

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

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hybrid roofing system that combines built-up ply sheets with styrene-butadiene-styrene (SBS)-modified bituminous cap sheet.
2. Rigid Insulation (to be installed above roof decks)
3. Walkways.

B. Related Sections:

1. Section 055000 – Metal Fabrications.
2. Section 061000 – Rough Carpentry.
3. Section 076200 – Sheet Metal Flashing and Trim.
4. Section 077100 – Roof Specialties.
5. Section 077200 – Roofing Accessories.

C. Reference and Industry Standards

1. The following reference standards shall be applicable to this Section:
 - a. New York City Building Code, **current** edition, as amended, inclusive of:
 - Chapter 15 Roof Assemblies and Roof Structures
 - Chapter 16 Structural Design
 - b. New York City Energy Conservation Construction Code, **current** edition, as amended.
 - c. The current Enterprise Green Communities (EGC) Criteria, and the current New York City Overlay.
2. Industry Standards:
 - ARMA (Asphalt Roofing Manufacturers Association)
 - ASTM (American Society for Testing and Materials)
 - CRRC (Cool Roof Rating Council)
 - FM (Factory Mutual Standards Laboratories Department)
 - NRCA (National Roofing Contractors Association)
 - PIMA (Polyisocyanurate Insulation Manufacturers Association)
 - SPRI (Single-Ply Roofing Industry)

D. The current NYC Overlay of the current Enterprise Green Communities Criteria:

1. Mandatory Requirements: See the NYC Overlay of the EGC reference standard for full specifications.

- a. All projects must achieve compliance with the mandatory criteria measures that are applicable:

- Criterion 6.4: Healthier Material Selection
- Criterion 6.9: Managing Moisture: Roofing and Wall Systems
- Criterion 6.10: Construction Waste Management.

2. Optional Project Requirements for Certification Points

- a. Additionally, rehab projects are required to achieve 55 optional points. Criteria with optional points related to this Specification Section include, but are not limited to:

- Criterion 6.1 Ingredient Transparency for Material Health
- Criterion 6.2 Recycled Content and Ingredient Transparency
- Criterion 6.4: Healthier Material Selection
- Criterion 6.5: Environmentally Responsible Material Selection
- Criterion 6.7: Regional Materials
- Criterion 6.10: Construction Waste Management.

- 1.2 PREINSTALLATION MEETINGS

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

- 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.

- 1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates:
 1. 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.
- C. Sample warranties.
- D. Documentation for compliance with Enterprise Green Communities Criteria.

- 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 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 15 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, ASTM D4272.
- C. SPRI's Directory of Roof Assemblies 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 SPRI's Directory of Roof Assemblies for roof assembly identical to that specified for this Project.
- D. Energy Code Performance: Roofing system shall have:
 - (1) a minimum 3-year aged Solar Reflectance Index when tested in accordance with ASTM C1549, ASTM E903 ASTM E1918, or CRRC-S100.
 - (2) a minimum 3-year aged Thermal Emittance when tested in accordance with ASTM C1371, ASTM E408, or CRRC-S100.
- E. 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.
- F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated.
 - 1. Identify products with appropriate markings of applicable testing agency.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain components for roofing system from the same manufacturer.

2.3 BASE SHEET MATERIALS

- A. SBS-Modified Bitumen Fiberglass Mat Base Sheet: ASTM D6163, Type II, Grade S, SBS-modified asphalt sheet, reinforced with fiberglass fabric, smooth surfaced, suitable for cold adhesive.

2.4 INTERPLY SHEETS

- A. Glass-Fiber Interply Sheet: ASTM D2178, Type IV, asphalt-impregnated, glass-fiber felt.

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

- A. Smooth-Surfaced Roofing Cap Sheet: ASTM D6164, Type I, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric, suitable for cold adhesive application method.
- B. Granule-Surfaced Roofing Cap Sheet: ASTM D6164/D6164M, Type I, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric, suitable for cold adhesive application method
 - 1. Granule Color: White.

2.6 BASE FLASHING SHEET MATERIALS

- A. Granule-Surfaced Flashing Sheet: ASTM D6164, Type I or II, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric, granule surfaced, suitable for application method specified, and as follows:
 - 1. Granule Color: White.

