provide tie-offs at the end of each day's Work to cover exposed roofing membrane sheets and insulation with 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.
- F. Prohibit foot traffic and equipment movement over roofing system until adhesive has cured. Minimize foot traffic and equipment movement over base plies prior to installation of membrane top ply/cap sheet.
- G. Cooperate with Architect/Engineer in performing inspections and testing of roofing system.

3.5 INSTALLATION OF BASE SHEET

- A. Wood and Plywood Substrates:
 - 1. Loosely lay one course of sheathing paper, lapping edges a minimum of 2 inches and ends a minimum of 6 inches.
 - 2. Install one lapped course of base sheets, extending sheet over and terminating beyond cants. Mechanically fasten to substrate.

3.6 ROOFING MEMBRANE INSTALLATION

- A. SBS-Modified-Bitumen Membrane Installation: Install roofing membrane base plies and cap sheet.
 - 1. Unroll sheets and allow to relax before installing.
 - 2. Cut out factory splices in top ply. Alternately, cover splice with full-width section of top-ply membrane that extends at least 6 inches beyond sides of splice.
 - 3. Accurately align sheets without stretching and maintain uniform side and end laps of minimum dimensions required by roofing-system manufacturer for selvage and non-selvage laps.
 - a. Start at low point of roof deck and shingle side laps with slope of deck where possible.
 - b. Stagger end laps at least 3 feet.
 - c. Extend sheets over and terminate about 1 inch above top of cants.
 - 4. .
 - 5. Cut out wrinkles and fishmouths, and repair with same number of plies removed.
 - 6. Laps:
 - a. Prepare and prime non-selvage laps as recommended by roofing-system manufacturer.
 - b. Continuously bond and seal laps, leaving no voids.
 - c. Repair wrinkles and voids in lapped seams.
 - 7. On granular or foil-surfaced roofs, embed loose granules or metallic powder in asphalt bleed out at side and end laps which exceeds 1/4 inch in width and at minor asphalt, primer, or adhesive spillage on finished membrane surfaces.
 - 8. At locations where asphalt, primer, or adhesive spillage on finished membrane surfaces exceeds 1 square foot, install additional top ply of membrane.

3.7 BASE FLASHING AND STRIPPING INSTALLATION

- A. General: Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrate according to roofing-system manufacturer's written instructions.
 - 1. Accurately align base flashing sheets without stretching and maintain uniform side and end laps required by roofing-system manufacturer for selvage and non-selvage laps.
 - a. Start wall and curb base flashing at low point of roof deck and shingle with slope of deck.
 - b. Extend base flashing plies to top of curbs, to within 1 inch of counterflashing reglets, at least 8 inches above finished surface of roofing system, and 4 inches onto field of roofing membrane. At locations where height of wall exceeds height acceptable to roofing-system manufacturer, comply with recommendations of roofing-system manufacturer for flashing high walls. Recommendations may include flashing in two stages: bottom half to recommended maximum height preceded by top half over remainder of wall.
 - c. Bond and seal laps, leaving no voids. Repair wrinkles and voids in laps and lapped seams. Prepare and prime non-selvage laps as recommended by roofing-system manufacturer.
 - 2. Install at least one ply of base flashing membrane same day that roofing membrane is installed to provide temporary watertight seal.
- B. Application of Bottom Plies:
 - 1. Mechanically fasten bottom ply to wood or plywood substrates with 1-inch capped nails at least 9 inches on center in both directions.
 - a. Cut out and repair wrinkles or loose areas of bottom ply to ensure that ply is continuously tight to substrate.
 - b. Adhere bottom ply over roofing membrane at cants in solid mopping of hot roofing asphalt.
- C. Backer Sheet Application: Adhere SBS-modified-bitumen backer sheet to substrate in solid mopping of hot roofing asphalt, applied at not less than 425 degrees F. Press sheet firmly into place while hot roofing asphalt is fluid, to ensure continuous adhesion to substrate with no voids, wrinkles, or unadhered base flashing.
- D. Flashing Sheet Application: Cold-applied.
 - 1. Cut sheets off end of roll and install vertically, working to selvage edge.
 - 2. For sheets without selvage edges or where selvage edge cannot be provided, limit length of sheets to 5 feet maximum. Prepare and prime non-selvage edges as recommended by roofing-system manufacturer.
 - 3. Stagger end lap seams in top ply at least 6 inches from lap seams in bottom plies.
- E. Mechanically fasten upper edge of base flashing securely at terminations and perimeter of roofing, using termination bars and fasteners spaced 8 inches on center and within 2 inches of end termination in base flashing.
- F. Install sheet metal flashing or counterflashing at top termination of base flashing, per Section 07 62 00.
- G. Equipment Penetrations: Flash per Drawing details or per roofing-system manufacturer's recommendations.
 - 1. Prime flange of sheet-metal flashing, allow to dry, and set in modified-bitumen mastic.

