

07522 ROOF ASSEMBLY MODIFIED BITUMEN ROOFING

SPECIFIER: All roof-related items above or outside the structural roof deck, including such work as blocking, insulation, membrane, sheet metal, hatches, vents, curbs, supports, edge guards and rainleaders are components of the Roof Assembly.

The entire Roof Assembly carries a special warranty by the roof membrane producer, as specified in the lead Roof Assembly section, 07500, and 07501

Note that no wood blocking is permitted. Use only galvanized steel SRB as specified in 07620.

Modified bitumen roofing and flashings shall be torch applied on new school building construction and wherever feasible in re-roofing. With steel blocking replacing wood, the danger of fire from torching is reduced. With torching, the use of messy asphalt kettles can be eliminated as well as the risk of improper mopping asphalt temperatures at point of application.

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Optional keynotes to Drawings follow each major product title, for A/Es using National CAD Standard.

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. Coordinate RA modified bitumen roofing with work before and after. See especially:
- | | |
|--|-------|
| 1. Framed equipment supports | 05590 |
| 2. RA (Roof Assembly) Lightweight Insulating Concrete (LWIC) | 07503 |
| 3. RA Steel Blocking and Sheet Metal | 07620 |
| 4. RA PVC Rainleaders to Storm Sewer | 07630 |
| 5. RA Supports for Rooftop Equipment | 07721 |
| 6. RA Hatches and Smoke Vents | 07723 |
| 7. RA Edge Guards | 07727 |

- 1.2 DEFINITIONS, REFERENCES, AND OVERALL STANDARDS Follow 07500

1.3 QUALITY ASSURANCE

- A. The cap sheet shall be reflective, rated by the Cool Roof Rating Council (CRRC). The assembly must comply with the requirements of LEED Credit SS 7.2.
- B. Energy Performance: Roofing system that meet the following minimum requirements:
1. Initial Solar Reflectance Index (SRI) not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.
 2. Listed on DOE's ENERGY STAR "Roof Products Qualified Products List" for low-slope products.
 3. Initial Solar Reflectance Index (SRI) not less than 0.70 and Thermal Emittance not less than 0.75 when tested according to Cool Roof Rating Council's CRRC-1.
- C. Early Certifications: In addition to the qualifications noted in these Specifications under "Energy Performance" , the Roof Assembly's SBS roof membrane producer, through the Contractor, shall certify within 28 days after the Contractor's Notice to Proceed with the Work:
1. That the Contractor and the SBS modified bitumen membrane producer who execute the Roof Assembly Producer's Special Warranty agree to jointly issue the Roof Assembly Producer's Special Warranty that is part of this Specifications section.

- D. Qualifications of each Roof Assembly installer. Each installer of each component of the Roof Assembly in sections 07503 through 07723 shall:
 - 1. Have 5 years of successful experience in the installation of that roof component.
 - 2. Be currently listed in the MDCPS Pre-Qualified Roofing Contractor List.
 - 3. Be currently licensed or certified by the producer of that part of the Roof Assembly.
- E. Insurer Certification. Assist Board in preparing roofing acceptance certification as needed for the fire and extended coverage insurance on the Roof Assembly.
- F. Pre-Installation Meeting. At least 6 weeks before installation of Roof Assembly, the Contractor shall conduct a meeting at the worksite with installers of each part of the Roof Assembly, affected installers of other work, A/E, AHJs, and Board representatives.
 - 1. Contractor shall require attendance by each subcontractor performing part of the Roof Assembly work.
 - 2. Contractor shall notify the following Board staff and representatives: Roofing Division Director, Roofing Division technicians and inspector, Building Code Inspectors, Project Manager, MDCPS Testing Lab.
 - 3. A/E shall record discussion, agreements and action items, and shall supply a copy of the meeting minutes to each participant within 1 week after meeting.

