

SECTION 07 52 16

SBS-MODIFIED BITUMEN MEMBRANE ROOFING – HEAT-WELDED

PART 1 GENERAL

1.01 SUMMARY

- A. Work shall include, but is not limited to, the following:
1. Preparation of existing (new), concrete, steel, wood, gypsum, cementitious wood fiber roof deck, and all flashing substrates.
 2. Thermal Barrier
 3. Insulation
 4. Coverboard
 5. SBS-modified bitumen vapor retarder (air barrier).
 6. SBS-modified bitumen base ply(s), heat-welded.
 7. SBS-modified bitumen cap sheet, heat-welded.
 8. SBS-modified bitumen membrane flashings.
 9. Liquid-applied, reinforced flashings.
 10. Sheet metal flashings and sheet metal roof edge system.
 11. All related materials and labor required to complete specified roofing necessary to receive specified manufacturer's warranty.

1.02 DEFINITIONS

- A. ASTM D 1079-Definitions of Term Relating to Roofing, Waterproofing and Bituminous Materials.
- B. The National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual, Fifth Edition Glossary.

1.03 PRE-INSTALLATION MEETINGS

- A. Convene prior to commencing work at a time and location to be determined by the Owner/Owners Representative.

1.04 REFERENCES

- A. AMERICAN SOCIETY OF CIVIL ENGINEERS - Reference Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- B. AMERICAN STANDARD OF TESTING METHODS (ASTM):
1. ASTM C 836 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
 2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
 3. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

4. ASTM C 1278 - Standard Specification for Fiber-Reinforced Gypsum Panel.
 5. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board.
 6. ASTM C 1325 – Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.
 7. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Damp proofing, and Waterproofing.
 8. ASTM D 312- Standard Specification for Asphalt Used in Roofing.
 9. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 10. ASTM D 3019 - Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered.
 11. ASTM D 3746 - Standard Test Method for Impact Resistance of Bituminous Roofing System.
 12. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
 13. ASTM D 5147 - Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.
 14. ASTM D 5849 - Standard Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement)
 15. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
 16. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
 17. ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- C. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)::
1. ANSI/SPRI/FM 4435/ES-1 Wind Design Standard for Edge System Used with Low Slope Roofing System.
 2. ANSI/SPRI FX-1, Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
 3. ANSI/SPRI IA-1, Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
 4. ANSI/FM 4474- American National Standard for Evaluating the Simulated Wind Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.
- D. FACTORY MUTUAL (FM):
1. FM 4450 - Approval Standard - Class I Insulated Steel Roof Decks.
 2. FM 4470 - Approval Standard - Class I Roof Covers.
- E. INTERNATIONAL CODES COUNCIL (ICC):
1. 20XX International Building Code (IBC).
- F. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA).

- G. SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION INC. (SMACNA) Architectural Sheet Metal Manual.
- H. UNDERWRITERS LABORATORY (UL):
 - 1. UL 790 Standard Test Methods for Fire Tests of Roof Coverings.
 - 2. UL 1256 – Fire Test of Roof Deck Constructions.

1.05 ACTION SUBMITTALS

- A. Product Data Sheets: Submit manufacturer's product data sheets, installation instructions and/or general requirements for each component.
- B. Material Safety Data Sheets: Submit manufacturer's Material Safety Data Sheets (MDS) for each component.
- C. Sample/Specimen Warranty from the manufacturer and contractor.
- D. Shop Drawings: Provide roof plan and applicable roof system detail drawings.

1.06 INFORMATIONAL SUBMITTALS

- A. Contractor Certification: Submit written certification from roofing system manufacturer certifying that the applicator is authorized by the manufacturer to install the specified materials and system.

1.07 CLOSEOUT SUBMITTALS

- A. Warranty: Provide manufacturer's and contractor's warranties upon substantial completion of the roofing system.

1.08 QUALITY ASSURANCE

- A. MANUFACTURER QUALIFICATIONS:
 - 1. Manufacturer shall have 20 years of experience manufacturing SBS-modified bitumen roofing materials.
 - 2. Trained Technical Field Representatives, employed by the manufacturer, independent of sales.
 - 3. Provide reports in a timely manner of all site visit reports.
 - 4. Provide specified warranty upon satisfactory project completion.
- B. CONTRACTOR QUALIFICATIONS:
 - 1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory project completion.
 - 2. Applicators shall have completed projects of similar scope using same materials as specified herein.
 - 3. Contractor shall provide full time, on-site superintendent or foreman experienced with the specified roof system through satisfactory project completion.
 - 4. Applicators shall be skilled in the application methods for all materials.
 - 5. Contractor shall maintain a daily record, on-site, documenting material installation and related project conditions.