2. Apply sealant at base flashing termination on sheet metal flashing.

H. At Perimeters:

1. Prime both sides of metal edging, gravel stop, and gutter flanges, and allow to dry.
2. Set in modified mastic over membrane as recommended by roofing-system manufacturer.
3. Mechanically fasten flanges 3 inches on center, staggered, and strip over with additional layer of base flashing, as recommended by roofing-system manufacturer.
4. Apply sealant along edge of base flashing at base of raised gravel stop dam to fill gap between base flashing and dam.

- I. Install roofing-membrane, cap-sheet stripping where metal flanges and edgings are set on membrane roofing, according to roofing-system manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage qualified, independent testing and inspecting agency to perform roof inspections and tests, and to prepare reports.
- B. Architect/Engineer will inspect roofing system at various stages of construction and at completion.
- C. If indicated by inspections, test cuts may be made to evaluate observed problems with roofing system.
 1. Approximate quantities of components within roofing membrane will be determined according to ASTM D3617.
 2. Test specimens will be examined for interply voids according to ASTM D3617 and to comply with criteria established in Appendix 3 of NRCA/ARMA Quality Control Guidelines for Application of Polymer Modified Bitumen Roofing.
- D. Final Roof Inspection: Arrange for roofing-system manufacturer's technical representative to inspect roofing installation on completion and submit report to Architect/Engineer. Notify Architect/Engineer and Owner's Representative 48 hours in advance of date and time of inspection.
- E. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, and describe nature and extent of deterioration and damage in written report, with copies to Architect/Engineer and Owner's Representative.
- F. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
- G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional Work with specified requirements.

3.9 CLEANING

- A. At the end of each workday, clean Site and Work areas and place rubbish, empty cans, rags, and other discarded materials in appropriate containers.
- B. After completing roofing Work:

1. Clean spillage and soiling from adjacent surfaces using cleaning agents and procedures recommended by manufacturer of affected surface. Exercise care to avoid scratching or damage to surfaces.
 2. Repair surfaces stained, marred, or otherwise damaged during roofing Work.
 3. Clean up debris and surplus materials and remove from Site.
- C. Waste Management:
1. Collect surplus roofing materials that cannot be reused and deliver to recycling or disposal facility.
 2. Treat materials that cannot be reused as hazardous waste and dispose of in an appropriate manner.

3.10 PROTECTION

- A. Protect roofing system from damage and wear during remainder of construction period.

