

## **SECTION 07 5500 - SBS MEMBRANE ROOFING**

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### **PART 1- GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SECTION INCLUDES:**

- A. Work results specified in this section includes the following:
  1. Preparation of substrate to receive roofing materials.
  2. Installation of roofing insulation.
  3. Application of roofing membranes.
  4. Installation of membrane metallic coated flashings.
  5. Installation of metal flashings.

#### **1.3 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION**

- A. Sheet Metal Flashing and Trim.
- B. Sheet Metal Roofing Specialties.
- C. Roofing Accessories.

#### **1.4 RELATED SECTIONS**

- A. Section 06 10 00 "Rough Carpentry" for blocking and nailers.
- B. Structural drawings and specifications for pressure fire treated plywood roof decking.
- C. Section 07 6000 "Flashing and Sheet Metal" for metal flashings and formed roofing metal components.

#### **1.5 DESCRIPTION OF WORK**

- A. The basic work descriptions required in this specification are referenced below. Refer to Part 2 of this specifications for manufacturers and products.
  1. Insulation - bottom layer: **One** layer of having a thickness of 2 inches, mechanically attached simultaneously with the top lay of insulation.
  2. Insulation – middle layer: Tapered providing for a slope of ¼-inch per foot, having a minimum starting thickness of **1/2** inch, mechanically attached simultaneously with top layer of insulation.
  3. Insulation - top layer: Cover Board, having a thickness of 1/2 inch, mechanically attached.
  4. Roof System: Torch applied 2 ply SBS with fire resistant top sheet.
  5. Flashing System: Metallic coated, torch applied.

#### **1.6 SUBMITTALS**

A. Submittal of Equals: Submit primary roof systems to be considered as equals to the specified roof system no less than 10 days prior to bid date. Submittals shall include the following:

1. Latest edition of the roofing system manufacturer's specifications and installation instructions.
2. Evidence of Factory Mutual Approval Standard 4470 for the proposed membrane system.
  - a) The roof configuration (including fastening of base sheet or insulation) shall be approved by FM for minimum 1-135 windstorm construction.
  - b) The roof membrane configuration shall be approved by FM for Class 1-SH (severe hail) exposure.
3. List of 3 of the proposed primary roofing manufacturer's projects, located in this region, of equal size and degree of difficulty which have been performing successfully using the same products and system as proposed for a period of at least 10 years.
4. Letter from the proposed primary roofing manufacturer confirming that the filler content in the elastomeric blend of the proposed roof membrane and flashing components does not exceed 35% in weight.
5. Complete list of material physical and mechanical properties for each sheet including: weights and thicknesses; low temperature flexibility; peak load; ultimate elongation; dimensional stability; compound stability; high temperature stability; granule embedment and resistance to thermal shock for foil faced products.
6. Sample copy of the proposed guarantee.

B. Submittals Prior to Contract Award:

1. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.
2. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

~~C. Submittals Prior to Project Close-out:~~

- ~~1. Certificate of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 6298 and indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate of Analysis for each production run of material shall indicate the following information:~~
  - ~~a) Material type~~
  - ~~b) Lot number~~
  - ~~c) Production date~~
  - ~~d) Dimensions and Mass (indicate the lowest values recorded during the production run);~~
    - ~~— Roll length~~
    - ~~— Roll width~~
    - ~~— Selvage width~~
    - ~~— Total thickness~~
    - ~~— Thickness at selvage (coating thickness)~~
    - ~~— Weight~~
  - ~~e) Physical and Mechanical Properties;~~
    - ~~— Low temperature flexibility~~
    - ~~— Peak load~~
    - ~~— Ultimate Elongation @ 5% Maximum Load~~
    - ~~— Dimensional stability~~
    - ~~— Compound Stability~~

- ~~—Granule embedment~~
- ~~—Resistance to thermal shock (foil faced products)~~