1.4 SUBMITTALS

Follow 01330

- 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 spaces for required signatures of corporate officers and RAP's surety.
 - a. Submit also a sample of the Producer's customary roofing warranty 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. Description of each product, including standards met, and the following:
 - 1. Miami-Dade Product Notice of Approval (NOA) number and expiration date.
 - 2. FMA 1-150 Wind Resistance Classification.
 - 3. Fasteners for mechanical attachment of base ply to each substrate, with withdrawal force test figures.
 - 4. List of roofing ply, base flashing, and walkway products for torch installation, and for hot mopped installation if applicable.
 - 5. Producer's installation instructions.

- C. Shop Drawings. Roof plan showing roofing, base flashing, slopes, crickets, penetrations, traffic pads, and details for proper roofing and flashing installation.
 - 1. Show all areas where hot mop application may be needed and for which the A/E and the Board's approval is requested, instead of the preferred application called for in these Specification.
 - 2. Show openings such as drains, hatches, vents, equipment curbs, and edge guards.
 - 3. Show negative pressures on each part of the roof along with modifications to producer's roofing design, such as number and pattern of fasteners, as needed to withstand negative pressures, calculated by a Florida registered professional engineer following TAS 117.
 - 4. Show details of interface between roofing, blocking, base ply flashings, metal flashings, cants, movement joints, drains, penetrations (such as piping, ducts, conduit and wires), hatches, vents, supports, curbs, portals and edge guards.
- D. LEED Submittal: (For LEED Projects only)
 - 1. Product Test Reports for Credit SS 7.2: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirements.
 - 2. Product Data for Credit EQ 4: For adhesives and sealants, including printed statement of VOC content.
- E. Samples. Two cap sheet samples no larger than 8 x 11 in. with granule colors as will be used for roofing and contrasting walkway color.
- F. Closeout Submittals.
 - 1. Report of producer's representative present during installation of Roof Assembly.
 - 2. Signed Special Warranties on producer's letterhead.

1.5 SPECIAL WARRANTIES

Follow 01790, 07500

- 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 producers' customary limited warranty forms.
- B. By each of the other Roof Assembly Component Producers and Installers: 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

Follow 01600

2.1 PROPERTIES OF SBS MODIFIED BITUMEN ROOF MEMBRANE ASSEMBLIES

- A. Description: 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. FMRC roof membrane Combustibility Class A
3. FMRC roof membrane assembly Windstorm Classification 1-150.
4. Miami-Dade BCCO Product Approval of roof membrane assembly for uplift class.

2.2 SBS MODIFIED BITUMEN ROOF MEMBRANE ON LIGHTWEIGHT INSULATING CONCRETE (LWIC)

- A. Description. 3-ply assembly for use over 32 - 40 lb/ft³ lightweight insulating concrete.
1. Base ply: Venting-type, impermeable asphalt coated polyester or polyester-glass sheet, mechanically fastened according to ASTM D4601.
 2. Interply: Smooth, polyester or polyester-glass hybrid reinforced modified bitumen sheet, torched to base ply according to ASTM D6162 or D6164.
 3. Cap ply: A reflective cap sheet, torched to interply, and composed of selected SBS modified bitumen applied onto a polyester reinforcement with a polypropylene film underside and a reflective white top surface. Solar Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Solar Reflectance Index shall be calculated using ASTM 1980. Thermal Emittance shall be measured according to ASTM E 408 or ASTM C 1371.

B. Base Ply:

- | <u>Product</u> | <u>Producer</u> |
|---|-----------------|
| 1. MB Base SA | Firestone. |
| 2. Parabase FG | Siplast. |
| 3. SopraBase TG | Soprema. |
| 4. Equal product in quality and record of performance in MDCPS projects as reviewed and approved by the Board's Roofing Dept., and the A/E. | |

C. Interply:

- | <u>Product</u> | <u>Producer</u> |
|---|-----------------|
| 1. SBS Poly Torch Base | Firestone. |
| 2. Paradiene 20 PR TG | Siplast. |
| 3. Sopralene FLAM 180 | Soprema. |
| 4. Equal product in quality and record of performance in MDCPS projects as reviewed and approved by the Board's Roofing Dept., and the A/E. | |

