

Section 07 55 55 –MODIFIED BITUMEN ROOFING

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 SUMMARY

- A. This Section includes the following:
  - 1. Modified bitumen roofing including cap sheet, interplay, base sheet, and associated materials.
  - 2. Base and Wall Flashing.
  - 3. Roof cant strips, traffic pads, and miscellaneous materials.
  - 4. Expansion joints as indicated.
- B. Related Sections includes the following:
  - 1. Section 076200 Flashing and Sheet Metal.
  - 2. Section 077129 Roof Expansion Joints
  - 3. Section 079200 Joint Sealants.

1.3 REFERENCES

- A. American Society of Civil Engineers ASCE.
  - 1. ASCE-Minimum Design Loads for buildings and Other Structures.
- B. American Society for Testing and Materials (ASTM).
  - 1. ASTM D 36-Soften Point of Bitumen (Ring and Ball Apparatus).
  - 2. ASTM D 41-Asphalt Primmer Used in Roofing, Damp-proofing, and Waterproofing.
  - 3. ASTM D 312-Asphalt Used in Roofing.
  - 4. ASTM D 2178-Asphalt Glass Felt used in Roofing and Waterproofing.
  - 5. ASTM D 2523-Testing Load-Strain Properties of Roofing Membranes.
  - 6. ASTM D 2822-Asphalt Roof Cement.
  - 7. ASTM D 4897-Asphalt Coated Glass Fiber Venting Base Sheet Used in Roofing.
  - 8. ASTM D 5147-Testing Modified Bitumen Sheet Materials.
  - 9. ASTM D 6162-Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
  - 10. ASTM D 6164-Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- C. Florida Building Code (FBC).
- D. NRCA (National Roofing Contractors Association).
- E. Underwriters Laboratory, Inc. (UL): Fire Hazard Classification Rating.

1.4 SYSTEM DESCRIPTION-ROOFING MEMBRANE AND INSULATION

- A. Modified Bitumen Roofing Membrane: One ply cap sheet membrane, hot mopped to a modified bitumen inter-ply membrane hot mopped to a mechanically attached felt base sheet, with wall and base flashing. A vented base sheet will be required over lightweight insulating concrete. (Two-ply polyester or polyester-glass mat-reinforced SBS roofing sheets over an

impermeable base ply, mechanically fastened to a substrate of lightweight concrete insulating concrete or LWIC fill course.)

- B. Standards:
  - 1. UL Class a roof membrane: ASTM E108.
  - 2. Factory Mutual Research Corporation (FMRC) roof membrane Combustibility Class A
  - 3. FMRC roof membrane assembly Windstorm Classification 1-150.
  - 4. Miami-Dade Building Code Compliance Office (BCCO) Product approval of roof membrane assembly for uplift.
- C. Base and Wall Flashing: Base and wall flashings shall be products of the same manufacturer as the modified bitumen cap sheet.
- D. Special Conditions: Re-roofing requires protection membrane on the recovery board as applicable... Tom Milner to add more...
- E. Roof slopes at the membrane level for all roof surfaces:
  - 1. New Construction: Ensure not less than 1/4 inch per foot.
  - 2. Re-Roofing Existing: Ensure not less than 1/4 inch per foot.
  - 3. Slope Verification (new or existing): After installation of the interplay ("dry-in") membrane, Contractor shall "wet test" to verify that decks with insulation possess a minimum slope as required above for proper roof drainage.
    - a.) Secure Owners approval for special conditions where the above required slopes cannot be provided.
    - b.) Contractor shall also address areas of ponding in the same manner as above.

#### 1.5 SUBMITTALS

- A. Special Warranties:
  - 1. Submit Roof Assembly Producer's Notice of Intent to Issue Special Warranty (NOI) within 30 days after Contractor's Notice to Proceed.
    - a. Submit in duplicate on copies of the form attached as part of this specifications section, signed by Contractor, roof assembly producer (RAP), roof membrane installer, and RAP's surety.
  - 2. Submit draft of text of Roof Assembly Producer's Special Warranty within 60 days after Contractor's Notice to Proceed, on RAP's corporate letterhead, with spacers for required signatures of corporate officers and RAP's surety.
    - a. Submit also a sample of the Producer's roofing warranty types for comparison.
    - b. Obtain approval of proposed Special Warranty text from A/E and the Board before making other submittals for Roof Assembly work.
  - 3. Special Warranties from other producers of Roof Assembly components: See other Roof Assembly sections for their Special Warranty requirements.
  - 4. Approval of lightweight insulating concrete, SBS roof membrane, and steel blocking/sheet metal installers: Submit letter from RAP, approving the firms who will actually install these components.
- B. Product Data: Provide current published product (data) literature indicating characteristics of each roofing material indicated, i.e., membrane materials, flashing materials, components, accessories, including product installation instructions.
  - 1. Solar Reflectance Index (SRI) product data.
- C. Shop Drawings: Show locations and extent of roofing. Include plans of roof showing pitches, sections, roof penetrations, details and attachments to other Work. Submit custom details for every condition, including drain sumps, overflow and scuppers, surface mounted counter flashings, equipment base flashings, also for re-roofing, showing attachment of curb and parapet extensions and flashings for pipes and vent stacks. Provide on drawings

base sheet fastening patterns as required to resist specified negative wind pressures, signed and sealed by a registered engineer, licensed in the State of Florida.