~~2. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.~~

## 1.7 QUALITY ASSURANCE

- A. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years.
- B. Product Quality Assurance Program: Primary roofing materials shall be manufactured under a quality management system that is monitored regularly by a third party auditor under the ISO 9001:2000 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.
- C. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.
  - 1. Underwriters Laboratories Class B acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.
  - 2. Factory Mutual Approval Standard 4470 listing for the proposed membrane system. The roof membrane configuration shall be approved by FM for Class 1-SH (severe hail) exposure. The roof configuration (including fastening of base sheet or insulation) shall be approved by FM for minimum 1-135 windstorm construction.
- D. Acceptable Contractor: Contractor shall have a minimum of 5 years experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.
- E. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.
- F. Manufacturer Requirements: Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

## 1.8 PRODUCT DELIVERY STORAGE AND HANDLING

- A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

- B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.
- C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.
- D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense.

## 1.9 PROJECT/SITE CONDITIONS

### A. Requirements Prior to Job Start

- 1. Notification: Give a minimum of 5 days notice to the Architect, Owner, and manufacturer prior to commencing any work and notify manufacturer on a daily basis of any change in work schedule.
- 2. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

### B. Environmental Requirements

- 1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.

### C. Protection Requirements

- 1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.
- 2. Torch Safety: Crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractor's Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas during roof construction activity, and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.
- 3. Limited Access: Prevent access by the unauthorized persons to materials, tools and equipment during the course of the project. Prevent access by unauthorized persons to areas being roofed until the roofing system is completed.
- 4. Debris Removal: Remove all debris daily from the roofing areas.

## 1.10 GUARANTEE/WARRANTY

- A. Roof Membrane/System Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the manufacturer's 20 year labor and materials guarantee covering the rigid insulation, insulation fasteners/plates and roof membrane/flashing system. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and shall be issued at no additional cost to the Owner.

- B. **Roofing Contractor's Guarantee: see attached sample warranty as basis for duration and requirements of guarantees.**

## **PART 2 - PRODUCTS**

### **2.1 ROOFING SYSTEM ASSEMBLY/PRODUCTS**

- A. Basis of Design: Siplast; "Paradiene 20 **TG**/30 TG FR", torchable roofing system.
1. Rigid Roof Insulation: Roof insulation shall be UL and FM approved. Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof assembly.
    - a. Polyisocyanurate: Paratherm by Siplast; Irving, TX. A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. Panels shall have a nominal thickness of 2 inches.
    - b. Polyisocyanurate Tapered Roof Insulation: Tapered Paratherm by Siplast; Irving, TX. Tapered panels and standard fill panels composed of a closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. The tapered system shall provide for a roof slope of 1/4 inch per foot and have a minimum thickness of 1-1/2 inches as required for specific roof assemblies.
  2. Gypsum Sheathing Panel: DensDeck Prime Gypsum Roof Board, by Georgia Pacific Corporation; Atlanta, GA. A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides having a nominal thickness of 1/2 inch. The panel surface shall be factory primed with a non-asphaltic primer.
  3. Perlite Tapered Edge Panels: A tapered panel composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The panels shall have a dimension sufficient to provide for a smooth transition and provide proper support for the membrane layer or subsequent layer of insulation when there are transitions of 1/4 inch or greater
  4. Flashing: Metallic costed SBS Membrane; "Aluminum Veral".
- B. Comparable systems:
- 1) Johns Manville acceptable products  
Base Ply: Dyna Ply T1 HW  
Cap sheet : Dyna Kap FR T1 HW  
Flashing sheet: Dyna Clad Aluminum
  - 2) Garland Acceptable Products  
Base Ply: HPR Torch Base  
Cap sheet : Stress Ply IV UV Mineral  
Flashing sheet: Stress Ply Plus IV UV Mineral