D. Cap Ply:

- | <u>Product</u> | <u>Producer</u> |
|---|-----------------|
| 1. SBS Premium FR w/ UltraWhite | Firestone. |
| 2. Paradiene 30 CR FR TG | Siplast. |
| 3. Sopralene Flam 180 | Soprema. |
| 4. Equal product in quality and record of performance in MDCPS projects as reviewed and approved by the Board's Roofing Dept., and the A/E. | |

2.3 BASE FLASHINGS

- A. Description: Base flashing, consisting of a base ply and a cap ply of membrane by same producer as SBS modified bitumen roof membrane, for torching base ply directly to concrete, masonry, steel, stucco, and other exterior finishes in the Work, and then torching the cap ply to the base ply.
1. Parapet flashing. Where shown on the Drawings or specified herein, and within the specified limits, also use base flashing to flash the face of a parapet.

2. The top ply of any base flashing, parapet flashing, or cover strip shall always be the cap ply specified herein.

B. Base Ply

- | <u>Product</u> | <u>Producer</u> |
|--|-----------------|
| 1. SBS Poly Torch Base | Firestone. |
| 2. Paradiene 20 PR TG | Siplast. |
| 3. Sopralene FLAM 180 | Soprema. |
| 4. Equal product in quality and record of performance in MDCPS projects as reviewed and approved by the Board's Roofing Dept. and the A/E. | |

C. Cap Ply

- | <u>Product</u> | <u>Producer</u> |
|---|-----------------|
| 1. SBS Premium PR | Firestone. |
| 2. Paradiene 40 FR TG | Siplast. |
| 3. Sopralene FLAM FR GR 250 | Soprema. |
| 4. Equal product in quality and record of performance in MDCPS projects as reviewed and approved by the Board's Roofing Dept., and the A/E. | |

2.4 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.

Specifier: All too often, roof vents admit water. Avoid using them wherever possible. When roofing over steel deck, specify bottom-venting slotted steel roof deck. Over new cast-in-place (CIP) concrete roof decks, make sure that 2 in. of lightweight insulating concrete (LWIC) and a venting roofing base ply are shown to allow water vapor to escape laterally.. With proper design, the following Roof Vent paragraph can be deleted in almost all cases.

- C. Roof Vents: Solar-powered, spun aluminum flanged cylinder, approximately 4 in. diameter, with one-way valve at top, capped by a rain shield that vents vapor arising from LWIC horizontally at least 8 in above the roof membrane surface.
 1. Integral flange of roof vent: 12 to 16 in. diameter, suitable for torching to cap ply of roof membrane beneath and for receiving 2 plies of torched flashing above.
- D. Roofing Granules: Ceramic coated, No.11 screen size, color matching cap sheet.
- E. Walkways and Pads. Using the same cap sheet used for roofing, provide walkways the width of a cap ply roll, but in a color that – to define the walkway and pad limits – is different from the color of the granules in the roofing cap sheet.

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).

3.2 EXAMINATION AND TESTING

- A. Contractor shall examine substrates, areas, and conditions with roofing installer and membrane producer's representative present, for conditions affecting performance of the Roof Assembly, including but not limited to the following:
 - 1. Verify that SRB items, hatches, vents, equipment curbs and portals are securely anchored to roof deck and that SRB blocking matches the thickness of the insulation.
 - 2. Do not use wood nailers or blocking anywhere in the Roof Assembly.
 - 3. Verify that hatches, curbs and penetrations have been placed fully 18 in. away from other vertical surfaces, and that the roof drains are securely clamped in place.
 - 4. Verify that penetrating piping, ducts and conduit are in place, at least 18 in. away from other vertical surfaces or penetrations, and are securely supported.
 - 5. Verify that there are adequate slopes for drainage and that there are no conditions in the deck that may impair adhesion of roofing components to roof substrate.
 - 6. Verify that substrate is visibly dry and free of moisture before start of work.
 - a. Before start of roofing, test for capillary moisture by plastic sheet method, following ASTM D 4263.
 - b. Before start of work each day, pour 1 pint of the specified hot asphalt on concrete and let cool. Do not start work if asphalt foams or can be easily stripped from concrete surface.
 - 7. Verify that substrate is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 in. out-of-plane relative to adjoining deck field.
- B. Roofing installer shall inspect surfaces to be roofed in the presence of Contractor and A/E, and shall accept surfaces and repairs in writing before starting roofing installation.
 - 1. Installer shall not start roofing work until Contractor has caused unsatisfactory conditions to be repaired and each substrate is made smooth, plane, firm, dry, free from dirt and oily or other bond-breaking substances
 - 2. Starting roofing work constitutes acceptance of substrates by the roofing installer and the first step in its ensuring a watertight job and provision of the required Special Warranty.