- D. Manufacturer's Certification, Bulk Bitumen: Submit manufacturer's certification indicating that bulk bituminous materials delivered to project comply with required standards. Include quantity, statistical and descriptive data for each product. Submit certificate with each load before it is used.
  - 1. Include continuous log showing time and temperature for each load of bulk bitumen, indicating date obtained from manufacturer, where held and how transported prior to final heating and application to roof.
- E. Field Test Reports: Submit daily softening point test reports on samples of asphalt used on project, taken at beginning of each day's work and at 2-hour intervals during course of the work thereafter. Test by Ring and ball Test, ASTM D 36, or similar recognized test method. Submit samples to independent laboratory for testing or perform tests in field at contractor's option.
- F. Samples:
  - 1. Submit 12 inch by twelve (12) inch samples of roofing membranes and accessories, with manufacturer's identification labels attached.
  - 2. Submit representative samples of each type of fastener, insulation and roofing accessory with manufacturer's identification labels attached.
  - 3. Refer to Quality Assurance Program.
- G. Permit Requirements:
  - 1. Scope: Building construction code enforcement for the School District of Indian River County is the sole responsibility of the SDIRC Building Department. Authorized by Florida Statute to enforce the Florida Building Code and SREF through the State of Florida Board of Education.
    - a.) Roof Permit is required within the high wind areas for all work in connection with the application, repair or maintenance of any roofing component or any roofing assembly and/or any of its components, including roof curbs.
    - b.) Roof Permit is required for all new roofing construction, including recovering and reroofing, repair or maintenance and shall have a uniform roofing permit application, as established by the authority having jurisdiction, completed and executed by a licensed contractor.
  - 2. Fees: There are no fees or expenses by the Consultant or Contractor for reviewing the documents or issuing the permit. Care should be taken by the Consultant or Contractor to submit drawings that are complete and ready for permitting. Incomplete or substantially incorrect drawing will be returned without action. Excessive resubmission and review of documents may result in project delays that may be charged to the Consultant or Contractor.
  - 3. Code Compliance:
    - a.) The complete roofing system shall comply with all applicable requirements of the current edition of the Florida Building Code.
    - b.) Product Approvals: Roofing system shall have current FBC HVHZ Protocols and required product Notice of Acceptance (NOA) for each roofing system applied to each type of substrate.
    - c.) Wind Resistance: Execute the installation of the roofing system (including insulation and flashings) to comply with wind resistance requirements of applicable building codes for specific negative wind pressures at various building elevations (heights) as indicated on the Drawings.

- (1.) Calculations: Wind load calculations shall be prepared by a licensed structural engineer registered in the State of Florida in accordance with ASCE 7, inclusive of all roofing components and equipment.
  - (2.) Provide roof drainage calculations. Identify method, type, material and spacing for all attachments required to meet the uplift pressures on all roof covering components, inclusive of accessories, tie downs, and/or equipment in the field, perimeter and corner zones.
- d.) Documents: Submit three (3) complete sets of plans of roof showing slope and locations of details. Submit custom details for every condition, including drain sumps, overflow and scuppers, flashings and counter flashings, equipment curbs, expansion joints, etc. also show attachment of extensions and flashings for pipes and vent stacks.
- (1.) Product Data: Provide current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, accessories, product specifications and installation instructions.
  - (2.) Roofing Manuals: Submit, in a three-ring binder, all roofing data, including manufacturer's catalogs/manuals of materials and accessories used in the Project, including manufacturer's recommendations.
  - (3.) Provide fire directory listing for the selected roof covering system from HOA listed in accordance with ASTM E 10e or UL 790.
  - (4.) Application Manual: Submit manufacturer's application manual, which describes completely the preparation of surfaces and application of specified materials, including details to suit all conditions.
  - (5.) Base Sheet Fastening Patterns: Provide drawings of fastener patterns as required to resist specified negative wind pressures, signed and sealed by a registered engineer, licensed in the State of Florida.
- e.) Application Manual: Submit manufacturer's application manual, which describes completely the preparation of surfaces and application of specified materials, including details to suit all conditions.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Provide primary products, including each type of roofing sheet, bitumen, flashings, vapor retarder (if any), and cap sheet produced by a single manufacturer. Provide secondary products only as recommended by manufacturer of primary products for use with roofing system specified. Manufacturers complying with the specified criteria shall also comply with the following:
1. Experience: Shall have been in the business of manufacturing Modified Bitumen roofing membrane systems for a minimum of 5 years.
  2. History of installations: Shall have installations of the specified roofing system in the south Florida HVHZ for a minimum of 5 years.
  3. Installer: Manufacturers shall have an on-going approved installer program.
  4. Manufacturer's Field Representative: Provide technical representatives (employees) to inspect the installation of the roofing systems as necessary to assure installation is in accordance with warranty requirements.
    - a.) Provide written reports of observations and recommendations to the Architect.
  5. 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 9000 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required as part of sample submittals.