6. Contractor shall maintain a copy of all submittal documents, on-site, available at all times for reference.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Refer to each product data sheet or other published literature for specific requirements.
- B. Deliver materials and store them in their unopened, original packaging, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.
- C. Protect and store materials in a dry, well-vented, and weatherproof location. Only materials to be used the same day shall be removed from this location. During cold weather, store materials in a heated location, removed only as needed for immediate use.
- D. When materials are to be stored outdoors, store away from standing water, stacked on raised pallets or dunnage, at least 4 in or more above ground level. Carefully cover storage with "breathable" tarpaulins to protect materials from precipitation and to prevent exposure to condensation.
- E. Carefully store roof membrane materials delivered in rolls on-end with selvage edges up. Store and protect roll storage to prevent damage.

1.10 SITE CONDITIONS

- A. SAFETY:
 1. The contractor shall be responsible for complying with all project-related safety and environmental requirements.
 2. Heat-welding shall include heating the specified membrane ply using propane roof torches or electric hot-air welding equipment. The contractor shall determine when and where conditions are appropriate to utilize heat-welding equipment. When conditions are determined by the contractor to be unsafe to proceed, equivalent SBS-modified bitumen materials and methods shall be utilized to accommodate requirements and conditions.
 3. Refer to NRCA CERTA recommendations, local codes and building owner's requirements for hot work operations.
 4. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified liquid-applied, or semi-solid roofing materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions.
 5. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified hot asphalt-applied materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent

approved materials and methods shall be utilized to accommodate requirements and conditions. .

6. The contractor shall refer to product Material Safety Data Sheets (MDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

B. ENVIRONMENTAL CONDITIONS:

1. Monitor substrate temperature and material temperature, as well as all environmental conditions such as ambient temperature, moisture, sun, cloud cover, wind, humidity, and shade. Ensure conditions are satisfactory to begin work and ensure conditions remain satisfactory during the installation of specified materials. Materials and methods shall be adjusted as necessary to accommodate varying project conditions. Materials shall not be installed when conditions are unacceptable to achieve the specified results.
2. Precipitation and dew point: Monitor weather to ensure the project environment is dry before, and will remain dry, during the application of roofing materials. Ensure all roofing materials and substrates remain above the dew point temperature as required to prevent condensation and maintain dry conditions.
3. Heat-Welding Application: Take all necessary precautions and measures to monitor conditions to ensure all environmental conditions are safe to proceed with the use of torches and hot-air welding equipment. Combustibles, flammable liquids and solvent vapors that represent a hazard shall be eliminated and primers shall be fully dry before proceeding with heat-welding operations. Refer to NRCA CERTA recommendations.

1.11 PERFORMANCE REQUIREMENTS

A. WIND UPLIFT RESISTANCE:

1. Performance testing shall be in accordance with ANSI/FM 4474, FM 4450, FM 4470, UL 580 or UL 1897.
 - a. Roof System Design Pressures: Calculated in accordance with ASCE 7, or applicable standard, for the specified roof system attachment requirements:
 - i. Field of Roof (Zone 1): - 0 psf.
 - ii. Perimeter of Roof (Zone 2): - 0 psf.
 - iii. Corners of Roof (Zone 3): - 0 psf.

B. FIRE CLASSIFICATION:

1. Performance testing shall be in accordance with UL 790, ASTM E108, FM 4450 or FM 4470 to meet the 1:12 roof slope requirement.
 - a. Meets requirements of UL Class A or FM Class A.
2. Performance testing shall be in accordance with UL 1256, FM 4450 or FM 4470 to meet the specified requirements for interior flame spread and fuel contribution.
 - a. Meets requirements of UL 1256, or FM Class 1.