3.3 OVERALL ROOFING PROCEDURES

- A. Construct the roofing assembly following:
 - 1. FM or FMRC Standard 4470, FMG 1-49, FMG 1-29, Loss Prevention Data Sheets 1-7, 1-28, 1-28R, 1-29, 1-29R and 1-49, to qualify for FM Classification 1a-150.
 - 2. UL Roofing Materials and Systems Annual Directory and Fire Resistance Directory.
 - 3. NRCA and Waterproofing Manual.
- B. Delivery, Storage, Handling, and Worksite Conditions. Move, handle, wrap, segregate, store, and handle products to protect them from temperature, moisture, bacteria, dirt, deformation, impact and other physical damage:
 - 1. Store rolled membranes on end, wrapped, and protect from rain and cold.
 - 2. Install roofing in dry weather over dry substrates. Do not install if wet or stormy weather is anticipated.
- C. Preparation:
 - 1. Properly prepare substrate surfaces and penetrations just before roofing.
 - 2. Recess anchor bolts and nuts and cut off projecting bolt ends flush.

3. Clean exposed metal surfaces of paint, rust, scale, oil, and bond-breaking matter.
4. Remove and discard temporary protection and seals to adjoining work each day.
5. Clean deck surface just before roofing, using brooms, vacuum and compressed air.

D. Procedures for All Roofing Work:

1. Do not break the roofing or flashing work into phases. Install each ply following the preceding ply within 48 hours, if weather is dry.
2. Provide as needed to perform the work in the most efficient manner, with particular attention to maintaining EVT temperatures in any bitumen used as required in roofing producer's instructions.
3. Protect building and adjacent surfaces from damage from bitumen spillage. Repair or replace surfaces so damaged.

3.4 INSTALLING MODIFIED BITUMEN ROOF MEMBRANE AND BASE FLASHINGS

A. Installing SBS Modified Bitumen Roof Membrane:

1. Install roof membrane assembly following the membrane producer's current published instructions, except as more stringently specified herein.
2. Anchor Ply: Mechanically fasten anchor ply to substrate.
3. Installing plies: Stagger and lap plies as recommended by producer:
 - a. Set plies without tears, fishmouths, air pockets or voids.
 - b. Fully adhere all edges and seams and trowel-seal squeeze-out to make watertight.
 - c. Apply roofing granules to exposed bitumen, while it is hot, at seams and edges.
 - d. Run membrane to fit tightly against vertical surfaces and projections.
 - e. Lay each ply in shingle fashion, from low to high points, to shed / drain water.
 - f. Carry roofing plies fully over top surface of steel roof blocking (SRB), up cants, and over the flanges of sheet metal fabrications.
4. Waterstops:
 - a. Protect roof deck and partially completed roofing from moisture by providing waterstops and seals to adjoining work at end of each day's work or when weather is threatening.
 - b. When the day's work stops and partially completed roofing is not ready to resist rain, install a temporary waterproof membrane over it.
 - c. Upon failure of installer to protect deck, roof insulation, and roofing, remove and replace the damaged materials and materials containing excessive moisture.
 - d. Remove waterstops before continuing work.
5. Uniform mineral surfacing: Over roofing and flashing areas that show bare bitumen, embed mineral granules in roofing cement to match mineral surfaced cap sheets.
6. Keep roof area clear: Do not store materials or equipment on completed roofing.