- B. Installers Qualifications: A single installer shall perform the work of this Section; and shall be a company with not less than 3 years of successful experience in the installation of roofing systems specified in this section:
  - 1. Installer Certification: Provide the Owner with written certification from the manufacturer of the roofing system certifying that the installer is approved by the manufacturer for installation of the specified roofing system; certification shall be submitted by the Manufacturer's Corporate Office. Provide a copy of the certification to the owner prior to award of the contract.
  - 2. Installer Licensing: The installer shall be a State Certified Roofing Contractor, certified by the State of Florida, Construction Industry Licensing Board.
  - 3. Installer's Field Supervision: Installer must maintain a full-time supervisor/foreman on the job-site during times that the roofing work is in progress. Supervisor must have minimum of 5 years' experience in roofing work specified in this section.
  - 4. Installer shall provide a list of 5 completed roofing projects installed in the South Florida area.
  
- C. UL Listing (or other testing agencies approved by FBD): Provide roofing systems and component materials that have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for Class A roof assemblies that are effective against severe fire test exposure.
  - 1. Provide roof covering materials bearing classification marking (UL) on bundle, package or container indicating that the materials have been produced under UL's classification and follow-up services.
  
- D. Code Compliance. *(Refer to Permit Requirements) (Section 1.5 (F)(c))*
  
- E. Energy Performance: Roofing system that meet the following minimum requirements:
  - 1. Solar Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Thermal emittance shall be measured according to ASTM e 408 or ASTM C 1371.
  - 2. Initial Solar Reflectance Index (SRI) not less than 78 when calculated according to ASTM E 1980 based on testing identical products by qualified testing agency.
  - 3. Listed on DOE's ENERGY STAR "Roof Products Qualified Products List" for low-slope products.

#### 1.7 PRE-INSTALLATION MEETING

- A. Pre-installation meeting shall not occur without submittal of Special Warranty Notice of Intent (NOI), approved Shop Drawings and/or roofing permit. Meeting shall convene a minimum of one week before starting work of this section.
  
- B. Required Attendees:
  - 1. Owner's Project Manager.
  - 2. SDIRC Building Department Representative
  - 3. Owner's Maintenance Foreman.
  - 4. Contractor.
  - 5. Roofing subcontractor
  - 6. Roof System Manufacturer/Producer and Surety
  - 7. Installers of deck or substrate construction to receive roofing work.
  - 8. Installers of roof-top units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any).
  - 9. All subcontractors associated with the Roof Assembly components.
  
- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.

- D. Agenda shall include:
1. Review preparation and installation procedures and coordinating and scheduling required with related work. Sections 07500/07501
  2. Review Roof Assembly (RA) system requirements (drawings, specifications, and other contract documents). Sections 07500/07501
  3. Review Shop Drawings and associated submittals.
  4. Review manufacturer's technical materials.
  5. Review and finalize construction schedule related to roofing work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
  6. Review required inspection, testing, certifying and material usage accounting procedures.
  7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary roofing.
  8. Tour representative areas of roofing substrates (decks), inspect and discuss condition of the substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.

#### 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver roofing materials and accessories in manufacturer's original protective containers with labels intact and legible. Comply with manufacturer's published instructions for storage and handling.
1. Each pallet, container, or unit shall have the material manufacturer's name and brand designation clearly listed.
- B. Store materials in dry protected areas, on clean, raised platforms with securely anchored weather protective covering.
1. Store rolled goods on a clean, flat, dry and elevated surface.
  2. Store material on the roof overnight only for use first thing the next day. Such materials shall be stored on pallets.
  3. Rolls shall be stored on ends on pallets.
  4. Store materials on roof in a manner to prevent overloading of deck.
  5. Store flammable materials away from open flames, sparks or excessive heat.
  6. Cover all materials with polyethylene or other waterproof plastic coverings.
- C. Handle all materials in a manner to prevent damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.
- D. Damaged Materials: Immediately mark with an "X" of yellow spray paint and remove and replace damaged or improperly stored materials from project site.
- E. Store and handle roofing sheets in a manner that will insure that there is no possibility of moisture pick-up. Store in a dry, well ventilated, weather-tight place, or store properly protected from weather or other moisture sources by leak-proof coverings and/or manufacturer's original un-opened containers. Do not leave unused felt on the roof overnight or when roofing work is not in progress without proper weather-tight protection.
- F. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck. The installer is responsible for any structural damage occurring due to the storage of materials or equipment on the roof.
- G. All materials shall be stored in locked, watertight trailers or in watertight coverings on roof.