### **2.2 DESCRIPTION OF SYSTEMS**

- A. Roofing Membrane Assembly: Siplast Paradiene 20 TG/30 FR TG torchable roof system. A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared

substrate. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend and coated one side with a torch grade SBS bitumen blend adhesive layer. The adhesive layer shall be manufactured using a process that embosses the surface with a grooved pattern to provide optimum burn-off of the plastic film and to maximize application rates. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

1. Modified Bitumen Base and Stripping Ply: Siplast Paradiene 20 - torchable grade:
  - a) Thickness (avg): 114 mils (2.9 mm) (ASTM D 5147)
  - b) Thickness (min): 110 mils (2.8 mm) (ASTM D 5147)
  - c) Weight (min per 100 ft<sup>2</sup> of coverage): 76 lb (3.7 kg/m<sup>2</sup>)
  - d) Maximum filler content in elastomeric blend: 35% by weight
  - e) Low temperature flexibility @ -13°F (-25°C) - PASS (ASTM D 5147)
  - f) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
  - g) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
  - h) Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
  - i) Dimensional Stability (max): 0.1% (ASTM D 5147)
  - j) Compound Stability (min): 250°F (121°C) (ASTM D 5147)
  - k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
  - l) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
  
2. Modified Bitumen Stripping Ply at Gravel Stop: Siplast Paradiene 20EG, torch grade:
  - a) Thickness (avg): 138 mils (3.5 mm) (ASTM D 5147)
  - b) Thickness (min): 134 mils (3.4 mm) (ASTM D 5147)
  - c) Weight (min per 100 ft<sup>2</sup> of coverage): 96 lb (4.7 kg/m<sup>2</sup>)
  - d) Peak filler content in elastomeric blend - 35% by weight
  - e) Low temperature flexibility @ -13°F (-25°C): PASS (ASTM D 5147)
  - f) Peak Load (avg) @ 73°F (23°C): 80 lbf/inch (14.1 kN/m) (ASTM D 5147)
  - g) Peak Load (avg) @ 0°F (-18°C): 150 lbf/inch (26.5 kN/m) (ASTM D 5147)
  - h) Ultimate Elongation (avg.) @ 73°F (23°C): 100% (ASTM D 5147)
  - i) Compound Stability (max): 0.1% (ASTM D 5147)
  - j) High Temperature Stability (min): 250°F (121°C) (ASTM D 5147)
  - k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
  - l) Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria
  
3. Modified Bitumen Finish Ply: Siplast Paradiene 30 FR - torchable grade:
  - a) Thickness (avg): 138 mils (3.5 mm) (ASTM D 5147)
  - b) Thickness at selvage (coating thickness) (avg): 118 mils (3.0 mm) (ASTM D 5147)
  - c) Thickness at selvage (coating thickness) (min): 114 mils (2.9 mm) (ASTM D 5147)
  - d) Weight (min per 100 ft<sup>2</sup> of coverage): 112 lb (5.4 kg/m<sup>2</sup>)
  - e) Maximum filler content in elastomeric blend: 35% by weight
  - f) Low temperature flexibility @ -13°F (-25°C): PASS (ASTM D 5147)
  - g) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
  - h) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
  - i) Ultimate Elongation (avg.) @ 73°F (23°C): 55% (ASTM D 5147)