B. Installing SBS Modified Bitumen Base Flashings:

1. Install base flashing assembly by torching where roofing terminates in a vertical or sloped obstacle or metal cap following the membrane producer's current published instructions, except as more stringently specified herein.
2. Unless otherwise shown, install parapet flashings as specified for base flashings. Always terminate the topmost edge of base flashing (and parapet flashing) beneath a sheet metal wall flashing that has a seated bead of sealant at its top edge.
3. Run base flashing at least 6 in. out onto roof membrane, seal and add granules.
4. Priming: Coat surfaces that will receive base flashings with modified roofing cement or primer.

5. Asphalt heating: If hot mopping of some flashings should prove necessary, and if mopping is approved by the Board's Roofing Dept., and the A/E, heat asphalt as specified in these Specifications.
6. Installing plies: Stagger and lap plies as recommended by producer.

3.5 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's Roofing Dept., 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, ± 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.

3.6 VERTICAL RUNS

- A. At Vertical or Sloping Applications of Roofing Membrane and Base Flashings.
 1. Where a roofing membrane or a base flashing carries more than 18 in. above the top surface of the roofing, apply a bar at its termination and flash edge with sheet metal
 2. Where a roofing membrane or a base flashing runs up any steep slope (greater than 2-1/2 in 12) surface, apply horizontal termination bars 24 in. o.c. to keep the membrane from sagging or sliding.
 3. Coordinate all terminations on sloped or vertical surfaces with the installation of stainless steel counterflashings.

3.7 BASE PLY FLASHING AT OTHER LOCATIONS

- A. At Cants, Crickets, Edge Drips, Expansion Joints:
 1. Install 2-ply base flashings following the membrane producer's current published instructions, except as more stringently specified herein.
 2. Carry roofing plies and base flashings fully over top surface of steel roof blocking (SRB), up cants, and over the flanges of sheet metal fabrications.
 3. Run base flashing at least 6 in. out onto roof membrane, seal and add granules.
- B. At Wall Tops and Copings:
 1. Carry 2-ply base (or parapet) flashings fully over top surface of parapets and concrete wall tops.
 2. Where base flashings terminate at a perimeter parapet or at the top of a tilt-up wall panel, carry the flashing over the top of the wall and anchor to the wall or panel with fasteners not less than 12 in. oc held the least distance from the exterior face of the wall or panel that will not spall the wall or panel, then fasten the coping over the flashing and seal both bottom edges.
 3. Where base flashings terminate, without a metal coping, at a perimeter parapet or at the top of a tilt-up wall panel, carry the flashing over the top of the wall and anchor to the wall or panel with fasteners not less than 12 in. oc. Hold fasteners back from the exterior face of the wall or panel the least distance that will not spall the wall or panel. Cover the edge of the base flashings with an additional torched cap ply to cover fasteners and the edge of the 2 plies, without carrying down the visible face of the wall or panel.
 4. Where base flashings meet at top from two sides of a wall, run one side under the other before terminating and fully adhere to make a 4-ply flashing at top surface before attaching sheet metal coping.
- C. At Scuppers and Other Through-wall Penetrating Fabrications:
 1. At through-wall scuppers, apply a 2-ply base flashing picture frame fashion to the entire perimeter – bottom, sides and top – and lap plies at interior corners to ensure full seal. Then install the sheet metal scupper fabrication, fastening at top and sides to avoid puncturing the flashing at bottom.
- D. At Roof and Wall Sheet Metal and Steel Penetrations, including Ducts and Hoods:

1. Coordinate base flashing installation, mopping and sealant work with the installing of sheet metal items following the membrane producer's current published instructions, except as more stringently specified herein.
 2. Apply 2-ply base flashing from 18 in. above roofing surface, down to the base of penetration or the cant, and 6 in. out onto roof. Add 2-ply base flashing cover over portion that runs out over roofing and extend at least 4 in. beyond.
- E. At Hatches, Smoke Vents, Curbs, Portals, Equipment Bases:
1. Coordinate ply installation, mopping and sealant work with the installing of rooftop-mounted units following the membrane producer's current published instructions, except as more stringently specified herein.
 2. Check SRB cants that have been fastened to the sides of each unit after roof insulation is in place and dry, for suitability as substrate for modified bitumen base flashings. Provide base flashings, extended upward to the rim of each unit, terminating under each unit's counterflashing, and fasten all plies securely to the sides of each unit. Run the 2-ply base flashing down to base of hatch, smoke vent, curb, portal or equipment base – or its cants – and 6 in. out onto roof. Add 2 cover plies identical to base flashing over the portion of base flashing that runs out over the roofing and extend the cover plies at least 4 in. beyond the termination of the base flashing.