1.9 PROJECT CONDITIONS

- A. Owner may occupy the existing premises during the entire period of the roof removal and replacement. Cooperate with Owner's Representative during construction operations to minimize conflict, and to facilitate continued use of the facility.
- B. Coordinate scheduling with the Owner in order to protect the building occupants and to protect the building contents from damage during construction operations.
- C. Do not permit traffic or material storage on completed roof surfaces.
- D. Protect adjacent building surfaces against damage and bitumen spillage.

1.10 SEQUENCING

- A. Sequence installation of modified bitumen roofing with related units of work specified in other sections to ensure that roof assemblies, including roof insulation, flashing, trim, accessories, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with the manufacturer's recommendations and warranty requirements. Do not apply roofing to a damp or wet substrate.
- B. Suspend all application and installation activities during inclement weather. Proceed with roofing work only when weather conditions comply with manufacturer's recommendations. Do not exceed temperature limitations recommended by the manufacturer.
- C. Night Seals/Water Cut Offs: Protect roof deck and insulation from moisture by providing water cut-offs at the end of each day's work or when the weather is threatening. Failure to protect the deck insulation and roofing from moisture will require the removal of damaged materials or materials containing excessive moisture. Remove water cut-offs prior to start of new work.
  - 1. Mop in two-ply sheets.
  - 2. Do not allow any voids in felt or bitumen.
  - 3. Extend roofing plies at least 12 inches onto prepared area of adjacent roofing. Embed plies into asphalt or adhesive. Strip edges with 12 inch wide ply sheet embedded completely in alternate courses of asphalt.
- D. Water Infiltration: If water infiltrates under or between the roofing plies or insulation during the installation of the roofing system, remove and replace that portion of the roof, including wet insulation.

1.12 SPECIAL WARRANTIES

- A. By Roof Membrane Producer and Roof Assembly Producer (RAP): Provide a 20 year written Special Warranty from the producer and the installer of roofing membrane and base ply flashings, covering correction of defects in the Roof assembly, signed by RAP and other parties shown on the RAP's Special Warranty.

1. See 07500 for full list of required additions to and modifications in language and provisions that shall be made to the producer's limited warranty types.

B. By each of the other Roof Component Producers and Installer: assemble and deliver to the A/E written Special Warranties covering correction of defects from each of the other component producers and installers as specified in 07500.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS/PRODUCERS

- A. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
- B. GAF Materials Corporation.
1. Interply: Ruberoid SBS Heat-Weld Smooth (160 mils) ASTM D6164 Type I, Grade S.
  2. Cap Ply: Ruberoid Energy Cap SBS 30 FR (0.140 inch thick) ASTM D6163, Type I, Grade G.
- C. Soprema Roofing and Waterproofing Inc.
1. Interply: Sopralene 180 Sanded (120 mils) ASTM D 6164, Type I, Grade S.
  2. Cap Ply: Soprastar Flam 180 (140 mils) ASTM D6164 Type I, Grade S.
- D. Other Acceptable Manufacturers:
1. Garland Co., Inc. (The).
  2. Tremco, Inc.

### 2.2 MODIFIED BITUMEN CAP & INTERPLY SHEETS

- A. Modified Bitumen Interply Sheet (comply with ASTM D 6164, Type I, Grade S):
1. Application: Heat Weld Torch.
  2. Polymer Modifier: SBS (Styrene-Butadiene-Styrene).
  3. Reinforcement: Polyester Mat.
  4. Surfacing: Sanded.
- B. Fire Rated Modified Bitumen Cap Ply Sheet (comply with ASTM D 6164, Type II and III ((provide Type III if manufacturer makes a Type III)), Grade G):
1. Application: Heat Weld Torch.
  2. Polymer Modifier: SBS (Styrene-Butadiene-Styrene).
  3. Reinforcement: Polyester Mat.
  4. Surfacing: Manufacturer's premium white, granular or smooth surfaced.
    - a.) Minimum Solar Reflectivity Index (SRI) compliant with ASTM E1980, 78 for roofs less than or equal to a 2:12 pitch and 29 for roofs greater than or equal to a 2:12 pitch. (*Refer to Section 1.6 (E)*)
- C. Base and Wall Flashing Material: 1-ply flashing consisting of one smooth ply and one granular ply, use same material as interply and cap ply membranes.

### 2.3 BASE SHEET MEMBRANES

- A. Base Sheet: Glass plies, asphalt coated fiberglass felts complying with ASTM D 2178, Type IV or Type VI, having a minimum weight 30 lb/sq.



- B. Vented Base Sheet (for use over LWIC): Conform to ASTM D 4897, UL rated type G-2 coated base sheet with course granular surfacing.

#### 2.4 BITUMENOUS MATERIALS

- A. Products must conform to the Notice of Acceptance for the specified materials.
- B. Asphalt Primer (for priming structural concrete decks, blocking and grounds, and metals): ASTM D 41.
- C. Asphalt Roofing Mastic (for general use, except for contact with Modified Bitumen Membranes): ASTM D 2822, Type II.