- j) Dimensional Stability (max): 0.1% (ASTM D 5147)
  - k) Compound Stability (min): 250°F (121° C) (ASTM D 5147)
  - l) Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)
  - m) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
  - n) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
  - o) Surfacing: ceramic granules
- B. Flashing Membrane Assembly: Siplast; “Veral” flashing system, aluminum finish. A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.
- 1. Cant Backing Sheet and Flashing Reinforcing Ply: Siplast Paradiene 20 SA
    - a) Thickness (avg): 102 mils (2.6 mm) (ASTM D 5147)
    - b) Thickness (min): 98 mils (2.5 mm) (ASTM D 5147)
    - c) Weight (min per 100 ft<sup>2</sup> of coverage): 72 lb (3.5 kg/m<sup>2</sup>)
    - d) Maximum filler content in elastomeric blend: 35% by weight
    - e) Low temperature flexibility @ -13° F (-25° C) - PASS (ASTM D 5147)
    - f) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
    - g) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
    - h) Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
    - i) Dimensional Stability (max): 0.1% (ASTM D 5147)
    - j) Compound Stability (min - sheet): 250°F (121°C) (ASTM D 5147)
    - j) Compound Stability (min – adhesive coating): 212°F (100°C) (ASTM D 5147)
    - k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
    - l) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
    - m) Back Surfacing: polyolefin film
  - 2. Metal-Clad Modified Bitumen Flashing Sheet: Siplast Veral Aluminum
    - a) Thickness (avg): 142 mils (3.6 mm) (ASTM D 5147)
    - b) Thickness (min): 138 mils (3.5 mm) (ASTM D 5147)
    - c) Weight (min per 100 ft<sup>2</sup> of coverage): 92 lb (4.5 kg/m<sup>2</sup>)
    - d) Coating Thickness – back surface (min): 40 mils (1 mm) (ASTM D 5147)
    - e) Maximum filler content in elastomeric blend: 35% by weight
    - f) Low temperature flexibility @ 0° F (-18° C): PASS (ASTM D 5147)
    - g) Peak Load (avg) @ 73°F (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147)
    - h) Peak Load (avg) @ 0°F (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147)
    - i) Ultimate Elongation (avg) @ 73°F (23°C): 45% (ASTM D 5147)
    - i) Tear-Strength (avg): 120 lbf (0.54 kN) (ASTM D 5147)
    - j) Dimensional Stability (max): 0.2% (ASTM D 5147)
    - k) Compound Stability (min): 225°F (107°C) (ASTM D 5147)
    - l) Cyclic Thermal Shock Stability (maximum): 0.2% (ASTM D 6298)
    - m) Approvals: UL Approved, FM Approved (products shall bear seals of approval)
    - n) Reinforcement: fiberglass scrim mat or other meeting the performance and dimensional stability criteria
    - o) Surfacing: aluminum metal foil
- C. Catalyzed Acrylic Resin Flashing System: Parapro 123 Flashing System by Siplast; Irving, TX. A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin

primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

## 2.3 ROOFING ACCESSORIES

### A. Bituminous Cutback Materials

1. Primer: Siplast PA-1125 Asphalt Primer by Siplast; Irving, TX. An asphalt, solvent blend conforming to ASTM D 41 requirements.
2. Mastics: Siplast PA-1021 Plastic Cement by Siplast; Irving, TX. An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.

### B. Sealant: Siplast PS-209 Elastomeric Sealant by Siplast; Irving, TX. A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

### C. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.

### D. Perlite Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.

### E. Fasteners

1. Insulation Fasteners: Insulation fasteners and plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The insulation fasteners shall provide attachment required to meet the specified uplift performance and to restrain the insulation panels against the potential for ridding. The fastening pattern for each insulation panel to be used shall be as recommended by the insulation manufacturer and approved by the manufacturer of the primary roofing products. Acceptable insulation fastener manufacturers for specific deck types are listed below.
2. Flashing Reinforcing Sheet Fasteners for Wood/Plywood Substrates to Receive Flashing Coverage: Fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable fasteners for specific substrate types are listed below.

#### a) Wood/Plywood Substrates

- A 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.
  - > Square Cap by W.H. Maze Co.; Peru, IL
  - > 12 Gauge Simplex Nail by the Simplex Nail and Manufacturing Co., Americus, GA

### F. Walktread: Paratread Roof Protection Material by Siplast; Irving, TX. A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.

1. Thickness: 0.217 in (5.5 mm)
2. Weight: 1.8 lb/ft<sup>2</sup> (8.8 kg/m<sup>2</sup>)
3. Width: 30 in (76.2 cm)



## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. General: Sweep or vacuum all surfaces, removing all foreign substances prior to commencement of roofing. Verify that all penetrations through the roof are in place or blocked out so that the roofing when completed will not be breached.