END OF SECTION

ROOFING INSTALLER'S WARRANTY

WHEREAS <Insert name> of <Insert address>, herein called *Roofing Installer*, has performed roofing and associated work, designated *Work*, on the following project:

Owner: <Insert name of Owner.>
Address: <Insert address.>
Building Name/Type: <Insert information.>
Address: <Insert address.>
Area of Work: <Insert information.>
Acceptance Date: <Insert date.>
Warranty Period: Two years.
Expiration Date: <Insert date.>

AND WHEREAS Roofing Installer has contracted, either directly with Owner or indirectly as subcontractor, to warrant said Work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period it will, at its own cost and expense, make or cause to be made such repairs to or replacement of said Work as necessary to correct faulty and defective Work and as are necessary to maintain said Work in watertight condition and warrants against the following:

1. Components of roofing system that do not comply with requirements; that do not remain watertight; that fail in adhesion, cohesion, or general durability; or that deteriorate in a manner not clearly specified by submitted roofing-system manufacturer's data as an inherent quality of the material for the application indicated, regardless of whether the Work was previously accepted by Owner. Warranty includes defects such as blisters, ridging, and excessive surfacing loss.
2. Damage by exposure to foreseeable weather; damage from leaks in roof system or related components; and damage by intrusion of foreseeable wind-borne moisture. Damage is understood to include accumulation of subsurface roof system moisture (i.e., wet insulation board), even if no other visible interior damage or moisture exists.

Warranty is made subject to the following terms and conditions:

1. Specifically excluded from Warranty are damages to Work and other parts of building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding **54** miles per hour;
 - c. fire;
 - d. failure of roof structure;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of Work;
 - f. activity on roofing by others, including construction contractors and maintenance personnel, 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 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, Warranty will become null and void on date of

said alterations, but only to extent said alterations affect Work covered by 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 limitation or termination of Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, Warranty will become null and void on date of said change, but only to extent said change affects Work covered by Warranty.
6. Owner will promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and will afford reasonable opportunity for Roofing Installer to inspect Work and to examine evidence of such leaks, defects, or deterioration. Roofing Installer shall inspect leak, defect, or deterioration within 24 hours of notification.
7. If permanent repair or replacement of warranted condition cannot be made immediately, due to weather conditions, availability of appropriate labor or materials, building occupancy, etc., Roofing Installer must make, or cause to be made, immediate temporary repairs to prevent any further damage, deterioration, or unsafe conditions. Permanent repair or replacement of warranted condition shall be scheduled as soon thereafter as practical, and with Owner's consent and approval.
8. If Owner notifies Roofing Installer of warranted condition that requires immediate attention to prevent potential injury or damage, and Roofing Installer cannot or does not promptly inspect and repair same, either permanently or temporarily, then Owner may make, or cause to be made, such temporary repairs as may be essential, and Roofing Installer will reimburse Owner for cost of such repairs. Such action will not relieve Roofing Installer of its obligation to perform any necessary permanent repairs, and Warranty shall remain in full force and effect for remaining portion of its original term.
9. Roofing Installer shall provide equipment, labor, and material required to remedy warranted conditions, including repair or replacement of damage to other work resulting therefrom, and removal and replacement of other work required to access warranted condition. Additional required work will be at Roofing Installer's sole expense for full term of Warranty. Warranty includes removal and replacement of roof-deck boards, base sheets, temporary roof/vapor retarder, insulation, cover boards, walkway products, and work that conceals defect, for all components of roofing system.
10. Roofing Installer shall perform a thorough inspection of roof system and other Work, within 30 day period preceding first and second anniversaries of start of Warranty period, in presence of roofing-system manufacturer's representative and Owner's Representative. Roofing Installer shall make, or cause to be made, necessary repairs or replacement to remedy conditions noted during inspections, under the terms of this Warranty. Repairs to be made within 30 days of inspection date or as otherwise agreed by Owner, even if such time extends beyond Warranty period.
11. Warranty is recognized to be 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, Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original Work according to requirements of Contract Documents, regardless of whether Contract was directly with Owner or with Owner's General Contractor.

IN WITNESS THEREOF, and intending to be legally bound hereby, Roofing Installer has caused this document to be executed by undersigned, duly-authorized officer.

(Roofing Installer) Corporate Seal:

By: _____

(Signature)

(Name)

(Date)

Subscribed and sworn to before me this _____ day of _____, 20__

Notary Public
My commission expires _____