#### 2.5 ROOF INSULATION, CRICKETS/SADDLES, COVER BOARD, and DECK BOARD

- A. Refer to Section 07220-Roof Insulation where applicable.
- B. Refer to Section 03520-Lightweight Insulating Concrete where applicable.

#### 2.6 MISCELLANEOUS MATERIALS

- A. Joint Sealants: Refer to Section 07920-Joint Sealants.
- B. Prefabricated Cants:
  - 1. Use metal unless otherwise approved in writing by Owner (refer to Section 07600-Flashing and Sheet Metal).
  - 2. When approved in writing by the Owner for re-roofing: Wood fiberboard, minimum 4 inch stock, mitered to form 45 degree angle at wall and parapets. Perlite cants are not allowed.
- C. Roofing Membrane Sealants: Compatible with cap sheet adhesive and furnished by modified bitumen membrane manufacturer.
- D. Pitch Pans: Not allowed.
- E. Ceramic Granules: Provide of same composition, size, and color as the modified bitumen cap sheet membrane. Broadcast into bitumen overruns.
- F. Lead Drain Flashings: 36 inch by 36 inch, formable type, 4 pounds per square foot.
- G. Blocking and Grounds:
  - 1. Use metal unless otherwise approved in writing by Owner (refer to Section 07600-Flashing and Sheet Metal).
  - 2. When use of wood is approved in writing by Owner for either new or Re-roofing: Provide wood that is pressure treated per Section 06300-Wood Treatment.
- H. Substrate Joint Tape: 6 inch or 8 inch wide coated rag mat.
- I. Traffic Pads: Cap sheet membrane manufacturer's standard factory-formed nonporous, heavy-duty, slip resistant, surface-textured pads or rolls, .080 inches thick minimum, 28 inches wide minimum. Color: Shall be contrasting color to the roof cap sheet.

#### 2.7 FASTENERS AND ACCESSORY PRODUCTS

- A. Fasteners: As approved by roofing membrane producer for cured LWIC or CIP concrete for each negative pressure in different parts of the Work, with adequate flanges or plates

- to prevent tearing of membrane at high pressures.
1. Follow the principles of RAS 113 and 128, and TAS 105,110,114,117 A,B & C, and 121, to meet the High Velocity Hurricane Zone (HVHZ) wind pressures called for in the Contract Documents.
  2. Corrosion resistance: Follow FMG 4470.
- B. Asphalt: Styrene-ethylene-butylene-styrene-modified; ASTM D6152.
1. Softening point, before and after heat exposure: 185 to 240 °F.
  2. Penetration units at 77° F: 20 to 60.
- C. Provide fasteners and plates of type, size, and spacing pattern that are approved by the manufacturer of the modified bitumen roofing system, and comply with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).
1. Mechanical Fasteners: Corrosion resistant steel fasteners, washers, and plates.
  2. Do not use mechanical fasteners to attach roofing membranes, except for attachment of base sheet to lightweight insulating concrete, and base and wall flashings.
  3. Do not use mechanical fasteners into post-tensioned concrete decks.
- D. Base Sheet Mechanical Fasteners (for LWIC):
1. Fasteners shall comply with FBC HVHZ Protocols and required product Notice of Acceptance (NOA) including corrosion resistance.
  2. Screw Fasteners (for fastening through Lightweight Insulating Concrete Decks to metal decks): Comply with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).
    - a.) Deck Screws: Comply with FBC HVHZ Protocols and required product Notice of Acceptance (NOA) including corrosion resistance.
    - b.) Stress Plate: Comply with FBC HVHZ Protocols and required product Notice of Acceptance (NOA) including corrosion resistance.
- C. Base and Wall Flashing Attachment: Flashing plies shall be adhesive attached and mechanically fastened with fasteners.
1. Fasteners: Steel, type, size, and spacing shall comply with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).
  2. Termination Bars: Use metal termination bars at concealed base and wall flashing conditions in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).
  3. Surface-Mounted Flashing Reglets: Refer to Section 07600.

### PART 3 EXECUTION

#### 3.1 COORDINATING ROOFING WITH OTHER PARTS OF ROOF ASSEMBLY

- A. Coordinate installation of roof membrane, base ply flashings, roof penetrations, and walkways with roof insulation, steel roof blocking, roofing sheet metal fabrications, roof hatches, smoke vents, equipment curbs and portals, rooftop equipment, and supports for rooftop equipment, edge guards, and screens in a manner that ensures that the entire Roof Assembly is watertight, high velocity wind-resistant, and warrantable as specified in the Special Warranty text attached to this section.
- B. Pitch pans or molded "curbs" shall not be used in place of properly providing the specified roof curbs and flashing at any kind of roof penetration or rooftop-mounted equipment.
- C. Fasteners for the attachment of base sheets to LWIC or other deck or wall surfaces: Following the principles of RAS 113 and 128, and TAS 105, 110, 114, 117 A,B & C, and 121, augment the producer's published requirements for securing roofing to surfaces as needed to meet the HVHZ

wind pressures called for in the Contract Documents. Also torch (or mop with hot asphalt if torching is not possible) so as to develop full uplift resistance.