- C. ROOF SLOPE:
 - 1. Finished roof slope for SBS modified bitumen surfaces shall be ¼ inch per foot (2 percent) minimum for roof drainage.
- D. IMPACT RESISTANCE:
 - 1. Performance testing for impact resistance shall be in accordance with FM 4450, FM 4470, ASTM D3746 or CGSB 37-GP 56M to meet the specified impact resistance requirements.
 - a. Meets requirements for FM-SH (Severe Hail), ASTM D3746, or CGSB 37-GP 56M.
- E. LEED SUSTAINABLE SITES (SS) CREDITS:
 - 1. SS 7.2, Heat Island Effect-Roof. Cap sheet shall be surfaced with highly reflective mineral granules. (SOPREMA SG Granule surfacing basis of design):
 - a. Seventy-five percent of the low-slope roof area shall have an SRI value greater than, or equal to, 78 as published by the Cool Roof Rating Council (CRRC).
- F. ENERGY-STAR RATING:
 - 1. The roof membrane shall meet the approval requirements of the US EPA EnergyStar Program. Cap sheet shall be surfaced with highly reflective, factory-applied, tri-laminate film surfacing. (SOPREMA Soprastar cap sheet basis of design):
 - a. Membrane Cap Sheet shall be an EnergyStar Approved Product.
 - i. Solar Reflectance: Initial: 0.78 3-year: 0.74
 - ii. Thermal Emittance: Initial: 0.89 3-year: 0.66
 - iii. Solar Reflectance Index (SRI): Initial 97 3-year: 86
- G. ROOF EDGE SYSTEM SECUREMENT:
 - a. Performance testing in accordance with ANSI/SPRI ES-1.
 - b. Performance testing meets requirements for specified roof system design pressures.

1.12 WARRANTY

- A. Manufacturer's **No Dollar Limit (NDL)** Warranty. The manufacturer shall provide the owner with the manufacturer's warranty providing labor and materials for **10 15 20** years from the date the warranty is issued.
- B. The contractor shall guarantee the workmanship and shall provide the owner with the contractor's warranty covering workmanship for a period of 2 years from completion date.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. SINGLE SOURCE MANUFACTURER: All SBS modified bitumen membrane and flashing sheets shall be manufactured by a single supplier with 20 years or more manufacturing history in the US.

1. Comply with the Manufacturer's requirements as necessary to provide the specified warranty.
 - B. PRODUCT QUALITY ASSURANCE PROGRAM: Manufacturer shall be an ISO 9001 registered company. A 'Quality Compliance Certificate (QCC) for reporting/confirming the tested values of the SBS-Modified Bitumen Membrane Materials will be supplied upon request.
 - C. ACCEPTABLE MANUFACTURER:
 1. SOPREMA, located at: 310 Quadral Dr.; Wadsworth, OH 44281; Tel: 800-356-3521; Tel: 330-334-0066; Website: www.soprema.us.
 2. Acceptable Alternate Manufacturers: _____
- 2.02 ROOFING SYSTEM
- A. ROOFING SYSTEM BASIS OF DESIGN: **SOPREMA**
- 2.03 SBS-MODIFIED BITUMEN MEMBRANES
- A. BASE PLY/FLASHING BASE PLY
 1. BASE PLY/FLASHING BASE PLY, HEAT-WELDED:
 - a. SOPREMA **Sopralene Flam 180**: SBS-modified bitumen membrane with plastic burn-off film on top and bottom surfaces. Non-woven polyester reinforcement.
 - i. Thickness: 118 mils (3.0 mm)
 - ii. Width: 39.4 in (1 m)
 - iii. Length: 32.8 ft (10 m)
 - iv. Meets or exceeds ASTM D6164, Type I, Grade S.
 - B. CAP SHEET/FLASHING CAP SHEET:
 1. CAP SHEET/ FLASHING CAP SHEET, HEAT-WELDED:
 - a. SOPREMA **Sopralene Flam 180 FR GR**: SBS-modified bitumen membrane Cap Sheet with a burn-off film bottom surface and mineral granule top surface. Non-woven polyester reinforced. UL Class A for specified roof slope requirements.
 - i. Thickness: 157 mils (4.0 mm)
 - ii. Width: 39.4 in (1 m)
 - iii. Length: 32.8 ft (10 m)
 - iv. Meets or exceeds ASTM D6164, Type I, Grade G.
 - v. Granule Surfacing:
 - a) White mineral granules.
 - b) SOPREMA SG Granule. Highly reflective, bright white mineral granule surfacing, listed by the Cool Roof Rating Council (CRRC).
 - i) Solar Reflectance: Initial: 0.70
 - ii) Thermal Emittance: Initial: 0.89
 - iii) Solar Reflectance Index (SRI): Initial: 86
 - C. RIGID INSULATION
 1. POLYISOCYANURATE INSULATION, SOPREMA Sopra-ISOr:

- a. SOPREMA Sopra-ISOr: Closed cell polyisocyanurate foam core bonded on each side to a glass fiber-reinforced felt facer.
 - i. Thickness: 0.0 in minimum board thickness. Total thickness to meet specified insulation system thermal resistance 'R' value
 - ii. Meets or exceeds ASTM C1289, Type II, Class 1, [Grade 2 \(20 psi\)](#). [Grade 3 \(25 psi\)](#).
 - b. SOPREMA Sopra-ISOr Tapered: Closed cell polyisocyanurate foam core bonded on each side to a glass fiber-reinforced felt facer, tapered to provide slope.
 - i. Taper: [1/4 in per foot](#). Insulation, crickets and saddles provided with taper as required for positive roof slope.
 - ii. Meets or exceeds ASTM C1289, Type II, Class 1, [Grade 2 \(20 psi\)](#). [Grade 3 \(25 psi\)](#).
- D. COVER-BOARD
- 1. ASPHALTIC ROOF BOARD
 - a. SOPREMA, **SOPRABOARD**: Mineral fortified, asphaltic roof substrate board with glass fiber facers. For use as roof cover-board and for vertical flashing substrate. ASPHALTIC ROOF BOARD shall be manufactured by the membrane supplier.
 - i. Thickness: 1/8 in 1/4 in
 - ii. Dimensions: 4 x 4 ft and 4 x 8 ft acceptable for mechanical attachment, insulation adhesive or asphalt application.
 - 2. GYPSUM ROOF BOARD
 - a. National Gypsum Company, DEXcell FA:
 - i. Gypsum core, glass fiber-faced, roof board:
 - ii. Thickness: [5/8 in 1/2 in 1/4 in](#)
 - iii. Dimensions: 4 x 4 foot or 4 x 8 foot boards
 - iv. Facer: Glass fiber.
 - v. Meets or exceeds ASTM C1177/C1177M.
 - b. Georgia Pacific Gypsum LLC, DensDeck Prime: Gypsum core, glass fiber-faced, factory primed, roof Cover-board.
 - i. Thickness: [5/8 in 1/2 in 1/4 in](#)
 - ii. Dimensions: [4 x 4 ft or 4 x 8 ft](#) boards.
 - iii. Facer: Factory primed, glass fiber.
 - iv. Meets or exceeds ASTM C1177/C1177M.
 - c. United States Gypsum, Securock: Gypsum core, fiber-reinforced roof Cover-board.
 - i. Thickness: [5/8 in 1/2 in](#)
 - ii. Dimensions: [4 x 4 ft or 4 x 8 ft](#) boards
 - iii. Facer: None.
 - iv. Meets or exceeds ASTM C1278.
 - 3. HIGH DENSITY POLYISOCYANURATE COVER-BOARD
 - a. SOPREMA Sopra-ISO Hr: 1/2 in thick, 4x8 ft. high density polyisocyanurate foam core bonded on each side to a coated inorganic glass-reinforced facer.

- i. R 2.5 for ½ in thickness.
- ii. Meets or exceeds ASTM C1289, Type II, Class 4, 100 psi.
- iii. Meets or exceeds ASTM D3273 for resistance to mold growth.

E. INSULATION ADHESIVE

1. POLYURETHANE FOAM INSULATION ADHESIVE

- a. SOPREMA **DUOTACK**: Two-component, polyurethane foam insulation adhesive, applied in ribbons from cartridges or two-component bulk packaging with pump-driven delivery system.
 - i. Ribbon size: 1/2 in to 3/4 in wide.
 - ii. Ribbon spacing: As required to meet specified wind uplift resistance performance.
 - a) Field of Roof (Zone 1): 12 in on-centers
 - b) Perimeter of Roof (Zone 2): 6 in on-centers
 - c) Corners of Roof (Zone 3): 4 in on-centers

2. ASPHALT INSULATION ADHESIVE

- a. MOPPING ASPHALT: Approved for use as insulation adhesive, complying with ASTM D312, **Type III or IV**. The Equiviscous Temperature (EVT), the finished blowing temperature (FBT) and the flash point (FP) shall be indicated on each container.
 - a) Application Rate: Full coverage, applied at EVT for a nominal rate of 23-25 lbs/square.

2.04 ACCESSORIES

A. PRIMERS:

- 1. SOPREMA **Elastocol Stick Zero Primer**: Zero VOC, self-adhesive membrane primer. Low VOC solvent-based primer for the preparation of roof membrane and flashing substrates for self-adhered SBS membrane and self-adhered SBS flashing applications.
- 2. SOPREMA **Elastocol 350 Primer**: Polymer emulsion primer, meeting low VOC requirements for the preparation of roof membrane and flashing substrates for asphalt, torch and COLPLY and COLPLY MODIFIED ADHESIVE, solvent-based, cold adhesive-applied and cement applications.