2.7 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 - 1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- C. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

- E. Cold-Applied Asphalt Adhesive: ASTM D3019, Type III, roof membrane manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive, specially formulated for compatibility and use with roofing membrane and base flashings.
- F. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required by roofing system manufacturer for application.
- 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. Roofing Granules: Roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve; color to match roof membrane.
- I. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.8 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C1289, [**Type II, Class 1, Grade 2**] [**Type II, Class 1, Grade 3**], felt or glass-fiber mat facer on both major surfaces.
 - 1. Size: [**48 by 48 inches**] [**48 by 96 inches**].
 - 2. Thickness:
 - a. Base Layer: < **Portion of thickness to achieve Energy Code R-Value**>.
 - b. Upper Layer: <**Remainder of thickness to achieve Energy Code R-Value**>.

2.9 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 as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
 - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
 - 3. Full-spread spray-applied, low-rise, two-component urethane adhesive.
- C. Insulation Cant Strips: ASTM C728, perlite insulation board.
- D. Insulation Cant Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Wood Nailer Strips: Comply with requirements in *Section 061000 – Rough Carpentry*.
- F. Tapered Edge Strips: ASTM C728, perlite insulation board.

- G. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

2.10 ASPHALT MATERIALS

- A. Asphalt Primer: ASTM D41.
- B. Roofing Asphalt: ASTM D312, Type III or IV as recommended by roofing system manufacturer for application.

2.11 WALKWAYS

- A. Walkway Pads: Manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, **[3/8 inch]** **[1/2 inch]** **[3/4 inch]** thick, minimum.
 - 1. Pad Size: Approximately 36 by 60 inches **<Insert size>**.
 - 2. Color: Contrasting with cap sheet.

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.

3.2 PREPARATION

- A. Prime roof surface with asphalt primer at a rate of 3/4 gal./100 sq. ft., and allow primer to dry.
- B. Perform fastener-pullout tests according to roof system manufacturer's recommendations.
 - 1. Submit test result within 24 hours of performing tests.
 - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav listed roof assembly or SPRI's Directory of Roof Assemblies listed roof assembly requirements.
- 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 and to not void warranty for existing roofing system.

- 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. Nailer Strips: Mechanically fasten 4-inch nominal-width wood nailer strips of same thickness as insulation perpendicular to sloped roof deck at the following spacing:
 - 1. **[16 feet]** **<Insert dimension>** apart for roof slopes greater than 1 inch per 12 inches but less than 3 inches per 12 inches.
- D. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.
- E. Installation Over **[Wood]** **[Wood Panel]** Decking:
 - 1. Mechanically fasten **[sheathing paper]** **[asphalt-coated fiberglass-mat base sheet]** to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to **[wood]** **[wood panel]** decks.
 - a. Lap edges a minimum of 2 inches, or as recommended by roof membrane manufacturer.
 - b. Lap ends a minimum of 6 inches, or as recommended by roof membrane manufacturer.
 - c. Fasten **[sheathing paper]** **[asphalt-coated fiberglass-mat base sheet]** according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - d. Fasten **[sheathing paper]** **[asphalt-coated fiberglass-mat base sheet]** to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 2. Install base layer of insulation with **[joints staggered not less than 24 inches in adjacent rows]** **[end joints staggered not less than 12 inches in adjacent rows]**.
 - a. Where installing composite and non-composite insulation in two or more layers, install non-composite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - 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 **[wood]** **[wood panel]** decks.
 - h. Adhere base layer of insulation to substrate using adhesive as follows:
 - 1) Set base layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
 - 2) Set base layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 3) Set base layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
3. Install upper layers of insulation and tapered insulation, with joints of each layer offset not less than 12 inches from previous layer of insulation.
- a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - e. 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.
 - f. Fill gaps exceeding 1/4 inch with insulation.
 - g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - h. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and, as follows:
 - 1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
 - 2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

F. Installation Over Concrete Decks:

1. Install base layer of insulation with [**joints staggered not less than 24 inches in adjacent rows**] [**end joints staggered not less than 12 inches in adjacent rows**].
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - c. 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.
 - d. Fill gaps exceeding 1/4 inch with insulation.
 - e. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - f. Adhere base layer of insulation to [**concrete roof deck**] [**vapor retarder**] according to [**FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification**] [**SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity**] and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft., and allow primer to dry.
 - 2) Set insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
 - 3) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 4) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
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.
 - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - e. 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.