### **3.2 SUBSTRATE PREPARATION**

- A. Insulation: Install insulation panels with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer's requirements and the following instructions. Where insulation is installed in two or more layers, stagger joints between layers.
  - 1. Insulation - double layer: Mechanically attach both layers simultaneously to the substrate, using the specified fasteners, at a rate of 1 fastener per 1.6 square feet of panel area (20 fasteners per 4 foot by 8 foot panel). Stagger the panel joints between insulation layers. Reference FM Global Property Loss Prevention Data Sheet 1-29 for perimeter and corner requirements.
  - 2. Tapered Edge at Transitions: Field-cut, shape and install tapered edge strip at transitions of 1/4 inch or greater between substrate components to provide a smooth transition and proper support for the subsequent insulation layer or membrane/flashing system components.

### **3.3 ROOF MEMBRANE INSTALLATION**

- A. Membrane Application: Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.
- B. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials including granules, and exercise care in ensuring that the finished application is acceptable to the Owner.
- C. Priming: Prime metal and concrete and masonry surfaces with a uniform coating of the specified asphalt primer.
- D. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants will not be permitted.
- E. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.
  - 1. Apply all layers of roofing perpendicular to the slope of the deck.
  - 2. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.
  - 3. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the torch applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog

ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.

4. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds 1/2 inch per foot. The manufacturer shall provide acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.
- F. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.
- G. Flashing Application: Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place over the primed substrate extending 6 inches onto the field of the roof area and 6 inches up the vertical surface utilizing minimum 3 inch laps. Set the non-combustible cant into place dry prior to installation of the roof membrane base ply. Flash walls and curbs using the reinforcing sheet and the metal foil flashing membrane. After the base ply has been applied to the top of the cant, prime the base ply surfaces to receive the reinforcing sheet. Fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps onto the primed base ply surface and up the primed wall or curb to the desired flashing height. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall or curb to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the vertical/horizontal surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).
- H. Catalyzed Acrylic Resin Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer's printed installer's guidelines and other applicable written recommendations as provided by the manufacturer.
- I. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

### **3.4 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS**

- A. Parapet and Wall Flashings: .
- B. Lead Drain Flashings: Completely prime the lead drain flashing and allow to dry prior to installation. After the base ply has been applied, set the lead flashing sheet in mastic and form to turn down inside of the drain bowl. Ply-in the perimeter of the lead flashing using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of 4 inches. Terminate the finish ply to extend beneath the clamping ring seal. Install the clamping ring with all bolts in place.
- D. Small Pipe Supports: Support all gas lines and conduits which are a maximum of 1 inch diameter and run horizontally over the roof membrane surface using wood blocking and the manufacturer's walktread - roof protection material. The blocking shall be 4 inches by 4 inches by 12 inches in size. Cut each

walktread pad to a size which extends a minimum of 2 inches beyond the perimeter of the blocking. Loosely secure the pipe to allow movement over the 6 inch center of each block; the spacing for the blocks shall be of adequate distance to prevent sagging of the pipe and to prevent the pipe from coming into contact with the new roof assembly. Set the walktread dry over the new roof assembly. Set each pipe support block dry over the walktread pad.

- E. Metal Pipe Flashings: Completely prime the metal pipe flanges and allow to dry prior to installation. After the base ply has been applied, set the flanges in mastic and strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-sleeve juncture of the pipe flashing. Install a watertight umbrella to the penetration, completely covering the opening of the pipe flashing. SEE ITEM: SEALANT for finish of this detail.
- F. Walktread: Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.
- G. Sealant: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

### **3.5 FIELD QUALITY CONTROL AND INSPECTIONS**

- A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.
- B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.
- C. Final Inspection
  - 1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.
- D. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

**END OF SECTION**