B. GENERAL PURPOSE ROOFING CEMENT AND MASTIC

- 1. SOPREMA Sopramastic: **SBS Elastic Cement**. Fiber-reinforced, roofing cement, packaged in 5 gallon pails. General purpose roofing cement for low-slope roofing used for sealing membrane T-joints and membrane edges along terminations, transitions and at roof penetrations.
 - a. VOC Content: 190 g/L or less.
 - b. Meets or exceeds ASTM D4586, Type I, Class II.
- 2. SOPREMA Sopramastic: **SBS Mastic**. Fiber-reinforced, roofing cement, packaged in 10.4 oz caulk tubes. General purpose roofing cement for low-slope roofing used for sealing membrane T-joints and membrane edges along terminations, transitions and at roof penetrations.

- a. VOC Content: 190 g/L or less.
 - b. Meets or exceeds ASTM D4586, Type I, Class II.
- C. INSULATION FASTENERS AND PLATES
 - 1. SOPREMA #12 DP Fastener and 3 in stress plate: Insulation system fasteners and metal stress plates.
 - 2. SOPREMA #14 MP Fastener and 3 in stress plate: Insulation system fasteners and metal stress plates.
- D. LIQUID-APPLIED REINFORCED FLASHING SYSTEM:
 - 1. SOPREMA Alsan Flashing: Single-component, polyurethane-bitumen resin with polyester reinforcing fleece fabric fully embedded into the resin to form roof system flashings.
 - a. VOC Content: 250 g/L.
 - b. Alsan Flashing: Liquid resin, Meets or exceeds ASTM C836.
 - c. Alsan PolyFleece: Non-woven polyester reinforcement.
 - d. Surfacing: Alsan Flashing with mineral granules broadcast into wet Alsan Flashing to match adjacent SBS-modified bitumen cap sheet.
- E. MINERAL GRANULES:
 - 1. SOPREMA Granules: No. 11, mineral coated colored granules, color to match cap sheet, supplied by membrane cap sheet manufacturer.
 - a. SOPREMA Granules
 - b. [SOPREMA SG Granules](#)
- F. SHEET METAL FLASHING:
 - 1. Contractor shall furnish all sheet metal flashings, counter flashings, roof edge system, and all other related sheet metal flashings and associated fasteners necessary to flash and counter flash the specified roofing system.
 - 2. Sheet metal flashing materials and fasteners shall be compatible with adjacent materials, to accommodate all project related exposures.
 - 3. Roof Edge System: Tested per ANSI/SPRI ES-1 to meet or exceed design pressures at roof edge.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examination includes visual observations, qualitative analysis, and quantitative testing measures as necessary to ensure conditions remain satisfactory throughout the project.
- B. The contractor shall examine all roofing substrates including, but not limited to: insulation materials, roof decks, walls, curbs, rooftop equipment, fixtures, and wood blocking.
- C. The applicator shall not begin installation until conditions have been properly examined and determined to be clean, dry and, otherwise satisfactory to receive specified roofing materials.
- D. During the application of specified materials, the applicator shall continue to examine all project conditions to ensure conditions remain satisfactory to complete the specified roofing system.

3.02 PREPARATION

- A. Before commencing work each day, the contractor shall prepare all roofing substrates to ensure conditions are satisfactory to proceed with the installation of specified roofing materials. Preparation of substrates includes, but is not limited to, substrate repairs, securement of substrates, eliminating all incompatible materials, and cleaning.
- B. Where conditions are found to be unsatisfactory, work shall not begin until conditions are made satisfactory to begin work. Commencing of work shall indicate contractor's acceptance of conditions.

3.03 INSULATION SYSTEM APPLICATION

- A. Follow insulation system component product data sheets, published general requirements and, approvals.
- B. Install all insulation system components on clean, dry, uniform and, properly prepared substrates.
- C. All insulation system boards shall be carefully installed and fitted against adjoining sheets to form tight joints.
- D. Insulation system boards that must be cut to fit shall be saw-cut or knife-cut in a straight line, not broken. Chalk lines shall be used to cut insulation components. Uneven or broken edges shall not be accepted. Remove dust and debris that develops during cutting operations.
- E. Stagger successive layers of insulation 12 in vertically and laterally to ensure board joints do not coincide with joints from the layers above and below.
- F. Crickets, saddles, and tapered edge strips shall be installed before installing Cover-boards.
- G. Install tapered insulation, saddles and crickets as required to ensure positive slope for complete roof drainage.
- H. Cover-boards shall be installed to fit tight against adjacent boards. When required by the Cover-board manufacturer, a uniform gap shall be provided between Cover-boards using a uniform guide placed between board joints to form a gap between all boards during installation.
- I. The finished insulation system surface shall be tight to, and flush with, adjacent substrates to form a satisfactory substrate to install specified roof membrane and flashings.
- J. Install specified cants where required for membrane flashing transitions.