- f. Fill gaps exceeding 1/4 inch with insulation.
- g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- h. Adhere each layer of insulation to substrate using adhesive, as selected from the following:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread 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, as selected, from the following:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- B. Install sheathing paper over cover board and immediately beneath roof membrane.

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. Where roof slope exceeds [**1/2 inch per 12 inches**] [**3/4 inch per 12 inches**] <Insert slope>, install roofing membrane sheets parallel with slope.
 - 1. Backnail roofing sheets to [**nailer strips**] [**substrate**] according to roofing system manufacturer's written instructions.

- D. 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.
 - 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. Loosely lay one course of sheathing paper, lapping edges and ends a minimum of 2 inches and 6 inches, respectively.
- C. Installation of SBS-Modified Bitumen Polyester-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. Mechanically attach base sheet to roof deck using mechanical fasteners specifically designed and sized for fastening base sheet to **[wood]** **[wood panel]** decks.
 - a. Fasten base sheet to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 6. Install base sheet without wrinkles, rears, and free from air pockets.
 - 7. 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. **[Heat weld end laps,]** **[Completely bond and seal laps,]** leaving no voids.
 - e. Roll laps with a 20-pound roller.
 - 8. Repair tears and voids in laps and lapped seams not completely sealed.

9. 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.

D. Installation of Asphalt-Coated 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. Mechanically attach base sheet to roof deck using mechanical fasteners specifically designed and sized for fastening base sheet to **[wood]** **[wood panel]** decks.
 - a. Fasten base sheet to resist specified uplift pressure at corners, perimeter, and field of roof.
5. Adhere to substrate in a uniform coating of cold-applied adhesive.
6. Install base sheet without wrinkles or tears, and free from air pockets.
7. 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.
8. Repair tears and voids in laps and lapped seams not completely sealed.

E. Installation of Vented Base Sheet:

1. Mechanically fasten, using mechanical fasteners specifically designed and sized for fastening to applicable substrate vented base sheet with vented side down.

3.8 INSTALLATION OF INTERPLY SHEETS

A. Install one ply sheet, starting at low point of roofing.

1. Align ply sheets without stretching.
2. Extend ply sheets over and terminate above cants.

3.9 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.
- C. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.
- 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. Apply roofing granules of same color as roof membrane to cover exuded bead at laps while bead is hot, to provide a continuous color appearance.
- F. Aggregate Surfacing: After installing and testing roofing, base flashing, and stripping, promptly apply flood coat to roof surface with 60 lb/100 sq. ft. of hot roofing asphalt. While flood coat is hot and fluid, cast the following average weight of aggregate in a uniform course:
 - 1. Aggregate Weight: [400 lb/100 sq. ft.] [300 lb/100 sq. ft.].

3.10 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. Backer Sheet Application:
 - a. Mechanically fasten backer sheet to walls or parapets.
 - b. Adhere backer sheet over roofing membrane at cants in cold-applied adhesive.
 - c. Seal all laps.
 - 3. Backer Sheet Application:
 - a. Mechanically fasten backer sheet to walls or parapets.
 - b. Adhere backer sheet to substrate in cold-applied adhesive.
 - c. Seal all laps.
 - 4. 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.
- 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. Roof Drains: Set [**30-by-30-inch-**] **<Insert dimensions>** 4-pound lead flashing in bed of asphaltic adhesive on completed roofing membrane.
1. Cover lead flashing with roofing cap-sheet stripping, and extend a minimum of [**4 inches**] [**6 inches**] beyond edge of metal flashing onto field of roofing membrane.
 2. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
 3. Install stripping according to roofing system manufacturer's written instructions.

3.11 INSTALLATION OF WALKWAYS

- A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.
1. Install walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Top and bottom of each roof access ladder.
 - e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - f. Locations indicated on Drawings.
 - g. As required by roof membrane manufacturer's warranty requirements.
 2. Provide 3-inch clearance between adjoining pads.
 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.12 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 system 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 075216