

SECTION 07550  
MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cold Applied 2-Ply Solvent Free Asphalt Roofing (StressPly). (2.5)(3.4)
- B. Accessories. (2.19)
- C. Edge Treatment and Roof Penetration Flashings. (2.20)(3.9)

1.2 RELATED SECTIONS

- A. Section \_\_\_\_\_ - Roof Deck Substrate Preparation.
- B. Section 05300 - Metal Roof Deck.
- C. Section 06100 - Rough Carpentry.
- D. Section 06114 - Wood Blocking and Curbing: Wood nailers and cant strips.
- E. Section 07220 - Insulation Board: Insulation and fastening.
- F. Section 07620 - Sheet Metal Flashing and Trim: Weather protection for base flashings.
- G. Section 07710 - Manufactured Roof Specialties: Counter flashing gravel stops, and fascia.
- H. Section 07724 - Roof Hatches: Frame and integral curb; Counter flashing.
- I. Section 08620 - Unit Skylights: Skylight frame and integral curb and counter flashing.
- J. Section 08630 - Metal-Framed Skylights: Skylight frame and integral curb and counter flashing.
- K. Section 08950 - Translucent Wall and Roof Assemblies: Counter flashing
- L. Section 08960 - Sloped Glazing Assemblies: Counter flashing.
- M. Section 15120 - Piping Specialties: Roof Drains, Sumps.

1.3 REFERENCES

- A. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- B. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- C. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- D. ASTM D 1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
- E. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.

- F. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- G. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
- H. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
- I. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- J. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- K. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- L. Factory Mutual Research (FM): Roof Assembly Classifications.
- M. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- N. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- O. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- P. Warnock Hersey (WH): Fire Hazard Classifications.
- Q. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- R. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- S. UL - Fire Resistance Directory.
- T. FM Approvals - Roof Coverings and/or RoofNav assembly database.
- U. FBC - Florida Building Code.
- V. Miami-Dade Building Code Compliance - N.O.A. (Notice of Acceptance).

#### 1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
  - 1. Factory Mutual Class A Rating.
  - 2. Underwriters Laboratory Class A Rating.
  - 3. Warnock Hersey Class A Rating.
- C. Design Requirements:
  - 1. Uniform Wind Uplift Load Capacity
    - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
      - 1) Design Code: ASCE 7, Method 2 for Components and Cladding.
      - 2) Importance Category:
        - a) I.

- b) II.
    - c) III.
    - d) IV
  - 3) Importance Factor of:
    - a) 0.77
    - b) 1.0
    - c) 1.15
    - d) 2.0
  - 4) Wind Speed: \_\_\_ mph
  - 5) Ultimate Pullout Value: \_\_\_ pounds per each of the fastener
  - 6) Exposure Category:
    - a) B.
    - b) C.
    - c) D.
  - 7) Design Roof Height: \_\_\_ feet.
  - 8) Minimum Building Width: \_\_\_ feet.
  - 9) Roof Pitch: \_\_\_ :12.
  - 10) Roof Area Design Uplift Pressure:
    - a) Zone 1 - Field of roof \_\_\_ psf
    - b) Zone 2 - Eaves, ridges, hips and rakes \_\_\_ psf
    - c) Zone 3 - Corners \_\_\_ psf
- 2. Snow Load: \_\_\_ psf.
- 3. Live Load: 20 psf, or not to exceed original building design.
- 4. Dead Load:
  - a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.
- D. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.
- E. LEED: Roof system shall meet the reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- F. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.
- G. Roof system shall have been tested in compliance with the following codes and test requirements:
  - 1. Florida FBC (For use outside Miami-Dade and Broward Counties):
    - a. Membrane Systems FL\_\_\_\_\_
    - b. Roofing Underlayments FL\_\_\_\_\_
    - c. Roofing Cements and Coatings FL\_\_\_\_\_
  - 2. Miami-Dade County:
    - a. Self-Adhered Membrane Systems Over:
      - 1) Concrete Decks N.O.A.
      - 2) Lightweight Concrete Decks N.O.A.
      - 3) Recover Decks N.O.A.
      - 4) Steel Decks N.O.A.
      - 5) Wood Decks N.O.A.
    - b. Torch and Mop Membrane Systems Over
      - 1) Concrete Decks N.O.A.
      - 2) Lightweight Concrete Decks N.O.A.
      - 3) Recover Decks N.O.A.
      - 4) Steel Decks N.O.A.
      - 5) Wood Decks N.O.A.