3.04 INSULATION FASTENER APPLICATION

- A. Fasten (Thermal Barrier, Insulation Base Layer, Insulation, Coverboard) to the deck using specified insulation fasteners and plates.
- B. Evenly distribute fasteners as required by the board manufacturer's published requirements.

- C. Fasten the insulation to meet the specified wind uplift resistance performance requirements and warranty requirements.
- D. Minimum insulation fastening requirement:
 - 1. Field of Roof (Zone 1): 1 fastener per 0.00 square ft
 - 2. Perimeter of Roof (Zone 2): 1 fastener per 0.00 square ft
 - 3. Corners of Roof (Zone 3): 1 fastener per 0.00 square ft
- E. Minimum insulation fastening requirement:
 - 1. Field of Roof (Zone 1): 00 fasteners per 4x8 ft board.
 - 2. Perimeter of Roof (Zone 2): 00 fasteners per 4x8 ft board.
 - 3. Corners of Roof (Zone 3): 00 fasteners per 4x8 ft board.
- F. For insulation and Cover-boards located partially within the defined perimeter and/or corners, install fastening for the entire board as specified herein.

3.05 INSULATION ADHESIVE APPLICATION

- A. Apply the specified two-component insulation adhesive to adhere (Insulation Base Layer, Insulation Layers, Coverboard) to the deck and insulation substrate(s).
- B. Follow insulation adhesive product data sheets and published general requirements for installation requirements.
- C. Apply insulation adhesive in uniform ribbons, 1/2 in to 3/4 in wide.
- D. Immediately install insulation components into insulation adhesive, and apply weight to ensure the materials maintain full contact with all ribbons for complete adhesion. Do not allow insulation adhesive to skin-over before placing the insulation materials into the adhesive.
- E. Adhere the insulation system to meet the specified wind uplift resistance performance and specified warranty requirements.
- F. Minimum insulation adhesive ribbon spacing:
 - 1. Field of Roof (Zone 1): 12 in on-centers.
 - 2. Perimeter of Roof (Zone 2): 6 in on-centers.
 - 3. Corners of Roof (Zone 3): 4 in on-centers.

3.06 INSULATION ADHESIVE (ASPHALT) APPLICATION

- A. Fully adhere (Insulation Base Layer, Insulation Layers, Coverboard) to deck and insulation substrate(s) using specified mopping asphalt.
- B. Install full coverage of mopping asphalt applied at 25-30 lbs/square, and as required to meet specified wind uplift approvals and warranty requirements.
- C. Immediately install insulation components into hot asphalt, and apply weight to ensure the insulation materials maintain full contact with the asphalt for full adhesion.

3.07 PRIMER APPLICATION

- A. Examine all substrates, and conduct adhesion peel tests as necessary, to ensure satisfactory adhesion is achieved.

- B. Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified roofing materials.
- C. Apply primer using brush, roller, or sprayer at the rate published on the product data sheet.
- D. Asphalt Primer: Apply **ELASTOCOL 350** primer to dry compatible masonry, metal, wood and other required substrates before applying asphalt and heat-welded membrane plies. Primer is optional for solvent based solvent-based SBS adhesives and cements, refer to product data sheets.
- E. Self-Adhesive Membrane Primer: Apply **ELASTOCOL STICK ZERO** to dry, compatible substrates as required to enhance adhesion of self-adhesive membrane plies. Ensure self-adhered membrane primer is tacky to-the-touch, but not wet. Primer should not transfer to the finger tips when touched.
- F. Project conditions vary throughout the day. Monitor changing conditions, monitor the drying time of primers, and monitor the adhesion of the membrane plies. Adjust primer and membrane application methods as necessary to achieve the desired results.

3.08 HEAT WELDING

- A. The Contractor is responsible for project safety. Where conditions are deemed unsafe to use open flames, manufacturer's alternate membrane application methods shall be used to install SBS modified bitumen membrane and flashings. Acceptable alternate installation methods include hot asphalt, cold adhesive-applied, self-adhered membranes and mechanically fastened plies. Hot-air welding equipment may be used in lieu of roof torches to seal membrane side and end laps where heat welding the laps is necessary. Refer to NRCA CERTA, local codes and building owner's requirements for hot work operations.
- B. Single or multi-nozzle, hand-held propane roof torches shall be used to install heat-welded membrane and flashing plies. Multi-nozzle carts (dragon wagons) may also be utilized to install membrane plies. Seven (7) nozzle carts are recommended for more uniform heat application in lieu of five (5) nozzle carts.