- D. Crickets and Obstructions: At rooftop equipment and other obstructions to free drainage, do not install roofing until cricket material has been installed over the top of the LWIC or other deck surface so that at least a 1/2 in./ft slope diverts water to each side of the obstruction, toward drains.
- E. Penetrations: In order to avoid present and future improper penetrations of the roof membrane and the crowding of base flashings (which must be periodically maintained), check the roof area before starting roofing and base flashing work. Do not start work until other trades have corrected the following potential membrane-penetration problems:
  - 1. Ladders, stairs, equipment and equipment supports that touch or protrude from the roof structure that is to be roofed.
  - 2. Piping, conduits, drains, equipment supports or equipment that is installed closer than 24 in. from walls or other obstructions that will receive base flashing. 18 in. clearance is acceptable if the base flashing can be easily accessed by mechanics for maintenance and replacement.
  - 3. Antennae for which no guy cable anchor structures have been provided at least 8 in. above roof level.
  - 4. Any condition in which a pitch pan might be introduced contrary to these Specifications because of perceived difficulty in executing the specified curbing and base flashing.
- F. Torching: All roof membranes (except base ply which shall be mechanically fastened), base flashings and traffic/protection pads shall be torch-applied unless the producer recommends and the Board's Roofing Dept., and the A/E approves hot mopping at specific locations where hot mopping will perform better.
- G. Supply products only in formulations that are designed for and will best perform with torching (except in locations where hot mopping has been approved).
- H. Asphalt heating: If hot mopping of some flashing should prove necessary, and if mopping is approved by the board and A/E, heat asphalt as specified in these Specifications.

### 3.2 REMOVALS

- A. Structural Concrete Decks: Remove completely all existing roof and insulation materials to concrete deck, clean decks and provide a uniform surface for application of insulation.
- B. Lightweight Insulating Concrete Decks: Remove completely all existing roof membrane. Install new lightweight insulating concrete system, or remove and replace existing wet or deteriorated lightweight insulating concrete in accordance with Section 03520.
- C. Metal Decks: Remove completely all existing roofing and insulation materials to metal deck, providing a uniform surface for application of either insulation board or lightweight insulating concrete.

### 3.3 EXAMINATION OF SURFACES

- A. Examine substrates, areas, and conditions under which roofing will be applied for compliance with requirements and other conditions affecting performance. Verify decks and insulation are dry and free of moisture of any form.
  - 1. Proceed with installation only after minimum concrete drying period recommended by roofing system manufacturer has passed.
  - 2. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 3. Verify proper placement of roof drains and other penetrations.

4. Verify proper securement of penetrating or roof mounted equipment.
5. Proceed with installation only after unsatisfactory conditions have been corrected.

- B. Inspect roof perimeters, edges, penetrations and transitions to vertical surfaces to ensure that blocking or grounds have been installed where appropriate and have been secured to comply with design up-lift pressures.

### 3.4 SUBSTRATE PREPARATION

- A. Sweep all surfaces prior to commencement of roofing. Comply with manufacturer's published instructions for preparation of substrates to receive roofing. Prior to priming, clean substrate of dust, debris, and other substances detrimental to roofing work.
- B. Structural Concrete: Structural concrete surfaces shall be properly cured, dry, and free of laitens, smooth, free of ridges and depressions, or exposed reinforcing.
- C. Lightweight Insulating Concrete: Patch lightweight insulating concrete decks with patching materials, specified in Section 03520, after removal of wet or deteriorated materials. Lightweight concrete surfaces shall be dry and properly cured.
- D. Metal: Metal Surfaces shall be smooth and free of sharp edges and rough welds and shall be free of moisture, rust, dirt and other foreign materials.
- E. Wood (when approved in writing b Owner for re-roofing): Wood surfaces shall be smooth, free of protruding nails, depressions, ridging, or raised edges.
- F. Priming: Prime both sides of metal flanges (all jacks, prefabricated flashing devices, edge metal, lead drain flashings, etc.) and concrete, masonry, and wood surfaces with a uniform coating of specified primer 24 hours prior to use.

### 3.5 INSULATION INSTALLATION

- A. Refer to Section 07502 – RA Lightweight Insulating Concrete (LWIC) requirements.

### 3.6 CANT STRIPS

- A. Install cant strips at transitions of BUR membrane with flat vertical surfaces.

### 3.7 TORCH APPLICATION SAFETY

- A. Torch applied modified bitumen requires safety precautions prior to, during, and after installation. Provide safety equipment, enforce safety requirements, and install in compliance with ARMA, CERTA, FBC, NFPA 51B and 241, NRCA, OSHA, torch membrane manufacturer's safety requirements, and other applicable regulations or requirements, and at a minimum as follows:
  1. Provide fire extinguishers.
  2. Wear protective clothing and equipment.
  3. Never use heat or open flame directly to or near combustible materials. Identify any potential sources of combustible materials in advance of using an open flame torch or heat.
  4. A fire watch must be maintained during and after all torch applications. A minimum fire watch of sufficient length (two hour minimum) must be maintained after all torch applications have been completed on any given day.