- c. Roofing Underlayments
  - 1) Garland Underlayments N.O.A.
- d. Roofing Cements and Coatings
  - 1) Garland Coatings and Mastics N.O.A.
- 3. Cool Roof Rating Council:
  - a. CRRC Directory CRRC \_\_\_\_\_
- 4. International Code Council Evaluation Service (ICC-ES):
  - a. Membrane Systems
    - 1) ESR-\_\_\_\_\_
  - b. Roofing Underlayments
    - 1) Garland Underlayments ESR-\_\_\_\_\_
    - 2) Surfacing UDL ESR-\_\_\_\_\_
- 5. Texas Department of Insurance:
  - a. Product Evaluation RC-\_\_\_\_
- 6. Underwriters Laboratories:
  - a. Certification TGFU.R\_\_\_\_\_
- 7. Warnock Hersey
  - a. ITS Directory of Listed Products
- 8. FM Approvals:
  - a. RoofNav Website

#### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.
- G. Field Quality Control: Employee holding a full time position with the manufacturer of the restoration product must be present to inspected the project 3 of 5 working days.
  - 1. Photos of inspection and testing shall be submitted to the owner each week documenting the progress completed the prior week and the surety that the product has been properly installed.

#### 1.6 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.

- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
  - 1. Record minutes of the conference and provide copies to all parties present.
  - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
  - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

#### 1.8 COORDINATION

- A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

#### 1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### 1.10 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed Edge-To-Edge NDL System Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installer, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition including Garland Metal Components.
  - 1. Warranty Period:
    - a. 30 years from date of acceptance.
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
  - 1. Warranty Period:

- a. 5 years from date of acceptance.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 850-274-9054. Fax: 216-641-0633. Web Site: [www.garlandco.com](http://www.garlandco.com).
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- C. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
  - 1. Bidder will not be allowed to change materials after the bid opening date.
  - 2. If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
  - 3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
    - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
    - b. Will provide the same guarantee for substitution as for the product and method specified.
    - c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
    - d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
    - e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
    - f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
  - 4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
  - 5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

### 2.2 COLD APPLIED 2-PLY SOLVENT FREE ASPHALT ROOFING - STRESSPLY, OPTIMAX, OR VERSIPLY

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
  - 1. StressBase 80:
- B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with interplay adhesive.
  - 1. StressPly Plus FR Mineral:
- C. Interply Adhesive: (Layer 1 and 2)
  - 1. Green-Lock Plus Membrane Adhesive:
- D. Flashing Base Ply: One ply bonded to the prepared substrate with Interply Adhesive: except torch sheet.
  - 1. StressBase 80:

- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive: except torch sheet.
  - 1. StressPly Plus FR Mineral:
- F. Flashing Ply Adhesive:
  - 1. Green-Lock Plus Flashing Adhesive:

### 2.3 ACCESSORIES:

- A. Roof Insulation: In accordance with Section 07220.
- B. Roof Insulation: Provide G-P Gypsum DenDeck Prime, G-P Gypsum DenDeck DuraGuard, USG Securrock for proper adhesion of the self-adhered base sheet in accordance with Section 07220.
- C. Urethane Sealant Hybrid - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
  - 1. Tensile Strength, ASTM D 412: 250 psi
  - 2. Elongation, ASTM D 412: 450%
  - 3. Hardness, Shore A ASTM C 920: 35
  - 4. Adhesion-in-Peel, ASTM C 92: 30 pli
- D. Non-Shrink Grout GarRock: All weather fast setting chemical action concrete material to fill pitch pans.
  - 1. Flexural Strength, ASTM C 78: (modified) 7 days 1100psi
  - 2. High Strength, ASTM C 109: (modified) 24 days 8400lbs (3810kg)
- E. Pitch Pocket Sealer - Seal-Tite: Two part, 100% solids, self-leveling, polyurethane sealant for filling pitch pans as recommended and furnished by the membrane manufacturer.
  - 1. Durometer, ASTM D 2240: 40-50 Shore
  - 2. Elongation, ASTM D 412: 250%
  - 3. Tensile Strength, ASTM D 412: 200 @ 100 mil
- F. Glass Fiber Cant - Glass Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended and furnished by the membrane manufacturer.