3.09 SBS MASTIC AND GENERAL PURPOSE ROOFING CEMENT APPLICATION

- A. Apply SOPREMA Sopramastic general purpose SBS mastic and roofing cement to seal drain leads, metal flanges, seal along membrane edge at terminations, and where specified and required in detail drawings.
- B. Do not use general purpose SBS mastics and roofing cement where flashing cement applications are required. Do not use SBS mastics and roofing cement beneath SBS-modified bitumen membrane and flashing plies.
- C. Apply general purpose SBS mastic and elastic roofing cement using caulk gun, or notched trowel at 2.0 – 2.5 gallons per square on each surface. Application rates vary based on substrate porosity and roughness. Tool-in as necessary to seal laps
- D. Embed matching granules into wet cement where exposed.

3.10 HEAT-WELDED, FULLY ADHERED MEMBRANE APPLICATION

- A. Follow material product data sheets and published general requirements for installation instructions.
- B. Ensure environmental conditions are safe and satisfactory, and will remain safe and satisfactory, during the application of the heat-welded membrane and flashings.
- C. Ensure all primers are fully dry before beginning heat-welding operations.
- D. Unroll membrane onto the roof surface and allow time to relax prior to heat welding.
- E. Starting at the low point of the roof, lay out the membrane to ensure the plies are installed perpendicular to the roof slope, shingled to prevent back-water laps.
- F. Ensure all roofing and flashing substrates are prepared and acceptable to receive the heat-welded membrane.
- G. Cut membrane to working lengths and widths to conform to rooftop conditions, and lay out to always work to a selvage edge.
- H. Ensure specified side-laps and end-laps are maintained. End-laps should be staggered 3 ft apart.
- I. Direct roof torch on the roll as necessary to prevent overheating and damaging the membrane and substrates.
- J. As the membrane is unrolled, apply heat to the underside of the membrane until the plastic burn-off film melts away. Continuously move the torch side-to-side across the underside of the roll to melt the bitumen on the underside of the sheet, while continuously unrolling membrane.
- K. While unrolling and heating the sheet, ensure a constant flow hot bitumen approximately $\frac{1}{4}$ to $\frac{1}{2}$ in flows ahead of the roll as it is unrolled, and there is $\frac{1}{8}$ to $\frac{1}{4}$ in bleed out at all laps.
- L. Adjust the application of heat to the underside of the membrane and to substrate as required for varying substrates and environmental conditions.
- M. At the 6 in end-laps, melt the plastic burn-off film from the top surface or embed granules and remove surfacing, where present, using a torch or hot-air welder.
- N. At end-laps, cut a 45 degree dog-ear away from the selvage edge, or otherwise ensure the membrane is fully heat-welded watertight at all T-joints.
- O. Each day, physically inspect all side and end-laps, and ensure the membrane is sealed watertight. Where necessary, use a torch or hot-air welder and a clean trowel to ensure all laps are fully sealed.
- P. Inspect the installation each day to ensure the plies are fully adhered. Repair all voids, wrinkles, open laps and all other deficiencies.
- Q. Offset cap sheet side and end-laps away from the base ply laps so that cap sheet laps are not located within 18 in of base ply laps.

3.11 FLASHING APPLICATION, HEAT WELDED

- A. Refer to SBS manufacturer's membrane application instructions, flashing detail drawings, and follow product data sheets and other published requirements for installation instructions. Refer to manufacturer's membrane flashing detail drawings.

- B. The contractor is responsible for project safety. Refer to NRCA CERTA recommendations and building owner requirements for hot work operations.
- C. Where required to seal substrates for fire safety, install specified adhered, self-adhered or fastened backer ply to the substrate. Ensure backer-ply covers and seals all substrates requiring protection from exposure to torch operations.
- D. Ensure all flashing substrates that require primer are primed, and the primer is fully dry.
- E. Unroll the flashing base ply and flashing cap sheet onto the roof surface to their complete length. Once relaxed, cut the membrane to the required working lengths to accommodate the flashing height, cants and the required over-lap onto the horizontal roof surface.
- F. Cut the flashing membrane from the end of the roll in order to always install flashings to the side-lap line or selvage edge line.
- G. Lay out the flashing base ply and flashing Cap Sheet to offset all side-laps a minimum of 12 inches so that side-laps are never aligned on top of the ply beneath. Shingle the flashing ply laps to prevent back-water laps.
- H. Install non-combustible cant strips at transitions where required.
- I. Ensure correct membrane and flashing sequencing to achieve redundant, multiply, watertight flashings.
- J. ROOF MEMBRANE BASE PLY:
 - 1. Before installing flashings, install the roof membrane base ply in the horizontal field of the roof, and extend the base ply up to the top of the cant, where present, at roof terminations, transitions and penetrations.
- K. FLASHING BASE PLY:
 - 1. Install the flashing base ply starting at the top leading edge of the vertical flashing substrate, down over the cant and onto the horizontal surface of the roof a minimum of 3 inches beyond the of base of the cant onto the roof. Cut the base ply at corners to form 3 inch side-laps. Install gussets to seal corner transitions.
 - 2. Install one or more flashing base ply(s) at all roof terminations, transitions and penetrations.
- L. ROOF MEMBRANE CAP SHEET:
 - 1. Install the roof membrane Cap Sheet in the horizontal field of the roof over the flashing base ply up to the roof termination, transition or penetration, and up to the top of cants where present.
 - 2. Using a chalk line, mark a line on the membrane cap sheet a minimum of 4 inches from the base of the cant onto the roof. Where granules are present, embed the cap sheet granules using a torch and trowel or granule embedder to prepare the surface to receive the flashing cap sheet.
- M. FLASHING CAP SHEET:
 - 1. Install the flashing Cap Sheet starting at the top leading edge on the vertical substrate, over the cant and onto the roof surface 4 inches from the base of the cant onto the roof.
 - 2. Install the flashing Cap Sheet to ensure a minimum two (2) ply flashing system is present at all roof terminations, transitions and penetrations.