Specifier: Avoid using roof vents wherever possible, by specifying bottom-venting slotted steel roof deck. Over new CIP concrete roof decks, make sure that 2 in. of LWIC and a venting roofing base sheet are shown to allow water vapor to escape laterally, thus avoiding the use of roof vents.

With proper design of structural deck and LWIC, the following article can be deleted in almost all cases.

3.8 INSTALLING ROOF VENTS

- A. Install 1 vent for each 1000 ft² of LWIC-insulated roof, holding the vents at least 6 ft from low points in the roof.
- B. Remove all plies of the roofing membrane and the LWIC / styrene insulation by neatly coring full depth (to top of structural deck), to form a vapor collection chamber the same diameter as the cylindrical vent, directly beneath the vent.
 1. Remove granules and torch-melt the cap ply directly beneath the vent flange. Embed the flange, centering it precisely over the collection chamber.
 2. Cover the flange by torching in 1 interply 30 in. in diameter (or 30 x 30 in. square) and 1 cap ply 18 in. in diameter (or 18 x 18 in. square).
 3. Apply a heavy bead of sealant where cap ply of the flashing meets the vent cylinder.
 4. Follow MDCPS Roofing Manual Roof Vent Detail 23/RS.

3.9 INSTALLING WALKWAYS AND PADS

- A. Unless more precisely shown on Drawings, lay out walkways to connect roof access points with items of roof-mounted equipment that need service or periodic inspection. Provide walkway access to 3 sides of each item of rooftop-mounted equipment, however do not place on the cricket side of any unit.

- B. Install walkway traffic treads cut from cap ply rolls in lengths not exceeding 16 ft following the membrane producer's current published instructions, except as more stringently specified herein:
 - 1. Leave 2 in. ± 1/2 in. between tread units to aid full roof drainage and reduce ponding.
 - 2. Torch treads to roofing cap sheet. Alternatively, but only if approved by the Board's Roofing Dept., and the A/E, hot mop walkway treads in 25 lb/sq of SEBS-modified asphalt at a temperature (at point of application) of not less than 425 °F
 - 3. Fully seal all edges of each walkway traffic tread, forming a watertight bevel to minimize damage from rolling equipment traffic.
- C. Install walkway pads or treads at ladder landings, all sides of rooftop equipment, and three sides of roof hatches and smoke vents. Install walkway pads wherever tools must be laid down to work on equipment or to climb over walls.

3.10 FIELD QUALITY CONTROL AND CORRECTION

- A. The roofing membrane producer's technical representative (PTR) shall make a final inspection of the roofing system at end of Roof Assembly installation but before date of Substantial Completion. PTR shall issue a written report listing punch list items that are to be corrected by the roofing installer. Submit copies to Contractor, A/E and Board. PTR shall monitor corrective work on all items and issue a report of satisfactory completion.
- B. Correct deficiencies in or remove roofing system components that do not follow Construction Documents and producer's instructions. Repair or reinstall roofing work at time of Substantial Completion to a condition free of damage and deterioration, obedient to Special Warranty obligations.

3.11 PROTECTION AND CLEANING

- A. Protect roofing system and surrounding areas from traffic, wear and damage during entire construction period.
- B. If any objects must be wheeled or dragged across roof, provide a 5/8 in. plywood traffic deck, set atop soft material such as 1/2 in. recover board
- C. Do not let dirt or debris accumulate on roof. Clean adjacent surfaces using agents and procedures acceptable to Contractor and to installers of affected adjacent construction. ///