### 2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Edge Metal Finishes:
  - 1. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, as shipped from the mill
  - 2. Exposed surfaces for coated panels:
    - a. Steel Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA). Provided with the following properties.
      - 1) Pencil Hardness: ASTM D3363, HB-H / NCCA II-2.
      - 2) Bend: ASTM D-4145, O-T / NCCA II-19
      - 3) Cross-Hatch Adhesion: ASTM D3359, no loss of adhesion
      - 4) Gloss (60 deg. angle): ASTM D523, 25+/-5%
      - 5) Reverse Bend: ASTM D2794, no cracking or loss of adhesion
      - 6) Nominal Thickness: ASTM D1005
        - a) Primer: 0.2 mils
        - b) Topcoat, 0.7 mils min
        - c) Clear Coat (optional, only used with 22 ga. steel) 0.3 mils
      - 7) Color: Provide as specified. (Subject to minimum quantities)

- B. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.
- C. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.
- D. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- E. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled.
- F. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- G. Liquid Flashing - Tuff-Flash: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
  - 1. Tensile Strength, ASTM D 412: 400 psi
  - 2. Elongation, ASTM D 412: 300%
  - 3. Density @77 deg. F 8.5 lb/gal typical
- H. Fabricated Flashings: Fabricated flashings and trim are specified in Section 07620.
  - 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- I. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
  - 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
  - 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
  - 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
  - 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.



4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
  5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
  6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
  7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.
- B. Poured reinforced concrete
1. Shall be smooth, dry, clean and free of ice/frost, projections and depressions. Concrete shall be fully cured and the surface shall be broom cleaned and free of release/curing agents prior to commencement of work.
  2. Prepared concrete surfaces for roofing or insulation by priming with asphalt/concrete primer conforming to ASTM D 41. Apply at a rate of approx. 1 gallon/100 sq. ft. (.4 L/m<sup>2</sup>). All primed areas shall be fully dried before proceeding with the application of the roof system. Hold back bitumen at the joints approximately 4 inches (102 mm) to prevent bitumen drippage.

### 3.3 INSTALLATION - GENERAL

- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
  2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water
- D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

### 3.4 INSTALLATION COLD APPLIED ROOF SYSTEM

- A. Base Ply: Cut base ply sheets into 18 foot lengths and allow plies to relax before installing. Install base sheet in Interply Adhesive: applied at the rate required by the manufacturer. Shingle base sheets uniformly to achieve one ply throughout over the prepared substrate. Shingle in proper direction to shed water on each large area of roofing.

1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
  2. Solidly bond to the substrate and adjacent ply with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
  3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Use care to eliminate air entrapment under the membrane.
  4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
  5. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
  6. Install base flashing ply to all perimeter and projection details.
  7. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.
- B. Modified Cap Ply(s): Cut cap ply sheets into 18 foot lengths and allow plies to relax before installing. Install in interplay adhesive applied at the rate required by the manufacturer. Shingle sheets uniformly over the prepared substrate to achieve the number of plies specified. Shingle in proper direction to shed water on each large area of roofing.
1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
  2. Solidly bond to the base layers with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
  3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.
  4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
  5. Allow cold adhesive to set for 5 to 10 minutes before installing the top layer of modified membrane.
  6. Extend membrane 2 inches beyond top edge of all cants in full moppings of the cold adhesive as shown on the Drawings.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06114.
1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
  2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
  3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
  4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if

required.

- G. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
  2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
  3. Adhere to the underlying base ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
  4. Solidly adhere the entire flashing ply to the substrate. Secure the tops of all flashings that are not run up and over curb through termination bar fastened at 6 inches (152 mm) O.C. and sealed at top.
  5. Seal all vertical laps of flashing ply with a three-course application of trowel-grade mastic and fiberglass mesh.
  6. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
  7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
  8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- H. Flashing Cap Ply:
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
  2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
  3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
  4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
  5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
  6. All stripping shall be installed prior to flashing cap sheet installation.
  7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
  8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- I. Roof Walkways: Provide walkways in areas indicated on the Drawings.

### 3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Coping Cap:
1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
  2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
  3. Attach tapered board to top of wall.

4. Install base flashing ply covering entire wall and wrapped over top of wall and down face with 6 inches (152 mm) on to field of roof and set in cold asphalt. Nail membrane at 8 inches (203 mm) o.c.
  5. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams and allow to cure and aluminize.
  6. Install continuous cleat and fasten at 6 inches (152 mm) o.c. to outside wall.
  7. Install new metal coping cap hooked to continuous cleat.
  8. Fasten inside cap 24 inches (609 mm) o.c. with approved fasteners and neoprene washers through slotted holes, which allow for expansion and contraction.
- B. Curb Detail/Air Handling Station:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
  2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
  3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
  4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
  5. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
  6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- C. Skylight:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
  2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
  3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
  4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of wood nailer and apply a three-course application of mastic and mesh. Allow to cure and aluminize.
  5. Install pre-manufactured lens and fasten flashing sides at 8 inches (203 mm) o.c. with fasteners and neoprene washers.
- D. Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
  2. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
  3. Run roof system plies over drain. Cut out plies inside drain bowl.
  4. Set lead/copper flashing (30 inch square minimum) in 1/4 inch bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
  5. Install base flashing ply (40 inch square minimum) in bitumen.
  6. Install modified membrane (48 inch square minimum) in bitumen.
  7. Install clamping ring and assure that all plies are under the clamping ring.
  8. Remove drain plug and install strainer.
- E. Pitch Pocket Umbrella:
1. Run all plies up to the penetration.
  2. Place the pitch pocket over the penetration and prime all flanges.
  3. Strip in flange of pitch pocket with one ply of base flashing ply. Extend 6 inches (152 mm) onto field of roof.
  4. Install second layer of modified membrane extending 9 inches (228 mm) onto field of the roof.