- N. During the membrane and flashing installation, ensure all plies are completely adhered into place, with no bridging, voids or openings. Ensure bitumen or flashing cement bleed-out is present at all flashing side and end-laps.
- O. Use a damp sponge float or damp rag to press-in the heat-welded flashing plies during installation.
- P. Where sufficient bitumen bleed-out is not present, and for all self-adhered plies, apply specified gun-grade sealant or mastic to seal the membrane termination along all roof terminations, transitions and penetrations. These include gravel stop edge metal, pipe penetrations, along the top edge of curb and wall flashing, and all other flashing terminations where necessary to seal flashings watertight.
- Q. Fasten the top leading edge of the flashing 8 in on-centers with appropriate 1 in metal cap nails or other specified fasteners and plates. Seal fastener penetrations watertight using specified sealant or mastic.
- R. Manufacturer's liquid-applied, reinforced flashing systems shall be installed where conditions are not favorable to install SBS modified bitumen flashings. Such conditions include irregular shapes penetrating roof surfaces (I-beams), confined areas and low flashing heights. Manufacturer's liquid-applied, reinforced flashing systems are recommended in lieu of pitch pans and lead pipe flashings.

3.12 LIQUID-APPLIED, SINGLE-COMPONENT, BITUMEN-URETHANE FLASHING SYSTEM APPLICATION, SOPREMA **ALSAN FLASHING**:

- A. Refer to manufacturer's details drawings, product data sheets and published general requirements for application rates and specific installation instructions
- B. Pre-cut SOPREMA ALSAN POLYFLEECE polyester reinforcing fleece to conform to roof terminations, transitions and penetrations being flashed. Ensure a minimum 2 in overlap of fleece at side and end-laps. Ensure the completed liquid-applied flashing membrane is fully reinforced.
- C. Apply the base coat of SOPREMA ALSAN FLASHING liquid-applied flashing resin onto the substrate using a brush or roller, working the material into the surface for complete coverage and full adhesion at 2.0 gallons per square.
- D. Immediately apply the SOPREMA ALSAN POLYFLEECE reinforcing into the wet base coat of resin. Using a brush or roller, work the SOPREMA ALSAN POLYFLEECE into the wet resin while applying the second coat of SOPREMA ALSAN FLASHING resin to completely encapsulate the fleece at 2.0 gallons per square, and extend the liquid resin 1 inch beyond the fleece.
- E. Allow the liquid membrane to sufficiently cure for 24 to 48 hours then apply the finish coat of SOPREMA ALSAN FLASHING resin at 2.0 gallons per square.
- F. Broadcast mineral granules into the wet finish coat as required to match the adjacent cap sheet.

3.13 SHEET METAL FLASHING APPLICATION

- A. Refer to sheet metal flashing detail drawings, and follow product data sheets and published general requirements for installation instructions.

- B. Follow the most recent edition of the SMACNA Architectural Sheet Metal Manual for fabrication and installation requirements.

3.14 WALKWAYS

- A. At areas outlined on the drawings, and around the perimeter of all rooftop equipment and at all door and stair landings, install walkway protection.
- B. Cut walkway from end of rolls. No piece shall be less than 24 in.
- C. Provide a 2 in space between sheets for drainage.

3.15 CLEAN-UP

- A. Clean-up and properly dispose of waste and debris resulting from these operations each day as required to prevent damages and disruptions to operations.

END OF SECTION

Guide Specification