3.8 ROOFING APPLICATION, GENERAL

- A. All layers of roofing shall be laid free of wrinkles, creases, or fish mouths. Sufficient pressure shall be exerted on the roll during application by “brooming” to ensure prevention of air pockets. Lap seams in the interplay layers shall be staggered with the lap seams of the cap sheet.
  - 1. All layers of roof shall be laid perpendicular to the slope of the deck.
- B. Substrate Joint Penetrations: Do not allow bitumen to penetrate substrate joints and enter building or damage insulation, vapor barriers (retarders) or other construction.

3.9 ONE-PLY “DRY-IN” MEMBRANE (optional for concrete decks)

- A. Apply one cap ply sheets to primed concrete deck by torch application, in compliance with manufacturer’s instructions and with FBC HVHZ Protocols and required product Notice of Acceptance (NOA). Turn up 8 inches at vertical surfaces.
- B. Laps: Side laps and end laps in compliance with manufacturer’s instructions and with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).

3.10 SLOPE VERIFICATION

- A. Refer to Article 1.4-System Description above.

3.11 BASE SHEET

- A. Install base sheet with specified fasteners in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).

3.12 INTERPLY SHEET

- A. Install interplay sheet membrane over interplay sheet by torch application, and in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).

3.13 SBS MODIFIED BITUMEN MEMBRANE (CAP SHEET)

- A. Install cap sheet membrane over interplay sheet by torch application, and in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).
- B. Granule Embedment: Broadcast granules over all bitumen overruns on the cap sheet surface while bitumen is still hot.

3.14 WALL AND BASE FLASHINGS

- A. Prime metal, concrete, masonry, and wood surfaces prior to flashing application at the minimum rate of 1 gallon per 100 square feet.
- B. Securely adhere wall and base flashings with adhesive in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).
- C. All loose laps and edges shall be checked and sealed.
- D. Base Flashings: Attach top edge of base flashing membrane with fasteners of type, size, and spacing in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).

- E. Wall Flashings: The top edge of the wall flashing membrane shall be attached to substrate with termination bar of type, size, and fastener spacing in compliance with FBC HVHZ Protocols and required product Notice of Acceptance (NOA).

### 3.15 FLASHING AND STRIPPING

- A. Provide manufacturer's recommended SBS modified bitumen flashing at cant strips, other sloping and vertical surfaces, roof edges, and curbs through the roof. Provide one ply of manufacturer's recommended SBS modified bitumen flashing. Nail or provide other forms of mechanical anchorage of flashing to vertical surfaces, as recommended by manufacturer or primary roofing materials. Modified bitumen flashing shall be granular surfaced (white).
- B. Allow for expansion of running metal flashing and edge trim, which adjoins roofing. Do not seal or bond membrane or flashing and stripping to metal flanges over 3'-0" in length.

### 3.16 RELATED COMPONENTS-INSTALLATION

- A. Refer to the appropriate specification section for roofing components integrated into the roofing membrane assembly.
- B. Sealant: All modified bitumen cap sheet edges exposed at edge metal, waste stacks, equipment supports, etc. shall be caulked with a smooth continuous bead of specified sealant.
- C. Energy Star Rated Coating: Prepare surface and apply per manufacturer's published instructions.

### 3.17 ROOF DRAIN INSTALLATIONS

- A. Prime lead drain flashing and allow to cure prior to installation.
- B. Adjust and secure new roof drains directly to existing roof decks with appropriate deck clamps.
- C. Install specified insulation at drains to form uniform sumps as indicated.
- D. Extend membranes and lead flashings under the clamping ring.
- E. Secure clamping rings using bolts supplied by drain manufacturer.
- F. Trim edges of membrane at the inside of drains.
- G. Connect roof drains to existing drain lines.

### 3.18 TRAFFIC PAD INSTALLATION

- A. Install traffic pad products in location indicated. Unless otherwise indicated: place continuous around all roof equipment, fans, etc., continuous from point of roof access to roof equipment, fans, etc. Adhere or hot air-weld walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

### 3.19 INSTALLING MODIFIED BITUMEN ROOF MEMBRANE BY HOT MOPPING

- A. Install SBS modified bitumen membrane by hot mopping ONLY when approved in writing by the Board and the A/E.