5. Fill pitch pocket half full with non-shrink grout. Let this cure and top off with pourable sealant.
6. Caulk joint between roof system and pitch pocket with roof cement.
7. Place a watershedding type bonnet over the top of the pitch pocket and clamp the top with a drawband collar. Caulk the upper edge of the band with an elastomeric sealant.

### 3.6 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

### 3.7 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

### 3.8 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at start-up and at intervals of 3 days of 5 working days. Provide a final inspection upon completion of the Work.
  1. Warranty shall be issued upon manufacturer's acceptance of the installation.
  2. Field observations shall be performed by a Sales Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
  3. Provide observation reports from the Sales Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
  4. Provide a final report from the Sales Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

### 3.9 SCHEDULES

- A. Base (Ply) Sheet:
  1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
    - a. Tensile Strength, ASTM D 5147
      - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
      - 2) 50mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
    - b. Tear Strength, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
      - 2) 50mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
    - c. Elongation at Maximum Tensile, ASTM D 5147

- 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
  - 2) 50mm/min @ -17.78 +/- 2 deg. C MD 4 % XD 4 %
  - d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)
- B. Modified Cap (Ply) Sheet:
1. StressPly Plus FR Mineral: 155 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane reinforced with a fiberglass and polyester composite scrim. ASTM D 6162, Type III Grade G
    - a. Tensile Strength, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
      - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 54.25 kN/m XD 54.25 kN/m
    - b. Tear Strength, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
      - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 2224 N XD 2224 N
    - c. Elongation at Maximum Tensile, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
      - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 8% XD 8%
    - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)
- C. Interply Adhesive:
1. Green-Lock Plus Membrane Adhesive: Cold applied solvent free membrane adhesive: zero V.O.C. compliant performance requirements:
    - a. Non-Volatile Content ASTM D 4586 100%
    - b. Density ASTM D 1475 12.3 lbs./gal. (1.47 g/cm<sup>3</sup>)
    - c. Viscosity Brookfield Spindle T-E at 5 rpm 124,000 cPs.
    - d. Flash Point ASTM D 93 400 deg. F min. (232 deg. C)
    - e. Slope: up to 3:12
- D. Flashing Base Ply:
1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
    - a. Tensile Strength, ASTM D 5147
      - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
      - 2) 50 mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
    - b. Tear Strength, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
      - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
    - c. Elongation at Maximum Tensile, ASTM D 5147
      - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
      - 2) 50 mm/min. @ -17.78 +/- 2 deg. C MD 4 % XD 4 %
    - d. Low Temperature Flexibility, ASTM D 5147
      - 1) Passes -40 deg. F (-40 deg. C)
- E. Flashing Ply Adhesive:
1. Green-Lock Plus Flashing Adhesive: Cold applied solvent free flashing adhesive: zero V.O.C.
    - a. Non-Volatile Content ASTM D 4586 100%
    - b. Density ASTM D 1475 11.8 lbs./gal. (1.17 g/cm<sup>3</sup>)
    - c. Viscosity Brookfield 400,000 cPs.
    - d. Flash Point ASTM D 93 400 deg. F min. (232 deg. C)
- F. Surfacing:
1. Flashing Cap (Ply) Sheet:
    - a. StressPly Plus FR Mineral: 155 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane reinforced with a fiberglass and polyester composite scrim. ASTM D 6162, Type III Grade G

- 1) Tensile Strength, ASTM D 5147
  - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
  - b) 50 mm/min. @ 23 +/- 2 deg. C MD 54.25 kN/m XD 54.25 kN/m
- 2) Tear Strength, ASTM D 5147
  - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
  - b) 50 mm/min. @ 23 +/- 2 deg. C MD 2224 N XD 2224 N
- 3) Elongation at Maximum Tensile, ASTM D 5147
  - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
  - b) 50 mm/min. @ 23 +/- 2 deg. C MD 8% XD 8%
- 4) Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)

END OF SECTION