1. Install roof membrane assembly following the membrane producer's current published instructions, except as more stringently specified herein.
  2. Priming: Coat surfaces that will receive membranes with modified roofing cement or primer.
  3. Asphalt heating: Heat SEBS-modified asphalt to equiviscous temperature (EVT), 125 centipoise for mop-applying and 75 centipoise for mechanical spreader applying,  $\pm 25$  °F measured at point of application. Do not let asphalt temperature go above producer's recommended limits during heating and applying, nor to within 25 °F of flash point. Equip tanks and kettles with accurate, properly working and readable thermometers in plain sight.
  4. Installing plies: Stagger and lap plies as recommended by producer. Set plies in recommended weight of hot bitumen:
    - a. Set plies without tears, fishmouths, air pockets or voids.
    - b. Set plies in 25 lb/sq of SEBS-modified asphalt at a temperature (at point of application) of not less than 425 °F
    - c. Fully adhere all edges and seams and trowel-seal to make watertight.
    - d. Apply roofing granules to exposed bitumen, while it is hot, at seams and edges.
    - e. Run membrane to fit tightly against vertical surfaces and projections.
    - f. Lay each ply in shingle fashion, from low to high points, to shed / drain water.
    - g. Carry roofing plies fully over top surface of steel roof blocking (SRB), up cants, and over the flanges of sheet metal fabrications.
  5. Waterstops:
    - a. Protect roof deck and partially completed roofing from moisture by providing waterstops at end of each day's work or when weather is threatening.
    - b. Upon failure of installer to protect deck, roof insulation, and roofing, remove and replace the damaged materials and materials containing excessive moisture.
    - c. Remove waterstops before continuing work.
  6. Uniform mineral surfacing: Over roofing areas that show bare bitumen, embed mineral granules in roofing cement to match mineral surfaced cap sheets.
  7. Keep roof area clear: Do not store materials or equipment on completed roofing.
- B. Install SBS modified bitumen base flashings by hot mopping ONLY when torching cannot be employed and when approved in writing by the Board's Roofing Dept., and the A/E:
1. Hot mop base flashings following the membrane producer's current published instructions, except as more stringently specified herein.
  2. Priming: Coat surfaces that will receive base flashings with roofing cement or primer.
  3. Asphalt heating: Heat asphalt as for SBS-modified bitumen membrane installation.
  4. Installing plies:
    - a. Stagger and lap plies as recommended by producer.
    - b. Set plies without tears, fishmouths, air pockets or voids.
    - c. Set plies in 25 lb/sq of SEBS-modified asphalt at a temperature (at point of application) of not less than 425 °F
    - d. Fully adhere all edges and seams and trowel-seal to make watertight.
  5. Run base flashing plies so as to fit tightly against vertical surfaces and projections.
  6. Uniform mineral surfacing: Over areas that show bare bitumen, embed mineral granules in roofing cement to match mineral surfaced cap sheets.
- C. ASPHALT:
1. Provide kettle or tanker with clearly visible operating thermometer.
  2. Do not heat asphalt above flash point and EVT recommendations.
  3. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants shall not be permitted.
  4. Application of asphalt: Uniformly apply applications without voids as recommended by roofing manufacturer.

5. Types of Asphalt: Refer to 2.4-Bituminous Materials above.
6. The roofing superintendent shall take temperature readings and maintain a log of asphalt at point of application.
7. Asphalt bitumen Heating: Heat and apply bitumen in accordance with equiviscous temperature range (EVT) as recommended by the NRCA. Do not raise the temperature above the minimum normal fluid-holding temperature necessary to attain EVT (+25 deg. F or 14 deg. C, at point of application) more than one hour prior to time of application. Discard bitumen held at a temperature exceeding finished blowing temperature (FBT) for a period exceeding 3 hours. Determine flash point, finished blowing temperature and EVT for bitumen, either by suitable, and determine maximum fire-safe handling temperature and do not exceed temperature higher than 25 deg. F. (14 deg. C.) below flash point. For aggregate-surfaced pour coats of bitumen, limit application temperature to minimum required for proper embedment of aggregate and maximum, which will permit retention of a coating of weight required (depends on slope of surface). Keep kettle lid closed except when adding bitumen.
8. Bitumen Mopping Weights: For interply mopping and for other moppings except otherwise indicated, apply bitumen at the rate of 25lbs. of asphalt per roof square between piles (+ or - 25 percent on a total job average basis).
9. Substrate Joint Penetrations: Do not allow bitumen to penetrate substrate joints and enter building or damage insulation, vapor barriers (retarders) or other construction.

### 3.20 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

### 3.21 JOB COMPLETION

- A. Inspect completed roofing and correct all defects to meet the specification requirements.
- B. Manufacturer's representative shall inspect the completed roofing system and notify the Architect of any defects in the application.

### 3.22 CLEANING

- A. Remove debris and clean roof deck and site on a daily basis and legally dispose at an approved disposal site.
- B. Clean any drippage or spills of asphalt or primers as work progresses.
  1. Remove drippings from all walls, windows, floors, ladders and finished surfaces.
- C. In areas where finished surfaces are soiled by asphalt or any other sources of soiling caused by work of the section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.
- D. Repair or replace defaced or disfigured finishes caused by the work of the Section.



3.23 PROTECTION

- A. Restrict construction traffic and equipment movement on the completed roofing to only essential personnel. Provide appropriate protection against traffic and construction activities on completed roofs.
- B. Where traffic must continue over finished roof membrane provide additional protective cover over surfaces.

END OF SECTION